Attachment 4
ATSDR ToxFaqs (on CD)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,1,2,2-TETRACHLOROETHANE

CAS # 79-34-5

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2006

This fact sheet answers the most frequently asked health questions (FAQs) about 1,1,2,2-tetrachloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: 1,1,2,2-Tetrachloroethane is a manufactured chemical that is no longer used much in the United States. Breathing high levels in a closed room can cause fatigue, vomiting, dizziness, and possibly unconsciousness. Breathing, drinking, or touching large amounts of 1,1,2,2-tetrachloroethane for a long period of time can cause liver damage, stomachaches, or dizziness. 1,1,2,2-Tetrachloroethane has been found in at least 329 of the 1,678 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is 1,1,2,2-tetrachloroethane?

1,1,2,2-Tetrachloroethane is a manufactured, colorless, dense liquid that does not burn easily. It is volatile and has a sweet odor.

In the past, it was used in large amounts to produce other chemicals, as an industrial solvent to clean and degrease metals, and as an ingredient in paints and pesticides. Commercial production of 1,1,2,2-tetrachloroethane for these uses has stopped in the United States. It presently is used only as a chemical intermediate in the production of other chemicals.

What happens to 1,1,2,2-tetrachloroethane when it enters the environment?

❏ Most 1,1,2,2-tetrachloroethane released to the environment eventually moves to the air or ground water.
❏ It does not attach to soil particles when released to land.
❏ When released to surface water, much of it will evaporate to the air while the rest may break down in the water.
❏ Breakdown of the chemical in the environment is slow; it takes about 1 year for half of the chemical to disappear from groundwater and 2 months in air.
❏ 1,1,2,2-Tetrachloroethane does not build up significantly in the bodies of fish or other organisms.

How might I be exposed to 1,1,2,2-tetrachloroethane?

❏ The general public is not expected to be exposed to significant amounts of 1,1,2,2-tetrachloroethane.
❏ 1,1,2,2-Tetrachloroethane is not commonly found in drinking water, soil, or food.
❏ Higher concentrations have been found occasionally in private well water that may have been used for drinking.
❏ You may be exposed to 1,1,2,2-tetrachloroethane if you live near a hazardous waste site that contains it or near an industrial building where the chemical is used.
❏ Since production of the chemical has stopped, most workers would not be exposed to it.
❏ If spills or accidents occur at work, exposure will likely be by breathing in vapors or through skin contact.

How can 1,1,2,2-tetrachloroethane affect my health?

1,1,2,2-Tetrachloroethane is not life-threatening unless you intentionally or accidentally drink more than a few spoonfuls at one time or spill a large amount so that you breathe it and get it on your skin. Breathing high levels in a closed room can cause fatigue, vomiting, dizziness, and possibly unconsciousness. However, most people recover from these effects once they are in fresh air. Breathing, drinking, or touching large amounts of 1,1,2,2-tetrachloroethane for a long period of time can cause liver damage, stomachaches, or dizziness.

The health effects of long-term (365 days or longer) exposure to low levels of 1,1,2,2-tetrachloroethane are not known. It is also not known whether 1,1,2,2-tetrachloroethane will cause reproductive effects in people.

How likely is 1,1,2,2-tetrachloroethane to cause cancer?

It is not known whether 1,1,2,2-tetrachloroethane causes cancer in humans. In a long-term study, 1,1,2,2-tetrachloroethane caused an increase in liver tumors in mice, but not in rats.

The International Agency for Research on Cancer (IARC) has determined that 1,1,2,2-tetrachloroethane cannot be classified as to its ability to cause cancer in humans, while the EPA has determined that it is a possible human carcinogen.

How can 1,1,2,2-tetrachloroethane affect children?

Exposure of children to large amounts of 1,1,2,2-tetrachloroethane will probably cause the same effects observed in adults (i.e., fatigue, vomiting, dizziness, liver damage, stomachache). It is not known whether children are more or less susceptible to the effects of 1,1,2,2-tetrachloroethane than adults.

No information is available regarding the detection of 1,1,2,2-tetrachloroethane in breast milk or in the fetuses of exposed women. However, based on similarities to other chlorinated chemicals, it is expected that 1,1,2,2-tetrachloroethane can cross the placenta from an exposed woman and reach the fetus.

A very small number of studies in animals do not suggest that 1,1,2,2-tetrachloroethane is a developmental toxin.

How can families reduce the risks of exposure to 1,1,2,2-tetrachloroethane?

❏ Exposure to high amounts of 1,1,2,2-tetrachloroethane is unlikely because the chemical is no longer used in household products.
❏ If you have old household products (i.e., cleaners, degreasers, and paints) at home that contain 1,1,2,2-tetrachloroethane, make sure they are stored out of the reach of children.

Is there a medical test to determine whether I've been exposed to 1,1,2,2-tetrachloroethane?

There are no medical tests to determine whether you have been exposed to 1,1,2,2-tetrachloroethane. Urine and blood tests are available, but are common to several other types of chemicals and would not specifically indicate exposure to 1,1,2,2-tetrachloroethane. The symptoms of 1,1,2,2-tetrachloroethane poisoning, such as stomachaches, fatigue, and dizziness, as well as the liver effects are common to many conditions and not useful to determine exposure to this chemical.

Has the federal government made recommendations to protect human health?

The EPA has decided that not more than 0.17 micrograms of 1,1,2,2-tetrachloroethane per liter of water (0.16 parts per billion [ppb] or about 1 drop in an above-ground pool) should be in lakes and streams, although no national drinking water standards have been set. EPA recommends that children do not drink water with more than 0.04 milligrams per liter (mg/L) of 1,1,2,2-tetrachloroethane for a period exceeding 10 days. EPA also requires that spills of 100 pounds or more of 1,1,2,2-tetrachloroethane to the environment be reported to the Agency.

The Occupational Safety and Health Administration (OSHA) has set a limit of 5 parts per million (ppm) in air to protect workers during an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends a limit of 1 ppm for 1,1,2,2-tetrachloroethane in workroom air over an 8- to 10-hour workday.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for 1,1,2,2-Tetrachloroethane (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,1-DICHLOROETHANE

CAS # 75-34-3

Agency for Toxic Substances and Disease Registry ToxFAQs July 1999

This fact sheet answers the most frequently asked health questions (FAQs) about 1,1-dichloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: 1,1-Dichloroethane is used to make other chemicals and to dissolve and remove grease. Breathing very high levels can affect your heart and animal studies have seen kidney disease from long-term exposure to high levels in air. 1,1-Dichloroethane has been found in at least 248 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is 1,1-dichloroethane?

(Pronounced 1,1-dī′ klôr′ ō ĕth′ ān′)

1,1-Dichloroethane is a colorless, oily liquid with a sweet odor. It evaporates easily at room temperature and burns easily. It does not occur naturally in the environment.

In the past, 1,1-dichloroethane was used as a surgical anesthetic, but it is no longer used this way. Today it is used primarily to make other chemicals, to dissolve substances such as paint, varnish, and finish removers, and to remove grease.

What happens to 1,1-dichloroethane when it enters the environment?

- 1,1-Dichloroethane is released from industrial processes primarily to the air.
- 1,1-Dichloroethane evaporates from water rapidly into the air.
- It can also be found in the air as a breakdown product of another chemical, 1,1,1-trichloroethane.
- 1,1-Dichloroethane does not dissolve easily in water.
- Small amounts of 1,1-dichloroethane released to soil can evaporate into the air or move into groundwater.
- It is not known how long it stays in soil.
- 1,1-Dichloroethane is not expected to build up in the body tissues of animals.

How might I be exposed to 1,1-dichloroethane?

- Breathing air containing it from industrial releases or hazardous waste sites.
- Drinking contaminated tap water.
- Touching soil containing it.
- Touching contaminated materials in the workplace.

How can 1,1-dichloroethane affect my health?

Very limited information is available on the effects of 1,1-dichloroethane on people's health. The chemical was discontinued as a surgical anesthetic when effects on the heart, such as irregular heart beats, were reported.

Studies in animals have shown that 1,1-dichloroethane can cause kidney disease after long-term exposure to high levels in air. Delayed growth was seen in the offspring of animals who breathed high concentrations of the chemical during pregnancy.

How likely is 1,1-dichloroethane to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified 1,1-dichloroethane for carcinogenicity.

1,1-Dichloroethane caused cancer in one study in which rats and mice were fed large doses of the chemical for their lifetimes.

Is there a medical test to show whether I've been exposed to 1,1-dichloroethane?

Tests are available that measure 1,1-dichloroethane in urine, blood, breath, and body tissues. These tests aren't available at most doctors' offices, but can be done at a special laboratory that has special equipment.

The tests must be done soon after exposure occurs, because most of the 1,1-dichloroethane that is taken into the body leaves within 2 days. In addition, these tests cannot tell you when you were exposed, or whether health effects will occur.

Has the federal government made recommendations to protect human health?

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of 1,1-dichloroethane be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 400 milligrams of 1,1-dichloroethane per cubic meter of air (400 mg/m^3) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend the same exposure limit in air.

NIOSH currently recommends that a level of 12,150 mg/m^3 be considered immediately dangerous to life and health. This is the exposure level of 1,1-dichloroethane that is likely to cause permanent health problems or death.

The federal recommendations have been uipdated as of July 1999.

Glossary

Anesthetic: A substance used to cause numbness.

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry. 1990. Toxicological profile for 1,1-dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

(Link to Public Health Statement)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,1-DICHLOROETHENE

CAS # 75-35-4

Agency for Toxic Substances and Disease Registry ToxFAQs September 1995

This fact sheet answers the most frequently asked health questions (FAQs) about 1,1-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to 1,1-dichloroethene occurs mainly in the workplace. Breathing high levels of 1,1-dichloroethene can affect the liver, kidney, and central nervous system. This chemical has been found in at least 515 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is 1,1-dichloroethene?

(Pronounced 1,1-dīˈklôrˈō ĕthˈēn)

1,1-Dichloroethene is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. It is also called vinylidene chloride.

1,1-Dichloroethene is used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications.

What happens to 1,1-dichloroethene when it enters the environment?

- 1,1-Dichloroethene enters the environment from industries that make or use it.
- 1,1-Dichloroethene evaporates very quickly from water and soil to the air.
- In the air, it takes about 4 days for it to break down.
- 1,1-Dichloroethene breaks down very slowly in water.
- It does not accumulate very much in fish or birds.
- In soil, 1,1-dichloroethene is slowly transformed to other less harmful chemicals.

How might I be exposed to 1,1-dichloroethene?

- Workers may be exposed in industries that make or use 1,1-dichloroethene (these industries are mainly in Texas and Louisiana).
- Food that is wrapped in plastic wrap may contain very low levels of 1,1-dichloroethene. The government controls these levels to prevent harm to your health.
- A small percentage (3%) of the drinking water supplies may contain very low levels of 1,1-dichloroethene.
- Air near factories that make or use 1,1-dichloroethene and air near hazardous waste sites may contain low levels of it.

How can 1,1-dichloroethene affect my health?

The main effect from breathing high levels of 1,1-dichloroethene is on the central nervous system. Some people lost their breath and fainted after breathing high levels of the chemical.

Breathing lower levels of 1,1-dichloroethene in air for a long time may damage your nervous system, liver, and lungs. Workers exposed to 1,1-dichloroethene have reported a loss in liver function, but other chemicals were present.

Animals that breathed high levels of 1,1-dichloroethene had damaged livers, kidneys, and lungs. The offspring of some of the animals had a higher number of birth defects. We do not know if birth defects occur when people are exposed to 1,1-dichloroethene.

Animals that ingested high levels of 1,1-dichloroethene had damaged livers, kidneys, and lungs. There were no birth defects in animals that ingested the chemical.

Spilling 1,1-dichloroethene on your skin or in your eyes can cause irritation.

How likely is 1,1-dichloroethene to cause cancer?

The Environmental Protection Agency (EPA) has determined that 1,1-dichloroethene is a possible human carcinogen.

Studies on workers who breathed 1,1-dichloroethene have not shown an increase in cancer. These studies, however, are not conclusive because of the small numbers of workers and the short time studied.

Animal studies have shown mixed results. Several studies reported an increase in tumors in rats and mice, and other studies reported no such effects.

Is there a medical test to show whether I've been exposed to 1,1-dichloroethene?

Tests are available to measure levels of 1,1-dichloroethene in breath, urine, and body tissues. These tests are not usually available in your doctor's office. However, a sample taken in your doctor's office can be sent to a special laboratory if necessary.

Because 1,1-dichloroethene leaves the body fairly quickly, these methods are useful only for finding exposures that have occurred within the last few days. These tests can't tell you if adverse health effects will occur from exposure to 1,1-dichloroethene.

Has the federal government made recommendations to protect human health?

The EPA has set a limit in drinking water of 0.007 parts of 1,1-dichloroethene per million parts of drinking water (0.007 ppm). EPA requires that discharges or spills into the environment of 5,000 pounds or more of 1,1-dichloroethene be reported.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 1 ppm of 1,1-dichloroethene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) currently recommends that workers breathe as little 1,1-dichloroethene as possible.

Glossary

Carcinogen: A substance that can cause cancer.
CAS: Chemical Abstracts Service.
Ingesting: Taking food or drink into your body.
ppm: Parts per million.
Tumor: An abnormal mass of tissue.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for 1,1-dichloroethene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,2-DIBROMO-3-CHLOROPROPANE
CAS # 96-12-8

Agency for Toxic Substances and Disease Registry ToxFAQs September 1995

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dibromo-3-chloropropane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to 1,2-dibromo-3-chloropropane occurs mainly from drinking water or eating food that contains the chemical. At high levels, this chemical may cause damage to the male reproductive system. This chemical has been found in at least 10 of 1,314 National Priorities List sites identified by the Environmental Protection Agency.

What is 1,2-dibromo-3-chloropropane?

(Pronounced 1,2-dīˈbrōˈmō-3-klôr ō prōˈpānˈ)

1,2-Dibromo-3-chloropropane is a manufactured chemical and is not found naturally in the environment. It is a colorless liquid with a sharp smell. It can be tasted in water at very low concentrations.

Some industries use it to make another chemical that is used to make materials that resist burning.

Large amounts of 1,2-dibromo-3-chloropropane were used in the past on certain farms to kill pests that harmed crops. Farmers in all states other than Hawaii stopped using this chemical in 1979. Hawaii stopped using it in 1985.

We do not know exactly how much of it is currently made or used by industry, but it is probably a small amount.

What happens to 1,2-dibromo-3-chloropropane when it enters the environment?

- Most of it that enters surface water evaporates into the air within several days or a week.
- It takes several months for it to break down in air.
- It doesn't stick to soil at the bottom of rivers, lakes, or ponds.
- In soil, some evaporates into the air, while small amounts may stay in the soil for several years.

How might I be exposed to 1,2-dibromo-3-chloropropane?

- Drinking water or eating food that contains the chemical.
- Breathing air or touching soil at or near agricultural areas where 1,2-dibromo-3-chloropropane was used in the past.
- Breathing air at hazardous waste sites where improper disposal methods were used.
- Working in an industry that uses 1,2-dibromo-3-chloropropane.

How can 1,2-dibromo-3-chloropropane affect my health?

The main effect from breathing high levels of 1,2-dibromo-3-chloropropane is damage to the male's ability to reproduce.

Studies on workers have shown that men may produce fewer sperm, produce sperm that results in more girl than boy babies, and eventually become unable to father children. It can also cause headaches, nausea, lightheadedness, and weakness in workers.

Animals breathing high levels of the chemical were not

able to reproduce and had damaged stomachs, livers, kidneys, brains, spleens, blood, and lungs. Breathing low to moderate levels also caused damage to the reproductive system.

The ability of people to reproduce was not affected by drinking water contaminated with low levels of 1,2-dibromo-3-chloropropane and there was no increase in the number of birth defects. Rats exposed to high levels did, however, have an increase in birth defects. It can also cause skin and eye damage from direct contact.

How likely is 1,2-dibromo-3-chloropropane to cause cancer?

The Department of Health and Human Services has determined that 1,2-dibromo-3-chloropropane may reasonably be anticipated to be a carcinogen.

Animal studies found cancer of the nose in animals exposed by breathing the chemical, cancer of the stomach and kidney in animals that ingested the chemical, and cancer of the stomach and skin in animals who had skin contact with the chemical.

We do not know if these same cancers would occur in people.

Is there a medical test to show whether I've been exposed to 1,2-dibromo-3-chloropropane?

Tests are available that measure the amount of 1,2-dibromo-3-chloropropane in exhaled air, blood, and samples of tissues from the body. These tests may require special equipment and they may not be available in your doctor's office.

Because exposure to this chemical lowers the number of sperm, we can count the number of sperm and blood levels of certain hormones in exposed men to determine whether harmful effects have occurred. However, these changes cannot tell the level or length of exposure to the chemical.

Has the federal government made recommendations to protect human health?

The Environmental Protection Agency (EPA) has set a limit of 0.2 parts of 1,2-dibromo-3-chloropropane per billion parts of drinking water (0.2 ppb). EPA requires that discharges or spills into the environment of 1 pound or more of 1,2-dibromo-3-chloropropane be reported. EPA banned the use of 1,2-dibromo-3-chloropropane as a pesticide in the United States in the early 1980s.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 1 part of 1,2-dibromo-3-chloropropane in one billion parts of air (1 ppb) for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) currently recommends that workers breathe as little 1,2-dibromo-3-chloropropane as possible.

Glossary

Carcinogen: A substance that can cause cancer.

Ingesting: Taking food or drink into your body.

ppb: Parts per billion.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for 1,2-dibromo-3-chloropropane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns. *(Link to Public Health Statement)*

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,2-DICHLOROETHANE

CAS #107-06-2

Division of Toxicology ToxFAQs™ September 2001

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-Dichloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethane usually occurs by breathing contaminated air in workplaces that use 1,2-dichloroethane. Breathing or ingesting high levels of 1,2-dichloroethane can cause damage to the nervous system, liver, kidneys, and lungs and may cause cancer. This substance has been found in at least 570 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is 1,2-dichloroethane?

1,2-Dichloroethane, also called ethylene dichloride, is a manufactured chemical that is not found naturally in the environment. It is a clear liquid and has a pleasant smell and sweet taste.

The most common use of 1,2-dichloroethane is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including polyvinyl chloride (PVC) pipes, furniture and automobile upholstery, wall coverings, housewares, and automobile parts. It is also used to as a solvent and is added to leaded gasoline to remove lead.

What happens to 1,2-dichloroethane when it enters the environment?

❏ Most of the 1,2-dichloroethane released to the environment is released to the air. In the air, 1,2-dichloroethane breaks down by reacting with other compounds formed by sunlight. It can stay in the air for more than 5 months before it is broken down.
❏ 1,2-Dichloroethane can also be released into rivers and lakes. It breaks down very slowly in water and most of it will evaporate to the air.
❏ 1,2-Dichloroethane released in soil will either evaporate into the air or travel down through the soil and enter underground water.

How might I be exposed to 1,2-dichloroethane?

❏ The general population may be exposed to 1,2-dichloroethane by breathing air or drinking water that contains 1,2-dichloroethane.
❏ People who work or live near a factory where 1,2-dichloroethane is used, may be exposed to higher than usual levels.
❏ People living near uncontrolled hazardous waste sites may also be exposed to higher than usual levels of 1,2-dichloroethane.

How can 1,2-dichloroethane affect my health?

Nervous system disorders, liver and kidney diseases, and lung effects have been reported in humans ingesting or inhaling large amounts of 1,2-dichloroethane.

In laboratory animals, breathing or ingesting large amounts of 1,2-dichloroethane have also caused nervous system disorders and liver, kidney, and lung effects. Animal studies also suggest that 1,2-dichloroethane may damage the

immune system. Kidney disease has also been seen in animals ingesting low doses of 1,2-dichloroethane for a long time. Studies in animals indicate that 1,2-dichloroethane does not affect reproduction.

How likely is 1,2-dichloroethane to cause cancer?

Human studies examining whether 1,2-dichloroethane can cause cancer have been considered inadequate. In animals, increases in the occurrence of stomach, mammary gland, liver, lung, and endometrium cancers have been seen following inhalation, oral, and dermal exposure.

The Department of Health and Human Services (DHHS) has determined that 1,2-dichloroethane may reasonably be expected to cause cancer. The EPA has determined that 1,2-dichloroethane is a probable human carcinogen and the International Agency for Cancer Research (IARC) considers it to be a possible human carcinogen.

How can 1,2-dichloroethane affect children?

We do not know if exposure to 1,2-dichloroethane will result in birth defects or other developmental effects in people. Studies in animals suggest that 1,2-dichloroethane does not produce birth defects.

It is likely that health effects seen in children exposed to high levels of 1,2-dichloroethane will be similar to the effects seen in adults.

How can families reduce the risk of exposure to 1,2-dichloroethane?

The general population is not likely to be exposed to large amounts of 1,2-dichloroethane. In the past, it was used in small amounts in household products such as cleaning agents, pesticides, and wallpaper and carpet glue. Risk of exposure from this source could be eliminated if these older products were immediately discarded.

Children should avoid playing in soils near uncontrolled hazardous waste sites where 1,2-dichloroethane may have been discarded.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethane?

Tests are available to measure 1,2-dichloroethane in breath, blood, breast milk, and urine of exposed people. Because 1,2-dichloroethane leaves the body fairly quickly, these tests need to be done within a couple of days of exposure. These tests cannot be used to predict the nature or severity of toxic effects. These tests are not usually done in the doctor's office.

Has the federal government made recommendations to protect human health?

The EPA allows 0.005 milligrams of 1,2-dichloroethane per liter of drinking water (0.005 mg/L).

The Occupational Safety and Health Administration has set a limit of 50 parts of 1,2-dichloroethane per million parts of air (50 ppm) in workplace air for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toxicological Profile for 1,2-Dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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1,2-DICHLOROETHENE

CAS # 540-59-0, 156-59-2, and 156-60-5

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethene occurs mainly in workplaces where it is made or used. Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired. *cis*-1,2-Dichloroethene has been found in at least 146 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). *trans*-1,2-Dichloroethene was found in at least 563 NPL sites. 1,2-Dichloroethene was found at 336 sites, but the isomer (*cis*- or *trans*-) was not specified.

What is 1,2-dichloroethene?

(Pronounced 1,2-dī-klôr′ ō-ĕth′ēn)

1,2-Dichloroethene, also called 1,2-dichloroethylene, is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1,2-dichloroethene in air (about 17 parts of 1,2-dichloroethene per million parts of air [17 ppm]).

There are two forms of 1,2-dichloroethene; one is called *cis*-1,2-dichloroethene and the other is called *trans*-1,2-dichloroethene. Sometimes both forms are present as a mixture.

What happens to 1,2-dichloroethene when it enters the environment?

- 1,2-Dichloroethene evaporates rapidly into air.
- In the air, it takes about 5-12 days for half of it to break down.
- Most 1,2-dichloroethene in the soil surface or bodies of water will evaporate into air.
- 1,2-Dichloroethene can travel through soil or dissolve in water in the soil. It is possible that it can contaminate groundwater.
- In groundwater, it takes about 13-48 weeks to break down.
- There is a slight chance that 1,2-dichloroethene will break down into vinyl chloride, a different chemical which is believed to be more toxic than 1,2-dichloroethene.

How might I be exposed to 1,2-dichloroethene?

- Breathing 1,2-dichloroethene that has leaked from hazardous waste sites and landfills.
- Drinking contaminated tap water or breathing vapors from contaminated water while cooking, bathing, or washing dishes.
- Breathing 1,2-dichloroethene, touching it, or touching contaminated materials in the workplace.

How can 1,2-dichloroethene affect my health?

Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.

When animals breathed high levels of *trans*-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged and the effects were more severe with longer exposure times. Animals that breathed very high

levels of *trans*-1,2-dichloroethene had damaged hearts.

Animals that ingested extremely high doses of *cis*- or *trans*-1,2-dichloroethene died.

Lower doses of *cis*-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver.

The long-term (365 days or longer) human health effects after exposure to low concentrations of 1,2-dichloroethene aren't known. One animal study suggested that an exposed fetus may not grow as quickly as one that hasn't been exposed.

Exposure to 1,2-dichloroethene hasn't been shown to affect fertility in people or animals.

How likely is 1,2-dichloroethene to cause cancer?

The EPA has determined that *cis*-1,2-dichloroethene is not classifiable as to its human carcinogenicity.

No EPA cancer classification is available for *trans*-1,2-dichloroethene.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethene?

Tests are available to measure concentrations of the breakdown products of 1,2-dichloroethene in blood, urine, and tissues. However, these tests aren't used routinely to determine whether a person has been exposed to this compound. This is because after you are exposed to 1,2-dichloroethene, the breakdown products in your body that are detected with these tests may be the same as those that come from exposure to other chemicals. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum allowable level of *cis*-1,2-dichloroethene in drinking water at 0.07 milligrams per liter of water (0.07 mg/L) and *trans*-1,2-dichloroethene at 0.1 mg/L.

The EPA requires that any spills or accidental release of 1,000 pounds or more of 1,2-dichloroethene must be reported to the EPA.

The Occupational Health Safety and Health Administration (OSHA) has set the maximum allowable amount of 1,2-dichloroethene in workroom air during an 8-hour workday in a 40-hour workweek at 200 parts of 1,2-dichloroethene per million parts of air (200 ppm).

Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Fertility: Ability to reproduce.

Ingest: To eat or drink something.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Solvent: A chemical that can dissolve other substances.

References

This ToxFAQs information is taken from the 1996 Toxicological Profile for 1,2-Dichloroethene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

1,4-Dioxane

What is 1,4-Dioxane?
1,4-Dioxane is a compound which is used both as a solvent, and as a stabilizer for other chlorinated solvents such as 1,1,1-trichloroethane (TCA) that are used in industrial degreasing operations. It is also present in a variety of paint products, automotive coolant liquid, and many commercial cosmetics and toiletries. [1,4-Dioxane is not the same as "dioxin," which is a different type of contaminant.] The ability to detect low concentrations of 1,4-Dioxane has only recently become available.

What happens to 1,4-Dioxane when it enters the environment?
1,4-Dioxane is known to migrate rapidly in the environment and mix easily with water. Since it does not bind well to soil, 1,4-Dioxane can move through the ground and enter groundwater. It does not readily evaporate from water or moist soil into the ambient air due in part to its low vapor pressure. Plants and animals are not likely to store 1,4-Dioxane so there is little concern for exposure via homegrown food supplies.

How might I be exposed to 1,4-Dioxane?
If your drinking water is contaminated with 1,4-Dioxane, your most likely exposure route would be water ingestion. Smaller amounts of exposure may occur from dermal contact while bathing and from inhalation of 1,4-Dioxane that evaporated from the water. 1,4-Dioxane is known to be present in some industrial and commercial products such as shampoos, liquid soaps or lotions, pesticides, and as an unintentional food additive in some food packaging adhesives.

How can 1,4-Dioxane enter and leave my body?
Uptake into the body: 1,4-Dioxane can be absorbed into the body following ingestion (via eating or drinking), inhalation (via breathing) and dermal exposure (across the skin).

Elimination from the body: 1,4-Dioxane is eliminated from the body mainly in the urine, both as 1,4-Dioxane itself and as breakdown products. Some 1,4-Dioxane also leaves through exhaled breath.

Bioconcentration potential: There is no evidence that 1,4-Dioxane bioconcentrates in the body.

How can 1,4-Dioxane affect my health and the environment?
Effects of 1,4-Dioxane on human health depend largely on how much of the chemical is present and absorbed into the body and on the duration and frequency of exposure. Effects also depend on the frequency of exposure and on the health of a person. EPA has classified 1,4-Dioxane as a Probable Human Carcinogen, based on sufficient animal carcinogenicity data. Repeated drinking water exposures to very high levels of 1,4-Dioxane in animals for a significant portion of their life span have caused increased mortality, and caused kidney and liver damage and liver tumors. There is very little information on the potential for 1,4-Dixoane to cause cancer in humans.

1,2,4-Trimethylbenzene

What is 1,2,4-trimethylbenzene?
1,2,4-trimethylbenzene (pseudocumene CAS 95-63-6) is a compound used as an intermediate in various processes including the manufacturing of dyes and pharmaceuticals.

What happens to 1,2,4-trimethylbenzene when it enters the environment?
The production and use of 1,2,4-Trimethylbenzene may result in its release to the environment through various waste streams. If released into the air, 1,2,4-trimethylbenzene will exist solely in the vapor phase. Vapor-phase 1,2,4-trimethylbenzene is degraded in the atmosphere with a half-life ranging from 12 hours to 30 days. 1,2,4-trimethylbenzene is expected to have low mobility in soil. Volatilization from moist and dry soil surfaces is expected to occur based on its chemical and physical properties. In water, 1,2,4-trimethylbenzene may adsorb to sediment or particulate matter. Break down of 1,2,4-trimethylbenzene in both soil and water is enhanced by aerobic bacteria. Photodegradation also occurs to this compound in water. 1,2,4-trimethylbenzene is expected to volatilize from water surfaces. Bioconcentration in aquatic organisms is moderate to high.

How might I be exposed to 1,2,4-trimethylbenzene?
The general population can be exposed to 1,2,4-trimethylbenzene via inhalation of ambient air, ingestion of food and drinking water, and dermal contact with vapors, food and other products containing 1,2,4-trimethylbenzene. Consumers will be exposed to 1,2,4-trimethylbenzene during the use of self-serve gasoline fill-up operations due to its presence in gasoline vapor. Worker exposure may occur through inhalation and dermal contact with this compound at workplaces where it is produced or used.

How can 1,2,4-trimethylbenzene enter and leave my body?
Uptake into the body: 1,2,4-trimethylbenzene is most easily absorbed into the body following ingestion (via eating or drinking) and inhalation (via breathing). Dermal absorption (across the skin) is less important.

Elimination from the body:
1,2,4-trimethylbenzene is eliminated from the body mainly in urine, both as 1,2,4-trimethylbenzene and as breakdown products.

Bioconcentration potential:
There is little evidence that 1,2,4-trimethylbenzene bioconcentrates in the body.

How can 1,2,4-trimethylbenzene affect my health and the environment?
Effects of 1,2,4-trimethylbenzene on human health depend largely on how much of the chemical is present and absorbed into the body. The frequency and duration of exposure to 1,2,4-trimethylbenzene, as well as the health of the person impact the potential for health effects.

When inhaled at high levels 1,2,4-trimethylbenzene affects the nervous system resulting in symptoms including nervousness, tension, anxiety, and asthmatic bronchitis. Exposure to

1,2,4-trimethylbenzene has also been shown to adversely affect the properties of blood including the blood's ability to coagulate. The lungs may also be affected by repeated or prolonged exposure, resulting in chronic bronchitis.

EPA has not published a cancer classification for this compound.

References

Toxnet (HSDB): http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~ycons5:1

International Program on Chemical Safety (IPCS). INCHEM: 1,2,4-TRIMETHYLBENZENE http://www.inchem.org/documents/icsc/icsc/eics1433.htm

1,3,5-Trimethylbenzene

What is 1,3,5-trimethylbenzene?
1,3,5-trimethylbenzene (synonym: mesitylene CAS 108-67-8) is a compound used primarily as an intermediate in the manufacturing of dyes, as a solvent, and as a paint thinner.

What happens to 1,3,5-trimethylbenzene when it enters the environment?
1,3,5-trimethylbenzene may be released directly to the environment as an emission from gasoline-powered vehicles, municipal waste-treatment plants, and coal-fired power stations. If released to the atmosphere, 1,3,5-trimethylbenzene will exist solely in the vapor phase. Vapor-phase 1,3,5-trimethylbenzene is degraded in the atmosphere with a half-life ranging from 7 hours and 67 days. Based on its physical and chemical properties, 1,3,5-trimethylbenzene is expected to have limited mobility in soil. Volatilization from moist and dry soil surfaces should occur. In water, 1,3,5-trimethylbenzene may adsorb to sediment or particulate matter but it is expected to volatilize from water surfaces. 1,3,5-trimethylbenzene should aerobically biodegrade in both soil and water. Bioconcentration of this compound can occur in some aquatic organisms.

How might I be exposed to 1,3,5-trimethylbenzene?
Exposure to 1,3,5-trimethylbenzene is possible through inhalation of ambient air, ingestion of food and drinking water, and through dermal contact with products containing 1,3,5-trimethylbenzene. The use of self-serve gasoline fill-up operations presents one potential pathway for exposure. Worker exposure may occur through inhalation and dermal contact with this compound at workplaces where it is produced or used.

How can 1,3,5-trimethylbenzene enter and leave my body?
Uptake into the body: 1,3,5-trimethylbenzene can be absorbed into the body following ingestion (via eating or drinking), inhalation (via breathing) and dermal exposures (across the skin).

Elimination from the body:
When 1,3,5-trimethylbenzene is inhaled, nearly 80% of it is transformed into other metabolites. These water-soluble metabolites are eliminated from the body primarily through the urine.

Bioconcentration potential:
There is very little evidence that 1,3,5-trimethylbenzene bioconcentrates in the body.

How can 1,3,5-trimethylbenzene affect my health and the environment?
Effects of 1,3,5-trimethylbenzene on human health depend largely on how much of the chemical is present and absorbed into the body. The frequency and duration of exposure to 1,3,5-trimethylbenzene, as well as the health status of the person, impact the potential for health effects.

When inhaled at high levels 1,3,5-trimethylbenzene affects the nervous system resulting in symptoms including nervousness, tension, anxiety, and asthmatic bronchitis. Exposure to 1,3,5-trimethylbenzene has also been shown to adversely affect the properties of blood

including the blood's ability to coagulate. The lungs may also be affected by repeated or prolonged exposure, resulting in chronic bronchitis.

EPA has not published a cancer classification for this compound.

References

Toxnet (HSDB): http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~G96sK0:1

International Program on Chemical Safety (IPCS). INCHEM: 1,3,5-TRIMETHYLBENZENE http://www.inchem.org/documents/icsc/icsc/eics1155.htm

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ALDRIN and DIELDRIN

CAS # 309-00-2 and 60-57-1

Division of Toxicology ToxFAQs™ September 2002

This fact sheet answers the most frequently asked health questions (FAQs) about aldrin and dieldrin. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to aldrin and dieldrin happens mostly from eating contaminated foods, such as root crops, fish, or seafood. Aldrin and dieldrin build up in the body after years of exposure and can affect the nervous system. Aldrin has been found in at least 207 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA). Dieldrin has been found in at least 287 of the 1,613 sites.

What are aldrin and dieldrin?

Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this fact sheet because aldrin quickly breaks down to dieldrin in the body and in the environment. Pure aldrin and dieldrin are white powders with a mild chemical odor. The less pure commercial powders have a tan color. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

What happens to aldrin and dieldrin when they enter the environment?

❏ Sunlight and bacteria change aldrin to dieldrin so that we mostly find dieldrin in the environment.
❏ They bind tightly to soil and slowly evaporate to the air.
❏ Dieldrin in soil and water breaks down very slowly.
❏ Plants take in and store aldrin and dieldrin from the soil.
❏ Aldrin rapidly changes to dieldrin in plants and animals.
❏ Dieldrin is stored in the fat and leaves the body very slowly.

How might I be exposed to aldrin or dieldrin?

❏ Dieldrin is everywhere in the environment, but at very low levels.
❏ Eating food like fish or shellfish from lakes or streams contaminated with either chemical, or contaminated root crops, dairy products, or meats.
❏ Air, surface water, or soil near waste sites may contain higher levels.
❏ Living in homes that were once treated with aldrin or dieldrin to control termites.

How can aldrin and dieldrin affect my health?

People who have intentionally or accidentally ingested large amounts of aldrin or dieldrin have suffered convulsions and some died. Health effects may also occur after a longer period of exposure to smaller amounts because these chemicals build up in the body.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Animals exposed to high amounts of aldrin or dieldrin also had nervous system effects. In animals, oral exposure to lower levels for a long period also affected the liver and decreased their ability to fight infections. We do not know whether aldrin or dieldrin affect the ability of people to fight disease.

Studies in animals have given conflicting results about whether aldrin and dieldrin affect reproduction in male animals and whether these chemicals may damage the sperm.

We do not know whether aldrin or dieldrin affect reproduction in humans.

How likely are aldrin and dieldrin to cause cancer?

There is no conclusive evidence that aldrin or dieldrin cause cancer in humans. Aldrin and dieldrin have been shown to cause liver cancer in mice. The International Agency for Research on Cancer (IARC) has determined that aldrin and dieldrin are not classifiable as to human carcinogenicity. The EPA has determined that aldrin and dieldrin are probable human carcinogens.

How can aldrin and dieldrin affect children?

Children can be exposed to aldrin and dieldrin in the same way as adults. There are no known unique exposure pathways for children. Children who swallowed amounts of aldrin or dieldrin much larger than those found in the environment suffered convulsions and some died, as occurred in adults. However, we do not know whether children are more susceptible than adults to the effects of aldrin or dieldrin.

We do not know whether aldrin or dieldrin cause birth defects in humans. Pregnant animals that ingested aldrin or dieldrin had some babies with low birth weight and some with alterations in the skeleton. Dieldrin has been found in human breast milk, therefore, it can be passed to suckling infants.

How can families reduce the risk of exposure to aldrin and dieldrin?

❑ Since aldrin and dieldrin are no longer produced or used, exposure to these compounds will occur only from past usage.

❑ Because aldrin and dieldrin were applied to the basement of some homes for termite protection, before buying a home families should investigate what, if any, pesticides have been used within the home.

Is there a medical test to show whether I've been exposed to aldrin and dieldrin?

There are laboratory tests that can measure aldrin and dieldrin in your blood, urine, and body tissues. Because aldrin changes to dieldrin fairly quickly in the body, the test has to be done shortly after you are exposed to aldrin. Since dieldrin can stay in the body for months, measurements of dieldrin can be made much longer after exposure to either aldrin or dieldrin. The tests cannot tell you whether harmful health effects will occur. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The EPA limits the amount of aldrin and dieldrin that may be present in drinking water to 0.001 and 0.002 milligrams per liter (mg/L) of water, respectively, for protection against health effects other than cancer. The EPA has determined that a concentration of aldrin and dieldrin of 0.0002 mg/L in drinking water limits the lifetime risk of developing cancer from exposure to each compound to 1 in 10,000.

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 0.25 milligrams of aldrin and dieldrin per cubic meter of air (0.25 mg/m^3) in the workplace during an 8-hour shift, 40 hour week. The National Institute for Occupational Safety and Health (NIOSH) also recommends a limit of 0.25 mg/m^3 for both compounds for up to a 10-hour work day, 40-hour week.

The Food and Drug Administration (FDA) regulates the residues of aldrin and dieldrin in raw foods. The allowable range is from 0 to 0.1 ppm, depending on the type of food product.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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ANTIMONY
CAS # 7440-36-0

Agency for Toxic Substances and Disease Registry ToxFAQs September 1995

This fact sheet answers the most frequently asked health questions (FAQs) about antimony. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to antimony occurs in the workplace or from skin contact with soil at hazardous waste sites. Breathing high levels of antimony for a long time can irritate the eyes and lungs, and can cause problems with the lungs, heart, and stomach. This chemical has been found in at least 403 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is antimony?

(Pronounced ăn′tə-mō′nē)

Antimony is a silvery-white metal that is found in the earth's crust. Antimony ores are mined and then mixed with other metals to form antimony alloys or combined with oxygen to form antimony oxide.

Little antimony is currently mined in the United States. It is brought into this country from other countries for processing. However, there are companies in the United States that produce antimony as a by-product of smelting lead and other metals.

Antimony isn't used alone because it breaks easily, but when mixed into alloys, it is used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and plastics to prevent them from catching fire. It is also used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass.

What happens to antimony when it enters the environment?

- Antimony is released to the environment from natural sources and from industry.
- In the air, antimony is attached to very small particles that may stay in the air for many days.
- Most antimony ends up in soil, where it attaches strongly to particles that contain iron, manganese, or aluminum.
- Antimony is found at low levels in some rivers, lakes, and streams.

How might I be exposed to antimony?

- Because antimony is found naturally in the environment, the general population is exposed to low levels of it every day, primarily in food, drinking water, and air.
- It may be found in air near industries that process or release it, such as smelters, coal-fired plants, and refuse incinerators.
- In polluted areas containing high levels of antimony, it may be found in the air, water, and soil.
- Workers in industries that process it or use antimony ore may be exposed to higher levels.

How can antimony affect my health?

Exposure to antimony at high levels can result in a variety of adverse health effects.

Breathing high levels for a long time can irritate your eyes and lungs and can cause heart and lung problems, stomach pain, diarrhea, vomiting, and stomach ulcers.

In short-term studies, animals that breathed very high levels of antimony died. Animals that breathed high levels

had lung, heart, liver, and kidney damage. In long-term studies, animals that breathed very low levels of antimony had eye irritation, hair loss, lung damage, and heart problems. Problems with fertility were also noted. In animal studies, problems with fertility have been seen when rats breathed very high levels of antimony for a few months.

Ingesting large doses of antimony can cause vomiting. We don't know what other effects may be caused by ingesting it. Long-term animal studies have reported liver damage and blood changes when animals ingested antimony. Antimony can irritate the skin if it is left on it.

Antimony can have beneficial effects when used for medical reasons. It has been used as a medicine to treat people infected with parasites.

How likely is antimony to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified antimony as to its human carcinogenicity.

Lung cancer has been observed in some studies of rats that breathed high levels of antimony. No human studies are available. We don't know whether antimony will cause cancer in people.

Is there a medical test to show whether I've been exposed to antimony?

Tests are available to measure antimony levels in the body. Antimony can be measured in the urine, feces, and blood for several days after exposure. However, these tests cannot tell you how much antimony you have been exposed to or whether you will experience any health effects. Some tests are not usually performed in most doctors' offices and may require special equipment to conduct them.

Has the federal government made recommendations to protect human health?

The EPA allows 0.006 parts of antimony per million parts of drinking water (0.006 ppm). The EPA requires that discharges or spills into the environment of 5,000 pounds or more of antimony be reported.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 0.5 milligrams of antimony per cubic meter of air (0.5 mg/m^3) for an 8-hour workday, 40-hour workweek.

The American Conference of Governmental Industrial Hygienists (ACGIH) and the National Institute for Occupational Safety and Health (NIOSH) currently recommend the same guidelines for the workplace as OSHA.

Glossary

Carcinogenicity: Ability to cause cancer.
CAS: Chemical Abstracts Service.
Ingestion: Taking food or drink into your body.
Long-term: Lasting one year or more.
Milligram (mg): One thousandth of a gram.
Parasite: An organism living in or on another organism.
ppm: Parts per million.
Short-term: Lasting 14 days or less.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for antimony. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

(Link to Public Health Statement)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ARSENIC

CAS # 7440-38-2

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2005

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 784 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenic (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

❏ Arsenic occurs naturally in soil and minerals and it therefore may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
❏ Arsenic cannot be destroyed in the environment. It can only change its form.
❏ Rain and snow remove arsenic dust particles from the air.
❏ Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
❏ Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

❏ Ingesting small amounts present in your food and water or breathing air containing arsenic.
❏ Breathing sawdust or burning smoke from wood treated with arsenic.
❏ Living in areas with unusually high natural levels of arsenic in rock.
❏ Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the lungs, bladder, liver, kidney and prostate. Inhalation of inorganic arsenic can cause increase risk of lung cancer. The Department of Health and Human Services (DHHS) has determined that inorganic arsenic is a known carcinogen. The International Agency for Research on Cancer (IARC), and the EPA have determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is also some evidence that suggests that long-term exposure to arsenic in children may result in lower IQ scores. There is some information suggesting that children may be less efficient at converting inorganic arsenic to the less harmful organic forms. For this reason, children may be more susceptible to health effects from inorganic arsenic than adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

❑ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.

❑ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Arsenic (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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BENZENE

CAS # 71-43-2

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2005

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 1,001 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- ❑ Industrial processes are the main source of benzene in the environment.
- ❑ Benzene can pass into the air from water and soil.
- ❑ It reacts with other chemicals in the air and breaks down within a few days.
- ❑ Benzene in the air can attach to rain or snow and be carried back down to the ground.
- ❑ It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- ❑ Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- ❑ Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- ❑ Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure.
- ❑ Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- ❑ Working in industries that make or use benzene.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene will affect fertility in men.

How likely is benzene to cause cancer?

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the blood-forming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and the EPA have determined that benzene is carcinogenic to humans.

How can benzene affect children?

Children can be affected by benzene exposure in the same ways as adults. It is not known if children are more susceptible to benzene poisoning than adults.

Benzene can pass from the mother's blood to a fetus. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How can families reduce the risks of exposure to benzene?

Benzene exposure can be reduced by limiting contact with gasoline and cigarette smoke. Families are encouraged not to smoke in their house, in enclosed environments, or near their children.

Is there a medical test to determine whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is a test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood; however, since benzene disappears rapidly from the blood, this test is only useful for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. The metabolite S-phenylmercapturic acid in urine is a sensitive indicator of benzene exposure. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 5 parts benzene per billion parts of water (5 ppb).

The Occupational Safety and Health Administration (OSHA) has set limits of 1 part benzene per million parts of workplace air (1 ppm) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Benzene (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CARBON TETRACHLORIDE

CAS # 56-23-5

Division of Toxicology ToxFAQs™ August 2005

This fact sheet answers the most frequently asked health questions (FAQs) about carbon tetrachloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Carbon tetrachloride does not occur naturally. Exposure to this substance results mostly from breathing air, drinking water, or coming in contact with soil that is contaminated with it. Exposure to very high amounts of carbon tetrachloride can damage the liver, kidneys, and nervous system. Carbon tetrachloride can cause cancer in animals. Carbon tetrachloride has been found in at least 425 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is carbon tetrachloride?

Carbon tetrachloride is a manufactured chemical that does not occur naturally. It is a clear liquid with a sweet smell that can be detected at low levels. It is also called carbon chloride, methane tetrachloride, perchloromethane, tetrachloroethane, or benziform.

Carbon tetrachloride is most often found in the air as a colorless gas. It is not flammable and does not dissolve in water very easily. It was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers, and in spot removers. Because of its harmful effects, these uses are now banned and it is only used in some industrial applications.

What happens to carbon tetrachloride when it enters the environment?

- ❑ It moves very quickly into the air upon release, so most of it is in the air.
- ❑ It evaporates quickly surface water.
- ❑ Only a small amount sticks to soil particles; the rest evaporates or moves into the groundwater.
- ❑ It is very stable in air (lifetime 30-100 years).
- ❑ It can be broken down or transformed in soil and water within several days.
- ❑ When it does break down, it forms chemicals that can destroy ozone in the upper atmosphere.
- ❑ It does not build up in animals. We do not know if it build up in plants.

How might I be exposed to carbon tetrachloride?

- ❑ Breathing contaminated air near manufacturing plants or waste sites.
- ❑ Breathing workplace air when it is used.
- ❑ Drinking contaminated water near manufacturing plants and waste sites.
- ❑ Breathing contaminated air and skin contact with water while showering or cooking with contaminated water.
- ❑ Swimming or bathing in contaminated water.
- ❑ Contact with or eating contaminated soil (pica child) at waste sites.

How can carbon tetrachloride affect my health?

High exposure to carbon tetrachloride can cause liver, kidney, and central nervous system damage. These effects can occur after ingestion or breathing carbon tetrachloride, and possibly from exposure to the skin. The liver is especially sensitive to carbon tetrachloride because it enlarges and cells are damaged or destroyed. Kidneys also are damaged, causing a build up of wastes in the blood. If exposure is low and brief, the liver and kidneys can repair the damaged cells and function normally again. Effects of carbon tetrachloride are more severe in persons who drink large amounts of alcohol.

If exposure is very high, the nervous system, including the brain, is affected. People may feel intoxicated and experience headaches, dizziness, sleepiness, and nausea and vomiting. These effects may subside if exposure is stopped, but in severe cases, coma and even death may occur.

There have been no studies of the effects of carbon tetrachloride on reproduction in humans, but studies in rats showed that long-term inhalation may cause decreased fertility.

How likely is carbon tetrachloride to cause cancer?

Studies in humans have not been able to determine whether or not carbon tetrachloride can cause cancer because usually there has been exposure to other chemicals at the same time. Swallowing or breathing carbon tetrachloride for years caused liver tumors in animals. Mice that breathed carbon tetrachloride also developed tumors of the adrenal gland. The Department of Health and Human Services (DHHS) has determined that carbon tetrachloride may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that carbon tetrachloride is possibly carcinogenic to humans, whereas the EPA determined that carbon tetrachloride is a probable human carcinogen.

How can carbon tetrachloride affect children?

The health effects of carbon tetrachloride have not been studied in children, but they are likely to be similar to those seen in adults exposed to the chemical. We do not know whether children differ from adults in their susceptibility to carbon tetrachloride.

A few survey-type studies suggest that maternal drinking water exposure to carbon tetrachloride might possibly be related to certain birth defects. Studies in animals showed that carbon tetrachloride can cause early fetal deaths, but did not cause birth defects. A study with human breast milk in a test tube suggested that it would be possible for carbon tetrachloride to pass from the maternal circulation to breast milk, but there is no direct demonstration of this occurring.

How can families reduce the risks of exposure to carbon tetrachloride?

❑ Discard any product that contains carbon tetrachloride that you may have at home and may have used in the past.

❑ Household chemicals should be stored out of the reach of children in their original containers.

❑ Sometimes older children sniff household chemical products to get high. Talk to your children about the dangers of sniffing chemicals.

Is there a medical test to determine whether I've been exposed to carbon tetrachloride?

Several sensitive and specific tests are available to measure carbon tetrachloride in exposed persons. The most convenient way is simply to measure carbon tetrachloride in the exhaled air. Carbon tetrachloride also can be measured in blood, fat, or other tissues. These tests are not usually done in the doctor's office because they require special equipment. Although these tests can show that a person has been exposed to carbon tetrachloride, the results cannot be used to reliably predict whether any adverse health effect might result. Because carbon tetrachloride leaves the body fairly quickly, these methods are best suited to detecting exposures that have occurred within the last several days.

Has the federal government made recommendations to protect human health?

The EPA has set a limit for carbon tetrachloride in drinking water of 5 parts of carbon tetrachloride per billion parts of water (5 ppb). The EPA has also set limits on how much carbon tetrachloride can be released from an industrial plant into waste water and is preparing to set limits on how much carbon tetrachloride can escape from an industrial plant into outside air.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for carbon tetrachloride in workplace air for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Carbon Tetrachloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CHLORINATED DIBENZO-p-DIOXINS (CDDs)

Agency for Toxic Substances and Disease Registry ToxFAQs February 1999

This fact sheet answers the most frequently asked health questions (FAQs) about chlorinated dibenzo-p-dioxins (CDDs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chlorinated dibenzo-p-dioxins (CDDs) (75 chemicals) occurs mainly from eating food that contains the chemicals. One chemical in this group, 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD, has been shown to be very toxic in animal studies. It causes effects on the skin and may cause cancer in people. This chemical has been found in at least 91 of 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are CDDs?

CDDs are a family of 75 chemically related compounds commonly known as chlorinated dioxins. One of these compounds is called 2,3,7,8-TCDD. It is one of the most toxic of the CDDs and is the one most studied.

In the pure form, CDDs are crystals or colorless solids. CDDs enter the environment as mixtures containing a number of individual components. 2,3,7,8-TCDD is odorless and the odors of the other CDDs are not known.

CDDs are not intentionally manufactured by industry except for research purposes. They (mainly 2,3,7,8-TCDD) may be formed during the chlorine bleaching process at pulp and paper mills. CDDs are also formed during chlorination by waste and drinking water treatment plants. They can occur as contaminants in the manufacture of certain organic chemicals. CDDs are released into the air in emissions from municipal solid waste and industrial incinerators.

What happens to CDDs when they enter the environment?

- When released into the air, some CDDs may be transported long distances, even around the globe.
- When released in waste waters, some CDDs are broken down by sunlight, some evaporate to air, but most attach to soil and settle to the bottom sediment in water.
- CDD concentrations may build up in the food chain, resulting in measurable levels in animals.

How might I be exposed to CDDs?

- Eating food, primarily meat, dairy products, and fish, makes up more than 90% of the intake of CDDs for the general population.
- Breathing low levels in air and drinking low levels in water.
- Skin contact with certain pesticides and herbicides.
- Living near an uncontrolled hazardous waste site containing CDDs or incinerators releasing CDDs.
- Working in industries involved in producing certain pesticides containing CDDs as impurities, working at paper and pulp mills, or operating incinerators.

How can CDDs affect my health?

The most noted health effect in people exposed to large amounts of 2,3,7,8-TCDD is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Other skin effects noted in people exposed to high doses of 2,3,7,8-TCDD include skin rashes, dis-

coloration, and excessive body hair. Changes in blood and urine that may indicate liver damage also are seen in people. Exposure to high concentrations of CDDs may induce long-term alterations in glucose metabolism and subtle changes in hormonal levels.

In certain animal species, 2,3,7,8-TCDD is especially harmful and can cause death after a single exposure. Exposure to lower levels can cause a variety of effects in animals, such as weight loss, liver damage, and disruption of the endocrine system. In many species of animals, 2,3,7,8-TCDD weakens the immune system and causes a decrease in the system's ability to fight bacteria and viruses. In other animal studies, exposure to 2,3,7,8-TCDD has caused reproductive damage and birth defects. Some animal species exposed to CDDs during pregnancy had miscarriages and the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy often had severe birth defects including skeletal deformities, kidney defects, and weakened immune responses.

How likely are CDDs to cause cancer?

Several studies suggest that exposure to 2,3,7,8-TCDD increases the risk of several types of cancer in people. Animal studies have also shown an increased risk of cancer from exposure to 2,3,7,8-TCDD.

The World Health Organization (WHO) has determined that 2,3,7,8-TCDD is a human carcinogen.

The Department of Health and Human Services (DHHS) has determined that 2,3,7,8-TCDD may reasonably be anticipated to cause cancer.

How can CDDs affect children?

Very few studies have looked at the effects of CDDs on children. Chloracne has been seen in children exposed to high levels of CDDs. We don't know if CDDs affect the ability of people to have children or if it causes birth defects, but given the effects observed in animal studies, this cannot be ruled out.

How can families reduce the risk of exposure to CDDs?

- ❑ Children should avoid playing in soils near uncontrolled hazardous waste sites.
- ❑ Discourage children from eating dirt or putting toys or other objects in their mouths.
- ❑ Everyone should wash hands frequently if playing or working near uncontrolled hazardous waste sites.
- ❑ For new mothers and young children, restrict eating foods from the proximity of uncontrolled sites with known CDDs.

Is there a medical test to show whether I've been exposed to CDDs?

Tests are available to measure CDD levels in body fat, blood, and breast milk, but these tests are not routinely available. Most people have low levels of CDDs in their body fat and blood, and levels considerably above these levels indicate past exposure to above-normal levels of 2,3,7,8-TCDD. Although CDDs stay in body fat for a long time, tests cannot be used to determine when exposure occurred.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.00003 micrograms of 2,3,7,8-TCDD per liter of drinking water (0.00003 µg/L). Discharges, spills, or accidental releases of 1 pound or more of 2,3,7,8-TCDD must be reported to EPA. The Food and Drug Administration (FDA) recommends against eating fish and shellfish with levels of 2,3,7,8-TCDD greater than 50 parts per trillion (50 ppt).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological profile for chlorinated dibenzo-p-dioxins. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CHLOROBENZENE
CAS # 108-90-7

Agency for Toxic Substances and Disease Registry ToxFAQs July 1999

This fact sheet answers the most frequently asked health questions (FAQs) about chlorobenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Chlorobenzene is used as a solvent for some pesticide formulations, as a degreaser, and to make other chemicals. High levels of chlorobenzene can damage the liver and kidneys and affect the brain. It has been found at 97 of the 1,177 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chlorobenzene?

(Pronounced klôr′ō-bĕn′zēn)

Chlorobenzene is a colorless, flammable liquid with an aromatic, almond-like odor. Some of it will dissolve in water, but it readily evaporates into air. It does not occur naturally in the environment.

Chlorobenzene production in the United States has declined by more than 60% from its peak in 1960. It was used in the past to make other chemicals, such as phenol and DDT. Now chlorobenzene is used as a solvent for some pesticide formulations, to degrease automobile parts, and as a chemical intermediate to make several other chemicals.

What happens to chlorobenzene when it enters the environment?

- Chlorobenzene released to air is slowly broken down by reactions with other chemicals and sunlight or can be removed by rain.
- In water, chlorobenzene will rapidly evaporate to the air and/or be broken down by bacteria.
- When released to soil, it is broken down rapidly by bacteria, but some will evaporate to the air and some may filter into the groundwater.
- Chlorobenzene does not build up in the food chain.

How might I be exposed to chlorobenzene?

- If you work where chlorobenzene is made or used you could be exposed by breathing air with chlorobenzene vapors or by spilling or splashing chlorobenzene on your skin.
- People that live near a waste site containing chlorobenzene could be exposed by drinking contaminated groundwater, breathing vapors released to the air, or getting contaminated soil on their skin.
- You could be exposed by eating food contaminated with chlorobenzene but there is not enough information to determine how often this occurs.

How can chlorobenzene affect my health?

Workers exposed to high levels of chlorobenzene in the air complained of headaches, nausea, sleepiness, numbness, and vomiting. We cannot be certain that all of these effects were due to chlorobenzene exposure because the workers may have been exposed to other chemicals.

Animal studies indicate that the liver, kidney, and central nervous system are affected by exposure to chlorobenzene.

Effects on the central nervous system from breathing chlorobenzene include unconsciousness, tremors, restlessness, and death. Longer exposure has caused liver and kidney damage. The limited data available indicate that chlorobenzene does not cause birth defects or infertility.

How likely is chlorobenzene to cause cancer?

It is not known whether chlorobenzene causes cancer in people. Although chlorobenzene did not produce cancer in animal studies with rats and mice, liver nodules which can lead to cancer were produced in male rats. The EPA has determined that chlorobenzene is not classifiable as to human carcinogenicity based on inadequate evidence in both humans and animals.

Is there a medical test to show whether I've been exposed to chlorobenzene?

Exposure to chlorobenzene can be determined by measuring it or its metabolites in urine, exhaled air, blood, and body fat, but these tests cannot be used to predict whether harmful health effects will occur. These tests are not usually done in the doctors' office because special equipment is needed.

Has the federal government made recommendations to protect human health?

The EPA has set a Maximum Contaminant Level (MCL) of 0.1 parts per million (0.1 ppm) for chlorobenzene in drinking water. Concentrations in drinking water for short-term exposures (up to 10 days) should not exceed 2 ppm. The EPA recommends that levels of chlorinated benzenes (a group of chemicals that includes chlorobenzene) in lakes and streams should be limited to 0.488 ppm to prevent possible health effects from drinking water or eating fish contaminated with this group of chemicals. Any release to the environment greater than 100 pounds of chlorobenzene must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a workplace air concentration limit of 75 ppm over an 8-hour workday, 40-hour workweek.

The federal recomendations have been updated as of July 1999.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

National Priorities List: A list of the nation's worst hazardous waste sites.

Pesticide: A substance that kills pests.

ppm: Parts per million.

Solvent: A substance that dissolves another substance.

Tremor: Trembling or shaking caused by disease or stress.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological profile for chlorobenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

(Link to Public Health Statement)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHLOROFORM
CAS # 67-66-3

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about chloroform. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chloroform can occur when breathing contaminated air or when drinking or touching the substance or water containing it. Breathing chloroform can cause dizziness, fatigue, and headaches. Breathing chloroform or ingesting chloroform over long periods of time may damage your liver and kidneys. It can cause sores if large amounts touch your skin. This substance has been found in at least 717 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chloroform?
(Pronounced klôr′ə-fôrm′)

Chloroform is a colorless liquid with a pleasant, nonirritating odor and a slightly sweet taste. It will burn only when it reaches very high temperatures.

In the past, chloroform was used as an inhaled anesthetic during surgery, but it isn't used that way today. Today, chloroform is used to make other chemicals and can also be formed in small amounts when chlorine is added to water.

Other names for chloroform are trichloromethane and methyl trichloride.

What happens to chloroform when it enters the environment?

- Chloroform evaporates easily into the air.
- Most of the chloroform in air breaks down eventually, but it is a slow process.
- The breakdown products in air include phosgene and hydrogen chloride, which are both toxic.
- It doesn't stick to soil very well and can travel through soil to groundwater.
- Chloroform dissolves easily in water and some of it may break down to other chemicals.
- Chloroform lasts a long time in groundwater.
- Chloroform doesn't appear to build up in great amounts in plants and animals.

How might I be exposed to chloroform?

- Drinking water or beverages made using water containing chloroform.
- Breathing indoor or outdoor air containing it, especially in the workplace.
- Eating food that contains it.
- Skin contact with chloroform or water that contains it, such as in swimming pools.

How can chloroform affect my health?

Breathing about 900 parts of chloroform per million parts air (900 ppm) for a short time can cause dizziness, fatigue, and headache. Breathing air, eating food, or drinking water containing high levels of chloroform for long periods of time may damage your liver and kidneys. Large amounts of chloroform can cause sores when chloroform touches your skin.

It isn't known whether chloroform causes reproductive effects or birth defects in people.

Animal studies have shown that miscarriages occurred in rats and mice that breathed air containing 30 to 300 ppm chloroform during pregnancy and also in rats that ate chloroform during pregnancy. Offspring of rats and mice that breathed chloroform during pregnancy had birth defects. Abnormal sperm were found in mice that breathed air containing 400 ppm chloroform for a few days.

How likely is chloroform to cause cancer?

The Department of Health and Human Services (DHHS) has determined that chloroform may reasonably be anticipated to be a carcinogen.

Rats and mice that ate food or drank water with chloroform developed cancer of the liver and kidneys.

Is there a medical test to show whether I've been exposed to chloroform?

Although the amounts of chloroform in the air that you exhale and in blood, urine, and body tissues can be measured, there is no reliable test to determine how much chloroform you have been exposed to or whether you will experience any harmful effects.

The measurement of chloroform in body fluids and tissues may help to determine if you have come into contact with large amounts of chloroform, but these tests are useful for only a short time after you are exposed. Chloroform in your body might also indicate that you have come into contact with other chemicals.

Has the federal government made recommendations to protect human health?

The EPA drinking water limit for total trihalomethanes, a class of chemicals that includes chloroform, is 100 micrograms per liter of water (100 μg/L).

The EPA requires that spills or accidental releases of 10 pounds or more of chloroform into the environment be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set the maximum allowable concentration of chloroform in workroom air during an 8-hour workday in a 40-hour workweek at 50 ppm.

Glossary

Carcinogenicity: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Ingesting: Taking food or drink into your body.

Microgram (μg): One millionth of a gram.

Miscarriage: Pregnancy loss.

ppm: Parts per million.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Chloroform (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

DDT, DDE, AND DDD

CAS # 50-29-3, 72-55-9, 72-54-8

Division of Toxicology ToxFAQs™ September 2002

This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

❑ DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.

❑ DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.

❑ DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.

❑ They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.

❑ Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.

❑ DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

❑ Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.

❑ Eating contaminated imported foods from countries that still allow the use of DDT to control pests.

❑ Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.

❑ Infants fed on breast milk from mothers who have been exposed.

❑ Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months.

A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to

breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies.
In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.
The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.
There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.
Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.
A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT,DDE, and DDE?

❑ Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
❑ Cooking will reduce the amount of DDT in fish.
❑ Washing fruit and vegetables will remove most DDT from their surface.
❑ Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.
The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

DICHLOROBENZENES

1,2-Dichlorobenzene CAS# 95-50-1
1,3-Dichlorobenzene CAS# 541-73-1
1,4-Dichlorobenzene CAS# 106-46-7

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2006**

This fact sheet answers the most frequently asked health questions (FAQs) about dichlorobenzenes. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to dichlorobenzenes mostly occurs from breathing indoor air or workplace air. Exposure to high levels of 1,2- or 1,4-dichlorobenzene may be very irritating to your eyes and nose and cause difficult breathing, and an upset stomach. Extremely high exposures to 1,4-dichlorobenzene can result in dizziness, headaches, and liver problems. 1,2-, 1,3-, and 1,4-Dichlorobenzenes have been identified in at least 281, 175, and 330, respectively, of the 1,662 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are dichlorobenzenes?

There are three dichlorobenzene isomers- 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene. Dichlorobenzenes do not occur naturally. 1,2-Dichlorobenzene is a colorless to pale yellow liquid used to make herbicides. 1,3-Dichlorobenzene is a colorless liquid used to make herbicides, insecticides, medicine, and dyes. 1,4-Dichlorobenzene, the most important of the three chemicals, is a colorless to white solid with a strong, pungent odor. When exposed to air, it slowly changes from a solid to a vapor. Most people can smell 1,4-dichlorobenzene in the air at very low levels.

What happens to dichlorobenzenes when they enter the environment?

❏ 1,4-Dichlorobenzene enters the environment when it is used in mothballs and in toilet-deodorizer blocks. Very little enters the environment from hazardous waste sites.

❏ Some 1,2- and 1,3-dichlorobenzenes are released into the environment when used to make herbicides and when people use products that contain these chemicals.

❏ Dichlorobenzenes do not dissolve easily in water, the small amounts that enter water quickly evaporate into the air.

❏ Sometimes, dichlorobenzenes bind to soil and sediment. Dichlorobenzenes in soil usually are not easily broken down by soil organisms. Evidence suggests that plants and fish absorb dichlorobenzenes.

How might I be exposed to dichlorobenzenes?

❏ You may be exposed to 1,4-dichlorobenzene by breathing vapors from products used in the home or in buildings, such as air fresheners, mothballs, and toilet-deodorizer blocks. 1,2-dichlorobenzene and 1,3-dichlorobenzene are not found frequently in the air of homes and buildings because these chemicals are not used in household products.

❏ You may be exposed to very low levels of dichlorobenzenes in drinking water. You are not likely to be exposed to dichlorobenzenes in soil.

❏ You may also be exposed to low levels of dichlorobenzenes in beef, pork, chicken, eggs, baked goods, soft drinks, butter, peanut butter, fruits, vegetables, and fish.

How can dichlorobenzenes affect my health?

Very little is known about the health effects of 1,3-dichlorobenzene, especially in humans, but they are likely to be similar to those of 1,2- and 1,4-dichlorobenzene.

Inhaling the vapor or dusts of 1,2-dichlorobenzene and 1,4-dichlorobenzene at very high concentrations could be very irritating to your eyes and nose and cause burning and tearing

of the eyes, coughing, difficult breathing, and an upset stomach. Dizziness, headaches, and liver problems have also been observed in people exposed to very high levels of 1,4-dichlorobenzene. There is limited evidence that inhaling 1,4-dichlorobenzene may decrease lung function.

People who have eaten 1,4-dichlorobenzene products regularly for long periods (months to years) developed skin blotches and anemia. 1,4-Dichlorobenzene might cause a burning feeling in your skin if you hold mothballs or toilet-deodorizer blocks against your skin for a long time.

Breathing or eating any of the dichlorobenzenes caused harmful effects in the liver of laboratory animals. Animal studies also found that 1,2- and 1,4-dichlorobenzene caused effects in the kidneys and blood, and that 1,3-dichlorobenzene caused thyroid and pituitary effects.

How likely are dichlorobenzenes to cause cancer?

The Department of Health and Human Services (DHHS) has determined that 1,4-dichlorobenzene may reasonably be anticipated to be a carcinogen. There is no direct evidence that 1,4-dichlorobenzene can cause cancer in humans. However, animals given very high levels in water developed liver tumors. 1,2-Dichlorobenzene was not carcinogenic in laboratory animals and 1,3-dichlorobenzene has not been tested for its potential to cause cancer. Both the International Agency for Research on Cancer (IARC) and the EPA concluded that 1,2- and 1,3-dichlorobenzene are not classifiable as to human carcinogenicity.

How can dichlorobenzenes affect children?

Children who are exposed to dichlorobenzenes are likely to exhibit the same effects as adults, although this is not known for certain. Children can also be exposed to dichlorobenzenes prenatally, because all three isomers have been detected in placenta samples, as well as through breast feeding. There is no reliable evidence suggesting that dichlorobenzenes cause birth defects, although animal data raise concern for effects of 1,4-dichlorobenzene on postnatal development of the nervous system.

How can families reduce the risk of exposure to dichlorobenzenes?

Exposure of children to 1,4-dichlorobenzene can be minimized by discouraging them from playing with, swallowing, or having skin contact with products containing 1,4-dichlorobenzene. These items should be stored out of reach of young children and kept in their original containers to prevent accidental poisonings. Keep your Poison Control Center's number by the phone.

Is there a medical test to show whether I've been exposed to dichlorobenzenes?

Several tests can be used to show if you have been exposed to dichlorobenzenes. The most commonly used tests measure their dichlorophenol breakdown products in urine and blood. The presence of the dichlorophenol breakdown products in the urine indicates a person has been exposed to dichlorobenzenes within the previous day or two. Another test measures the levels of dichlorobenzenes in your blood, but this is used less often. These tests require special equipment that is not routinely available in a doctor's office, but they can be performed in a special laboratory. Neither of these tests can be used to show how high the level of dichlorobenzene exposure was or to predict whether harmful health effects will follow.

Has the federal government made recommendations to protect human health?

EPA regulates the levels of dichlorobenzenes that are allowable in drinking water. The highest level of 1,4-dichlorobenzene allowed in drinking water is 0.075 parts 1,4-dichlorobenzene per 1 million parts of water (0.075 ppm).

The Occupational Safety and Health Administration (OSHA) has set a limit for 1,4-dichlorobenzene of 75 parts 1,4-dichlorobenzene per 1 million parts of air (75 ppm) in the workplace.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Dichlorobenzenes (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ETHYLBENZENE

CAS # 100-41-4

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth′ əl bĕn′ zēn′)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Freons

What are freons?
Freons are part of a class of compounds referred to as chlorofluorocarbons (CFCs) which have been largely phased out of production in developed countries due to their effect on the ozone layer. These compounds have a variety of historical uses including use as refrigerants, foam blowing agents and propellants. The physical and chemical properties of freons will vary depending on characteristics of the formulation including the extent of fluorine substitution.

How might I be exposed to freons?
The general population may be exposed to freons through inhalation of ambient air and ingestion of drinking water. Dermal absorption is negligible but repeated exposure may cause local skin irritation and dry skin. Although the production of this compound has been phased out, the stability of this compound has allowed it to persist within the environment.

Workers may be exposed to freons through inhalation and dermal contact with these compounds at workplaces where they are produced or used. Servicing of equipment containing freons can also result in exposures.

How can freons enter and leave my body?
Uptake into the body:
Inhalation (via breathing) is the primary route of entry for freons into the body. Ingestion (via eating or drinking) and dermal exposures (across the skin) to freons are less important routes of entry. Once inside the body, freons are readily absorbed into the blood stream and distributed to various types of tissue. The highest tissue concentrations of absorbed Freon are found in the brain, lung, and liver.

Elimination from the body:
Freons are resistant to metabolic degradation and transformation, and are eliminated from the body largely unchanged. Exhalation is the most significant route of elimination of freons from the body.

Bioconcentration potential:
There is little evidence that freons bioconcentrate within the body.

What happens to freons when they enter the environment?
Freons are released into the environment largely through the disposal of waste refrigerant-containing equipment. Due to their high vapor pressure, almost all of the amount released into the environment eventually accumulates in the atmosphere. In general, chlorofluorocarbons show a high degree of thermal stability and are extremely resistant to almost all chemical reagents. Freons are very stable in the lower atmosphere where they can remain for up to 400 years. Within the upper atmosphere, freons react with and degrade ozone which has prompted restrictions on their production and use. Due to their stability, freons can be transported long distances and are distributed in a uniform pattern around the globe. If released to soil, freons have moderate mobility. Volatilization of freons occurs from moist soil surfaces and to a lesser extent from dry soil surfaces. Freons

also volatilize from water and are not expected to adsorb to suspended solids and sediment. Biodegradation of freons in water and soils proceeds slowly under anaerobic (lacking oxygen) conditions. The potential for bioconcentration in aquatic organisms is considered moderate.

How can freons affect my health and the environment?
Freons have a low toxicity to humans when exposed to typical environmental concentrations. At high exposure levels, potential health effects include nervous system (tingling sensation, humming in the ears, and apprehension), cognitive (slurred speech and decreased performance in psychological tests) cardiac (heart rhythm abnormality) and respiratory (reduction of ventilatory lung capacity) effects.

Within the upper atmosphere, freons degrade ozone as a result of chemical reactions. Reduction in the ozone layer has been linked with increases in penetration of ultraviolet light (UV-B) to the earth's surface with resulting adverse human health and environmental impacts.

References

International Program on Chemical Safety (IPCS). Fully Halogenated Chlorofluorocarbons. ENVIRONMENTAL HEALTH CRITERIA 113
http://www.inchem.org/documents/ehc/ehc/ehc113.htm

Iron

What is iron?
Iron (CAS 7439-89-6) is the second most abundant metal and the fourth most abundant element in the earth's crust, comprising 5.1% (by weight) of the earth's crust. Iron is a ubiquitous essential element required for human survival. Among the critical functions of iron is its role in the process of oxygen transport and oxidative metabolism. Iron occurs as a natural constituent of all foods of plant and animal origin, and may also be present in drinking water. Iron is also added to some foods to provide nutritional supplementation.

What happens to iron when it enters the environment?
The production and use of iron compounds throughout many industries may result in the release of these compounds into the environment. The mining and processing of iron ores may result in additional release of iron compounds. Airborne emissions of iron compounds may result from activities of the iron and steel industries. The behavior and mobility of iron in the environment depends both on its chemical form and on environmental conditions. Iron in soil or water will not volatilize under typical environmental conditions. Iron is taken up by plants and animals.

How might I be exposed to iron?
Everyone is exposed to iron in food, water and air. People in certain occupations may be exposed to higher iron levels through inhalation and dermal contact with these compounds at workplaces where iron compounds are produced or used.

How can iron enter and leave my body?

Uptake into the body:
The chemical form of iron is important in assessing its biological availability. In addition, the body regulates its iron levels by decreasing absorption when existing iron levels are high or by increasing absorption when levels are low.

Elimination from the body:
Iron within the body is efficiently recycled. Most iron elimination occurs through the GI tract with some additional iron elimination occurring through urine or skin defoliation.

Bioconcentration potential:
The body store of iron is divided between essential iron-containing compounds and excess iron, which is held in storage in a variety of body tissues.

How can iron affect my health and the environment?
Iron is nontoxic to humans at typical environmental concentrations. Acute toxicity of iron ingested from normal dietary sources has not been reported. However, there are numerous reports of acute toxicity resulting from the ingestion of large overdoses of medicinal iron, especially in small children. Inhalation of airborne iron can cause irritation to the respiratory and GI tracts. EPA has not published a cancer classification for iron compounds and evidence does not support the carcinogenicity of this compound. Iron deficiency in the

diet is a more common health concern. Recommended iron consumption ranges from approximately 10 to 30 mg per day with greater doses recommended for lactating women.

References

Toxnet (HSDB):
http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~YmEL8P:1

International Program on Chemical Safety (IPCS).
http://www.inchem.org/documents/jecfa/jecmono/v18je18.htm

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2005

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,280 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.

❏ When lead is released to the air, it may travel long distances before settling to the ground.

❏ Once lead falls onto soil, it usually sticks to soil particles.

❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such stained glass.

❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services (DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on

Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❏ Avoid exposure to sources of lead.

❏ Do not allow children to chew or mouth painted surfaces that may have been painted with lead-based paint.

❏ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❏ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❏ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (µg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3-6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a lead level of 10 µg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 µg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for lead (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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MANGANESE
CAS # 127-18-4

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about manganese. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Manganese is a trace element and eating a small amount from food or water is needed to stay healthy. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the brain, liver, kidneys, and the developing fetus. This chemical has been found in at least 603 of 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is manganese?
(Pronounced măng′ gə-nēz′)

Manganese is a naturally occurring metal that is found in many types of rocks. Pure manganese is silver-colored, but does not occur naturally. It combines with other substances such as oxygen, sulfur, or chlorine. Manganese can also be combined with carbon to make organic manganese compounds. Common organic manganese compounds include pesticides, such as maneb or mancozeb, and methylcyclopentadienyl manganese tricarbonyl (MMT), a fuel additive in some gasolines.
Manganese is an essential trace element and is necessary for good health. Manganese can be found in several food items, including grains and cereals, and is found in high amounts in other foods, such as tea.

What happens to manganese when it enters the environment?

❑ Manganese can enter the air from iron, steel, and power plants, coke ovens, and from dust from mining operations.
❑ It can enter the water and soil from natural deposits, disposal of wastes or deposits from airborne sources.
❑ Manganese exists naturally in rivers, lakes, and under-ground water.
❑ Plants in the water can take up some of the manganese from water and concentrate it.

How might I be exposed to manganese?

❑ Everyone is exposed to small amounts of manganese in air, water, and food.
❑ Individuals who work in occupations that mine or use manganese are likely to be exposed to excess levels in their work environment.
❑ People who improperly use pesticides such as maneb and mancozeb, may be exposed to excess levels.

How can manganese affect my health?

Some individuals exposed to very high levels of manganese for long periods of time in their work developed mental and emotional disturbances and slow and clumsy body movements.
This combination of symptoms is a disease called "manganism." Workers usually do not develop symptoms of manganism unless they have been exposed to manganese for many months or years. Manganism occurs because too much manganese injures a part of the brain that helps control body movements.

Exposure to high levels of airborne manganese, such as in a manganese foundry or battery plant, can affect motor skills such as holding one's hand steady, performing fast hand movements, and maintaining balance. Exposure to high levels of the metal may also cause respiratory problems and sexual dysfunction.

How likely is manganese to cause cancer?

There are no human cancer data available for manganese. Exposure to high levels of manganese in food resulted in a slightly increased incidence of pancreatic tumors in male rats and thyroid tumors in male and female mice.

The EPA has determined that manganese is not classifiable as to human carcinogenicity.

How can manganese affect children?

Daily intake of small amounts of manganese is needed for growth and good health in children. Manganese is constantly present in the mother and is available to the developing fetus during pregnancy. Manganese is also transferred from a nursing mother to her infant in breast milk at levels that are appropriate for proper development.

Children, as well as adults, who lose the ability to remove excess manganese from their bodies develop nervous system problems. Because at certain ages children take in more than adults, there is concern that children may be more susceptible to the toxic effects of excess manganese.

Animal studies indicate that exposure to high levels of manganese can cause birth defects in the unborn. There is no information on whether mothers exposed to excess levels of manganese can transfer the excess to their developing fetus during pregnancy or to their nursing infant in breast milk.

How can families reduce the risk of exposure to manganese?

In most situations, there is no need to reduce one's exposure to manganese because it is an essential nutrient for good health.

Excess levels of manganese may be present in soils, especially at or near hazardous waste sites. Therefore, it is important to discourage hand-to-mouth activity in young children, especially near hazardous waste sites or in areas that may have increased manganese levels in the soil.

Manganese is also present in pesticides that may be used around the home. These pesticides should be used in a manner consistent with manufacturer's instructions.

Is there a medical test to show whether I've been exposed to manganese?

Tests are available that show levels of manganese in different body fluids. Measurements of manganese in blood, urine, feces, and scalp hair can be used to determine exposure to excess levels of manganese by testing whether levels of the metal in your body tissues are greater than normal. However, these tests cannot predict how the levels in your tissues will affect your health. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a non-enforceable guideline for the level of manganese in drinking water at 0.05 milligrams per liter (0.05 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 5 milligrams manganese per cubic meter (5 mg/m 3) of workplace air for the average amount of manganese during an 8-hour workday, 40-hour workweek.

The National Research Council has recommended safe and adequate daily intake levels for manganese that range from 0.3 to 1 mg/day for children up to 1 year, 1 to 2 mg/day for children up to age 10, and 2 to 5 mg/day for children 10 and older.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for manganese. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

Division of Toxicology ToxFAQs™ August 2005

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

- ❑ Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- ❑ Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- ❑ Naphthalene can become weakly attached to soil or pass through soil into underground water.
- ❑ In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- ❑ Naphthalene does not accumulate in the flesh of animals or fish that you might eat.
- ❑ 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

- ❑ Breathing low levels in outdoor air.
- ❑ Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- ❑ Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- ❑ Drinking water from contaminated wells.
- ❑ Touching fabrics that are treated with moth repellents containing naphthalene.
- ❑ Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene

causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Humans Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using fireplaces or heating appliances in the their homes.

❑ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❑ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❑ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❏ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❏ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❏ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❏ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❏ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❏ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❏ Breathing air near hazardous waste sites and drinking contaminated well water.

❏ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❏ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❏ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❏ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❏ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

PENTACHLOROPHENOL

CAS #87-86-5

Division of Toxicology ToxFAQs™ September 2001

This fact sheet answers the most frequently asked health questions (FAQs) about pentachlorophenol. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Pentachlorophenol is a manufactured chemical which is a restricted use pesticide and is used industrially as a wood preservative for utility poles, railroad ties, and wharf pilings. Exposure to high levels of pentachlorophenol can cause increases in body temperature, liver effects, damage to the immune system, reproductive effects, and developmental effects. This substance has been found in at least 313 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is pentachlorophenol?

Pentachlorophenol is a manufactured chemical that does not occur naturally. Pure pentachlorophenol exists as colorless crystals. Impure pentachlorophenol (the form usually found at hazardous waste sites) is dark gray to brown and exists as dust, beads, or flakes. Humans are usually exposed to impure pentachlorophenol (also called technical grade pentachlorophenol).

Pentachlorophenol was widely used as a pesticide and wood preservative. Since 1984, the purchase and use of pentachlorophenol has been restricted to certified applicators. It is no longer available to the general public. It is still used industrially as a wood preservative for utility poles, railroad ties, and wharf pilings.

What happens to pentachlorophenol when it enters the environment?

❏ Pentachlorophenol can be found in the air, water, and soil. It enters the environment through evaporation from treated wood surfaces, industrial spills, and disposal at uncontrolled hazardous waste sites.
❏ Pentachlorophenol is broken down by sunlight, other chemicals, and microorganisms to other chemicals within a couple of days to months.
❏ Pentachlorophenol is found in fish and other foods, but tissue levels are usually low.

How might I be exposed to pentachlorophenol?

❏ The general populations can be exposed to very low levels of pentachlorophenol in contaminated indoor and outdoor air, food, drinking water and soil.
❏ People who work or live near a wood treatment facility or in the production of utility poles, railroad ties, or wharf pilings may be exposed to pentachlorophenol in the air or by coming in contact with the treated wood.
❏ People living near hazardous waste sites may also be exposed to higher than usual levels of pentachlorophenol.

How can pentachlorophenol affect my health?

Studies in workers show that exposure to high levels of pentachlorophenol can cause the cells in the body to produce excess heat. When this occurs, a person may experience a very high fever, profuse sweating, and difficulty breathing. The body temperature can increase to dangerous levels, causing injury to various organs and tissues, and even death. Liver effects and damage to the immune system have also been observed in humans exposed to high levels of pentachlorophenol for a long time. Damage to the thyroid and reproductive system has been observed in laboratory animals exposed to high doses of pentachlorophenol. Some of the harmful effects of pentachlorophenol are caused by the other chemicals present in technical grade pentachlorophenol.

How likely is pentachlorophenol to cause cancer?

Some studies have found an increase in cancer risk in workers exposed to high levels of technical grade pentachlorophenol for a long time, but other studies have not found this. Increases in liver, adrenal gland, and nasal tumors have been found in laboratory animals exposed to high doses of pentachlorophenol.

The EPA has determined that pentachlorophenol is a probable human carcinogen and the International Agency for Cancer Research (IARC) considers it possibly carcinogenic to humans.

How can pentachlorophenol affect children?

Infants who were exposed to diapers and bedding which was accidentally contaminated with pentachlorophenol had high fevers, a large amount of sweating, difficulty breathing, and harmful effects on the nervous system and liver, and some died. Although these effects are similar to effects seen in adults exposed to pentachlorophenol, we do not know whether children and adults differ in their susceptibility to pentachlorophenol.

We do not know if exposure to pentachlorophenol will result in birth defects or other developmental effects in people. Death, low body weights, decreased growth, and skeletal effects have been observed in laboratory animals exposed to high levels of pentachlorophenol during development.

How can families reduce the risk of exposure to pentachlorophenol?

Pentachlorophenol was a widely used pesticide for a long time. Today its use is restricted and it can only be used by certified applicators. You may have old containers of pesticides in your attic, basement, or garage that contain pentachlorophenol. Removing these old containers will reduce your family's risk of exposure to pentachlorophenol.

If you live near utility poles and railroad tracks, you should prevent your children from playing, climbing, or sitting on them especially in the hot summer months.

Though pentachlorophenol has been found in some food, its levels are low. You can minimize the risk of your family's exposure by peeling and thoroughly washing fruits and vegetables before cooking.

Children should avoid playing in soils near hazardous waste sites where pentachlorophenol may have been discarded.

Is there a medical test to show whether I've been exposed to pentachlorophenol?

Tests are available to measure pentachlorophenol and its breakdown product in blood, urine, and body tissues. These tests cannot be performed in the doctor's office because they require the use of special equipment. Because pentachlorophenol leaves the body fairly quickly, these tests are best for finding exposures that occurred within the last several days. These tests do not tell you how much pentachlorophenol you have been exposed to and cannot be used to predict the occurrence, nature, or severity of toxic effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit for drinking water of 1 part of pentachlorophenol per billion parts of water (1 ppb).

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.5 milligrams of pentachlorophenol per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toxicological Profile for Pentachlorophenol Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TRICHLOROETHYLENE

CAS # 79-01-6

Division of Toxicology ToxFAQs™ July 2003

This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

What happens to trichloroethylene when it enters the environment?

- Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- Trichloroethylene does not build up significantly in plants and animals.

How might I be exposed to trichloroethylene?

- Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is "probably carcinogenic to humans."

Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: The ability of a substance to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.
Nonflammable: Will not burn.
ppm: Parts per million.
Sediment: Mud and debris that have settled to the bottom of a body of water.
Solvent: A chemical that dissolves other substances.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

tert-butyl alcohol

What is tert-butyl alcohol?
Tert-butyl alcohol (CAS 75-65-0) is a compound with a variety of uses including the manufacturing flotation agents and flavors, as a solvent, as a paint remover, and as an octane booster in gasoline.

What happens to tert-butyl alcohol when it enters the environment?
If released into the air tert-butyl alcohol will exist solely as a vapor. The half life for degradation of airborne tert-butyl alcohol is an estimated 14 days. In soil, tert-butyl alcohol is highly mobile. Volatilization from moist soil surfaces is expected to be an important fate process. Volatilization from dry soil surfaces may also occur. Tert-butyl alcohol is not expected to adsorb to suspended solids and sediment in water.

How might I be exposed to tert-butyl alcohol?
Exposure to tert-butyl alcohol is possible through inhalation of ambient air, ingestion of food and drinking water, and through dermal contact with products containing tert-butyl alcohol. Worker exposures may occur through inhalation and dermal contact with this compound at workplaces where tert-butyl alcohol is produced or used.

How can tert-butyl alcohol enter and leave my body?

Uptake into the body:
Tert-butyl alcohol can be absorbed into the body following ingestion (via eating or drinking), inhalation (via breathing) and dermal exposures (across the skin).

How can tert-butyl alcohol affect my health and the environment?
Tert-butyl alcohol primarily impairs the central nervous system and may cause headache, muscle weakness, giddiness, incoordination, confusion, nausea and vomiting. Irritation of skin, eyes, and throat, coughing, and shortness of breath may also be noted. It may also be irritating to skin upon direct contact (HSDB, 1995).

ACGIH considers tert-butyl alcohol an A4 compound indicating that it is not classifiable as a Human Carcinogen. There is limited evidence that tert-Butyl alcohol can cause cancer as demonstrated in studies using mice (NTP).

References
Toxnet (HSDB): http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~dqnf2Q:1

National Toxicology Program (NTP): TR 436 Toxicology and Carcinogenesis Studies of t -Butyl Alcohol (CAS No. 75-65-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies) http://ntp.niehs.nih.gov/ntpweb/index.cfm?objectid=0709F73D-A849-80CA-5FB784E866B576D1

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TETRACHLOROETHYLENE
CAS # 127-18-4

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is tetrachloroethylene?

(Pronounced tĕt′rə-klôr′ ō-ĕth′ə-lēn′)

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be performed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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TOLUENE
CAS # 108-88-3

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

❏ Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petrolieum products as well as from leasking underground storage tanks at gasoline stations and other facilities.

❏ When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

❏ Toluene does not usually stay in the environment long.

❏ Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

❏ Breathing contaminated workplace air or automobile exhaust.

❏ Working with gasoline, kerosene, heating oil, paints, and lacquers.

❏ Drinking contaminated well-water.

❏ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

Is there a medical test to show whether I've been exposed to toluene?

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

VINYL CHLORIDE

CAS # 75-01-4

Division of Toxicology and Environmental Medicine ToxFAQs™ July 2006

This fact sheet answers the most frequently asked health questions (FAQs) about vinyl chloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to vinyl chloride occurs mainly in the workplace. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, unconsciousness, and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. This substance has been found in at least 616 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is vinyl chloride?

Vinyl chloride is a colorless gas. It burns easily and it is not stable at high temperatures. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Vinyl chloride is also known as chloroethene, chloroethylene, and ethylene monochloride.

What happens to vinyl chloride when it enters the environment?

❑ Liquid vinyl chloride evaporates easily. Vinyl chloride in water or soil evaporates rapidly if it is near the surface.
❑ Vinyl chloride in the air breaks down in a few days to other substances, some of which can be harmful.
❑ Small amounts of vinyl chloride can dissolve in water.
❑ Vinyl chloride is unlikely to build up in plants or animals that you might eat.

How might I be exposed to vinyl chloride?

❑ Breathing vinyl chloride that has been released from plastics industries, hazardous waste sites, and landfills.
❑ Breathing vinyl chloride in air or during contact with your skin or eyes in the workplace.
❑ Drinking water from contaminated wells.

How can vinyl chloride affect my health?

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. People are more likely to develop these changes if they breathe high levels of vinyl chloride. Some people who work with vinyl chloride have nerve damage and develop immune reactions. The lowest levels that produce liver changes, nerve damage, and immune reaction in people are not known. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow in their hands. Their fingers turn white and hurt when they go into the cold.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

Animal studies have shown that long-term exposure to vinyl chloride can damage the sperm and testes.

How likely is vinyl chloride to cause cancer?

The U.S. Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, lung cancer, and some cancers of the blood have also been observed in workers.

How can vinyl chloride affect children?

It has not been proven that vinyl chloride causes birth defects in humans, but studies in animals suggest that vinyl chloride might affect growth and development. Animal studies also suggest that infants and young children might be more susceptible than adults to vinyl chloride-induced cancer.

How can families reduce the risk of exposure to vinyl chloride?

Tobacco smoke contains low levels of vinyl chloride, so limiting your family's exposure to cigarette or cigar smoke may help reduce their exposure to vinyl chloride.

Is there a medical test to show whether I've been exposed to vinyl chloride?

The results of several tests can sometimes show if you have been exposed to vinyl chloride. Vinyl chloride can be measured in your breath, but the test must be done shortly after exposure. This is not helpful for measuring very low levels of vinyl chloride. The amount of the major breakdown product of vinyl chloride, thiodiglycolic acid, in the urine may give some information about exposure. However, this test must be done shortly after exposure and does not reliably indicate the level of exposure.

Has the federal government made recommendations to protect human health?

Vinyl chloride is regulated in drinking water, food, and air. The EPA requires that the amount of vinyl chloride in drinking water not exceed 0.002 milligrams per liter (mg/L) of water.

The Occupational Safety and Health Administration (OSHA) has set a limit of 1 part vinyl chloride per 1 million parts of air (1 ppm) in the workplace.

The Food and Drug Administration (FDA) regulates the vinyl chloride content of various plastics. These include plastics that carry liquids and plastics that contact food. The limits for vinyl chloride content vary depending on the nature of the plastic and its use.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Vinyl Chloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

XYLENE

CAS # 1330-20-7

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2005

This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. Xylene has been found in at least 844 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

There are three forms of xylene in which the methyl groups vary on the benzene ring: *meta*-xylene, *ortho*-xylene, and *para*-xylene (*m*-, *o*-, and *p*-xylene). These different forms are referred to as isomers.

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar. Chemical industries produce xylene from petroleum. It is one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

❏ Xylene evaporates quickly from the soil and surface water into the air.
❏ In the air, it is broken down by sunlight into other less harmful chemicals.
❏ It is broken down by microorganisms in soil and water.
❏ Only a small amount of it builds up in fish, shellfish, plants, and other animals living in xylene-contaminated water.

How might I be exposed to xylene?

❏ Using a variety of consumer products including gasoline, pain, varnish, shellac, rust preventives, and cigarette smoke. Xylene can be absorbed through the respiratory tract and through the skin.
❏ Ingesting xylene-contaminated food or water, although these levels are likely to be very low.
❏ Working in a job that involves the use of xylene such as painters, paint industry workers, biomedical laboratory workers, automobile garage workers, metal workers, and furniture refinishers.

How can xylene affect my health?

No health effects have been noted at the background levels that people are exposed to on a daily basis.

High levels of exposure for short or long periods can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

How likely is xylene to cause cancer?

Both the International Agency for Research on Cancer (IARC) and the EPA have found that there is insufficient information to determine whether or not xylene is carcinogenic.

How can xylene affect children?

The effects of xylene have not been studied in children, but it is likely that they would be similar to those seen in exposed adults. Although there is no direct evidence, children may be more sensitive to acute inhalation exposure than adults because their narrower airways would be more sensitive to swelling effects.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How can families reduce the risks of exposure to xylene?

❑ Exposure to xylene as solvents (in paints or gasoline) can be reduced if the products are used with adequate ventilation and if they are stored in tightly closed containers out of the reach of small children.

❑ Sometimes older children sniff household chemicals in attempt to get high. Talk with your children about the dangers of sniffing xylene.

❑ If products containing xylene are spilled on the skin, then the excess should be wiped off and the area cleaned with soap and water.

Is there a medical test to determine whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA set a limit of 10 parts xylene per million parts drinking water (10 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 100 parts xylene per million parts of workplace air (100 ppm) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Xylene (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Attachment 5
proUCL Outputs (on CD)

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
Main Property - Shallow	
1	1,1,1-Trichloroethane
2	1,1-Dichloroethane
3	1,1-Dichloroethene
4	1,2,3,4,6,7,8-HpCDD
5	1,2,3,4,6,7,8-HpCDF
6	1,2,3,4,7,8,9-HpCDF
7	1,2,3,4,7,8-HxCDD
8	1,2,3,4,7,8-HxCDF
9	1,2,3,6,7,8-HxCDD
10	1,2,3,6,7,8-HxCDF
11	1,2,3,7,8,9-HxCDD
12	1,2,3,7,8,9-HxCDF
13	1,2,3,7,8-PeCDD
14	1,2,4-Trichlorobenzene
15	1,2-Dichlorobenzene
16	1,2-Dichloroethane
17	1,3-Dichlorobenzene
18	1,4-Dichlorobenzene
20	2,3,4,6,7,8-HxCDF
21	2,3,4,7,8-PeCDF
22	2,3,7,8-TCDF
23	2-Methylnaphthalene
24	2-Methylphenol
25	4,4'-DDD
26	4,4'-DDE
27	4,4'-DDT
28	4-Chloro-3-methylphenol
29	4-Methylphenol
30	Acenaphthene
31	Acetone
32	Aldrin
33	Aluminum
34	Anthracene
35	Antimony
36	Aroclor-1260
37	Arsenic
38	Barium
39	Benzene
40	Benzo(a)anthracene
41	Benzo(a)pyrene
42	Benzo(b)fluoranthene
43	Benzo(g,h,i)perylene
44	Benzo(k)fluoranthene

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
45	Benzyl butyl phthalate
46	Beryllium
47	Biphenyl (diphenyl)
48	Cadmium
49	Calcium
50	Caprolactam
51	Carbazole
52	Carbon disulfide
53	Chlorobenzene
54	Chloroethane
55	Chloromethane
56	Chromium
57	Chrysene
58	Cobalt
59	Copper
60	Cyclohexane
61	Di-n-butyl phthalate
62	Dibenz(a,h)anthracene
63	Dibenzofuran
64	Dieldrin
65	Endosulfan sulfate
66	Endrin
67	Endrin aldehyde
68	Endrin ketone
69	Ethylbenzene
70	Fluoranthene
71	Fluorene
72	HPCDD (total)
73	HPCDF (total)
74	Heptachlor
75	HxCDD (total)
76	HxCDF (total)
77	Indeno(1,2,3-c,d)pyrene
78	Iron
79	Isopropylbenzene (cumene)
80	Lead
81	Magnesium
82	Manganese
83	Methoxychlor
84	Methyl ethyl ketone
85	Methyl isobutyl ketone
86	Methyl tert-butyl ether
87	Methylcyclohexane
88	Methylene chloride
89	Naphthalene
90	Nickel

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
91	OCDD
92	OCDF
93	PeCDD (total)
94	PeCDF (total)
95	Phenanthrene
96	Potassium
97	Pyrene
98	Selenium
99	Silver
100	Sodium
101	Styrene
102	TCDD (total)
103	TCDF (total)
104	Tetrachloroethene
105	Thallium
106	Toluene
107	Total Dioxin Toxicity equivalent
108	Trichloroethene
109	Vanadium
110	Vinyl chloride
111	Xylenes, total
112	Zinc
113	alpha-BHC
114	alpha-Chlordane
115	beta-BHC
116	bis(2-Ethylhexyl)phthalate
117	cis-1,2-Dichloroethene
118	delta-BHC
119	gamma-Chlordane
120	trans-1,2-Dichloroethene
Main Property - Deep	
1	1,1,1-Trichloroethane
2	1,1-Dichloroethane
3	1,1-Dichloroethene
4	1,2,3,4,6,7,8-HpCDD
5	1,2,3,4,6,7,8-HpCDF
6	1,2,3,4,7,8,9-HpCDF
7	1,2,3,4,7,8-HxCDD
8	1,2,3,4,7,8-HxCDF
9	1,2,3,6,7,8-HxCDD
10	1,2,3,6,7,8-HxCDF
11	1,2,3,7,8,9-HxCDD
12	1,2,3,7,8,9-HxCDF
13	1,2,3,7,8-PeCDD
14	1,2,4-Trichlorobenzene

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
15	1,2-Dichlorobenzene
16	1,2-Dichloroethane
17	1,3-Dichlorobenzene
18	1,4-Dichlorobenzene
19	1,4-Dioxane (p-dioxane)
20	2,3,4,6,7,8-HxCDF
21	2,3,4,7,8-PeCDF
22	2,3,7,8-TCDF
23	2-Methylnaphthalene
24	2-Methylphenol
25	4,4'-DDD
26	4,4'-DDE
27	4,4'-DDT
28	4-Chloro-3-methylphenol
29	4-Methylphenol
30	Acenaphthene
31	Acetone
32	Acetophenone
33	Aldrin
34	Aluminum
35	Anthracene
36	Antimony
37	Aroclor-1260
38	Arsenic
39	Barium
40	Benzene
41	Benzo(a)anthracene
42	Benzo(a)pyrene
43	Benzo(b)fluoranthene
44	Benzo(g,h,i)perylene
45	Benzo(k)fluoranthene
46	Benzyl butyl phthalate
47	Beryllium
48	Biphenyl (diphenyl)
49	Cadmium
50	Calcium
51	Caprolactam
52	Carbazole
53	Carbon disulfide
54	Chlorobenzene
55	Chloroethane
56	Chloromethane
57	Chromium
58	Chrysene
59	Cobalt
60	Copper

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
61	Cyclohexane
62	Di-n-butyl phthalate
63	Dibenz(a,h)anthracene
64	Dibenzofuran
65	Dieldrin
66	Endosulfan sulfate
67	Endrin
68	Endrin aldehyde
69	Endrin ketone
70	Ethylbenzene
71	Fluoranthene
72	Fluorene
73	HPCDD (total)
74	HPCDF (total)
75	Heptachlor
76	HxCDD (total)
77	HxCDF (total)
78	Indeno(1,2,3-c,d)pyrene
79	Iron
80	Isopropylbenzene (cumene)
81	Lead
82	Magnesium
83	Manganese
84	Methoxychlor
85	Methyl ethyl ketone
86	Methyl isobutyl ketone
87	Methyl tert-butyl ether
88	Methylcyclohexane
89	Methylene chloride
90	Naphthalene
91	Nickel
92	OCDD
93	OCDF
94	PeCDD (total)
95	PeCDF (total)
96	Pentachlorophenol
97	Phenanthrene
98	Potassium
99	Pyrene
100	Selenium
101	Silver
102	Sodium
103	Styrene
104	TCDD (total)
105	TCDF (total)
106	Tetrachloroethene

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
107	Thallium
108	Toluene
109	Total Dioxin Toxicity equivalent
110	Trichloroethene
111	Vanadium
112	Vinyl chloride
113	Xylenes, total
114	Zinc
115	alpha-BHC
116	alpha-Chlordane
117	beta-BHC
118	bis(2-Ethylhexyl)phthalate
119	cis-1,2-Dichloroethene
120	delta-BHC
121	gamma-BHC
122	gamma-Chlordane
123	trans-1,2-Dichloroethene
Parking Lot - Deep	
2	2-Methylnaphthalene
3	4,4'-DDD
4	4,4'-DDE
5	4,4'-DDT
6	Acenaphthylene
7	Acetone
8	Aluminum
9	Anthracene
10	Antimony
11	Arsenic
12	Barium
13	Benzo(a)anthracene
14	Benzo(a)pyrene
15	Benzo(b)fluoranthene
16	Benzo(g,h,i)perylene
17	Benzo(k)fluoranthene
18	Beryllium
19	Biphenyl (diphenyl)
20	Cadmium
21	Calcium
22	Chromium
23	Chrysene
24	Cobalt
25	Copper
26	Dibenz(a,h)anthracene
27	Dieldrin
28	Endrin

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
29	Endrin ketone
30	Fluoranthene
31	Fluorene
32	Indeno(1,2,3-c,d)pyrene
33	Iron
34	Lead
35	Magnesium
36	Manganese
37	Methoxychlor
38	Methyl ethyl ketone
39	Methylene chloride
40	Naphthalene
41	Nickel
42	Phenanthrene
43	Potassium
44	Pyrene
45	Selenium
46	Silver
47	Sodium
48	Thallium
49	Toluene
50	Vanadium
51	Xylenes, total
52	Zinc
53	cis-1,2-Dichloroethene
54	gamma-Chlordane
Large Vacant Lot - Shallow	
1	1,2-Dichlorobenzene
2	1,4-Dichlorobenzene
3	2-Methylnaphthalene
4	4,4'-DDD
5	4,4'-DDE
6	4,4'-DDT
7	Acetone
8	Acetophenone
9	Aluminum
10	Antimony
11	Aroclor-1260
12	Arsenic
13	Barium
14	Benzo(a)anthracene
15	Benzo(a)pyrene
16	Benzo(b)fluoranthene
17	Benzo(g,h,i)perylene
18	Benzo(k)fluoranthene

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
19	Beryllium
20	Cadmium
21	Calcium
22	Caprolactam
23	Chlorobenzene
24	Chromium
25	Chrysene
26	Cobalt
27	Copper
28	Dibenz(a,h)anthracene
29	Dieldrin
30	Endosulfan sulfate
31	Endrin
32	Endrin aldehyde
33	Endrin ketone
34	Ethylbenzene
35	Fluoranthene
36	Heptachlor
37	Heptachlor epoxide
38	Indeno(1,2,3-c,d)pyrene
39	Iron
40	Isopropylbenzene (cumene)
41	Lead
42	Magnesium
43	Manganese
44	Methoxychlor
45	Methyl ethyl ketone
46	Methyl isobutyl ketone
47	Methylcyclohexane
48	Methylene chloride
49	Naphthalene
50	Nickel
51	Phenanthrene
52	Potassium
53	Pyrene
54	Selenium
55	Silver
56	Sodium
57	Tetrachloroethene
58	Thallium
59	Toluene
60	Trichloroethene
61	Vanadium
62	Xylenes, total
63	Zinc
64	alpha-BHC

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
65	alpha-Chlordane
66	beta-BHC
67	bis(2-Ethylhexyl)phthalate
68	cis-1,2-Dichloroethene
69	gamma-BHC
70	gamma-Chlordane
Large Vacant Lot - Deep	
1	1,1-Dichloroethane
2	1,2-Dichlorobenzene
3	1,3-Dichlorobenzene
4	1,4-Dichlorobenzene
5	2-Methylnaphthalene
6	4,4'-DDD
7	4,4'-DDE
8	4,4'-DDT
9	Acetone
10	Acetophenone
11	Aluminum
12	Anthracene
13	Antimony
14	Aroclor-1260
15	Arsenic
16	Barium
17	Benzo(a)anthracene
18	Benzo(a)pyrene
19	Benzo(b)fluoranthene
20	Benzo(g,h,i)perylene
21	Benzo(k)fluoranthene
22	Benzyl butyl phthalate
23	Beryllium
24	Cadmium
25	Calcium
26	Caprolactam
27	Chlorobenzene
28	Chromium
29	Chrysene
30	Cobalt
31	Copper
32	Dibenz(a,h)anthracene
33	Dieldrin
34	Endosulfan I
35	Endosulfan sulfate
36	Endrin
37	Endrin aldehyde
38	Endrin ketone

Table of Contents for Attachment 5a - ProUCL Files - Soil
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Location - Chemical Name
39	Ethylbenzene
40	Fluoranthene
41	Heptachlor
42	Heptachlor epoxide
43	Indeno(1,2,3-c,d)pyrene
44	Iron
45	Isopropylbenzene (cumene)
46	Lead
47	Magnesium
48	Manganese
49	Methoxychlor
50	Methyl ethyl ketone
51	Methyl isobutyl ketone
52	Methylcyclohexane
53	Methylene chloride
54	Naphthalene
55	Nickel
56	Phenanthrene
57	Potassium
58	Pyrene
59	Selenium
60	Silver
61	Sodium
62	Tetrachloroethene
63	Thallium
64	Toluene
65	Trichloroethene
66	Vanadium
67	Vinyl chloride
68	Xylenes, total
69	Zinc
70	alpha-BHC
71	alpha-Chlordane
72	beta-BHC
73	bis(2-Ethylhexyl)phthalate
74	cis-1,2-Dichloroethene
75	gamma-BHC
76	gamma-Chlordane

Former AMCO Chemical Facility – Shallow Soil

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_1
1,1,1-Trichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.252679
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	81		
Mean	9.47619	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	15.64744
Standard Deviation	16.39701		
Variance	268.8619	Gamma Distribution Test	
Coefficient of Variation	1.730338	A-D Test Statistic	6.345014
Skewness	4.574399	A-D 5% Critical Value	0.757654
		K-S Test Statistic	0.486312
Gamma Statistics		K-S 5% Critical Value	0.192634
k hat	1.562215	Data do not follow gamma distribution	
k star (bias corrected)	1.370787	at 5% significance level	
Theta hat	6.065868		
Theta star	6.912954	95% UCLs (Assuming Gamma Distribution)	
nu hat	65.61303	Approximate Gamma UCL	13.26539
nu star	57.57307	Adjusted Gamma UCL	13.61903
Approx.Chi Square Value (.05)	41.12758		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	40.05964	Shapiro-Wilk Test Statisitic	0.360103
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	4.394449	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.895777	95% H-UCL	10.29149
Standard Deviation of log data	0.579613	95% Chebyshev (MVUE) UCL	12.31885
Variance of log data	0.335951	97.5% Chebyshev (MVUE) UCL	14.27252
		99% Chebyshev (MVUE) UCL	18.11013
		95% Non-parametric UCLs	
		CLT UCL	15.36168
		Adj-CLT UCL (Adjusted for skewness)	19.17813
		Mod-t UCL (Adjusted for skewness)	16.24273
		Jackknife UCL	15.64744
		Standard Bootstrap UCL	15.25575
		Bootstrap-t UCL	143.6557
RECOMMENDATION		Hall's Bootstrap UCL	54.11914
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	16.59524
		BCA Bootstrap UCL	20.2381
Use 95%		95% Chebyshev (Mean, Sd) UCL	25.07286
		97.5% Chebyshev (Mean, Sd) UCL	31.82155
		99% Chebyshev (Mean, Sd) UCL	45.07804

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_2
1,1-Dichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.358058
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	14000		
Mean	1334	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	2857.961
Standard Deviation	4049.165		
Variance	16395736	Gamma Distribution Test	
Coefficient of Variation	3.035356	A-D Test Statistic	4.235981
Skewness	2.979161	A-D 5% Critical Value	0.894351
		K-S Test Statistic	0.330083
Gamma Statistics		K-S 5% Critical Value	0.210082
k hat	0.189402	Data do not follow gamma distribution	
k star (bias corrected)	0.19409	at 5% significance level	
Theta hat	7043.226		
Theta star	6873.084	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.954877	Approximate Gamma UCL	3852.732
nu star	8.1518	Adjusted Gamma UCL	4204.107
Approx.Chi Square Value (.05)	2.822543		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.586638	Shapiro-Wilk Test Statisitic	0.700204
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	9.546813	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.277486	95% H-UCL	9870.088
Standard Deviation of log data	2.498359	95% Chebyshev (MVUE) UCL	1506.604
Variance of log data	6.241797	97.5% Chebyshev (MVUE) UCL	1993.817
		99% Chebyshev (MVUE) UCL	2950.852
		95% Non-parametric UCLs	
		CLT UCL	2787.393
		Adj-CLT UCL (Adjusted for skewness)	3401.184
		Mod-t UCL (Adjusted for skewness)	2953.7
		Jackknife UCL	2857.961
		Standard Bootstrap UCL	2709.797
		Bootstrap-t UCL	50026.93
RECOMMENDATION		Hall's Bootstrap UCL	54484
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2707.476
		BCA Bootstrap UCL	3290.976
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5185.524
		97.5% Chebyshev (Mean, Sd) UCL	6852.082
		99% Chebyshev (Mean, Sd) UCL	10125.71

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_3
1,1-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.289065
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	240		
Mean	19	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	38.3855
Standard Deviation	51.50728		
Variance	2653	Gamma Distribution Test	
Coefficient of Variation	2.71091	A-D Test Statistic	6.364944
Skewness	4.358379	A-D 5% Critical Value	0.790244
		K-S Test Statistic	0.526677
Gamma Statistics		K-S 5% Critical Value	0.198057
k hat	0.667404	Data do not follow gamma distribution	
k star (bias corrected)	0.603807	at 5% significance level	
Theta hat	28.4685		
Theta star	31.46701	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.03099	Approximate Gamma UCL	32.36939
nu star	25.35989	Adjusted Gamma UCL	33.7666
Approx.Chi Square Value (.05)	14.8856		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	14.26966	Shapiro-Wilk Test Statisitic	0.41391
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	5.480639	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.032822	95% H-UCL	19.3247
Standard Deviation of log data	0.91985	95% Chebyshev (MVUE) UCL	22.34379
Variance of log data	0.846124	97.5% Chebyshev (MVUE) UCL	27.1035
		99% Chebyshev (MVUE) UCL	36.45302
		95% Non-parametric UCLs	
		CLT UCL	37.48784
		Adj-CLT UCL (Adjusted for skewness)	48.91017
		Mod-t UCL (Adjusted for skewness)	40.16716
		Jackknife UCL	38.3855
		Standard Bootstrap UCL	37.36001
		Bootstrap-t UCL	1707.493
RECOMMENDATION		Hall's Bootstrap UCL	467.585
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	41.2381
		BCA Bootstrap UCL	52.59524
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	67.9932
		97.5% Chebyshev (Mean, Sd) UCL	89.19259
		99% Chebyshev (Mean, Sd) UCL	130.8347

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_4
1,2,3,4,6,7,8-HpCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.859717
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.706	Data are normal at 5% significance level	
Maximum	1100		
Mean	409.1765	95% UCL (Assuming Normal Distribution)	
Median	268	Student's-t UCL	972.2605
Standard Deviation	478.5356		
Variance	228996.3	Gamma Distribution Test	
Coefficient of Variation	1.169509	A-D Test Statistic	0.39004
Skewness	1.549014	A-D 5% Critical Value	0.690353
		K-S Test Statistic	0.324773
Gamma Statistics		K-S 5% Critical Value	0.413436
k hat	0.418666	Data follow gamma distribution	
k star (bias corrected)	0.271333	at 5% significance level	
Theta hat	977.3341		
Theta star	1508.022	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.349328	Approximate Gamma UCL	5043.375
nu star	2.170665	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.176109		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.809603
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.34814		
Maximum of log data	7.003065	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.453874	95% H-UCL	1.18E+28
Standard Deviation of log data	3.273035	95% Chebyshev (MVUE) UCL	6000.867
Variance of log data	10.71276	97.5% Chebyshev (MVUE) UCL	8083.904
		99% Chebyshev (MVUE) UCL	12175.63
		95% Non-parametric UCLs	
		CLT UCL	802.737
		Adj-CLT UCL (Adjusted for skewness)	1000.748
		Mod-t UCL (Adjusted for skewness)	1003.146
		Jackknife UCL	972.2605
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1452.121
		97.5% Chebyshev (Mean, Sd) UCL	1903.403
		99% Chebyshev (Mean, Sd) UCL	2789.861

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_5
1,2,3,4,6,7,8-HpCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.900289
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1895	Data are normal at 5% significance level	
Maximum	178		
Mean	70.09737	95% UCL (Assuming Normal Distribution)	
Median	51.1	Student's-t UCL	159.7465
Standard Deviation	76.18812		
Variance	5804.629	Gamma Distribution Test	
Coefficient of Variation	1.08689	A-D Test Statistic	0.397338
Skewness	1.344229	A-D 5% Critical Value	0.685956
		K-S Test Statistic	0.325817
Gamma Statistics		K-S 5% Critical Value	0.411957
k hat	0.456535	Data follow gamma distribution	
k star (bias corrected)	0.2808	at 5% significance level	
Theta hat	153.5422		
Theta star	249.6342	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.65228	Approximate Gamma UCL	831.8925
nu star	2.246403	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.189288		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.806079
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.663366		
Maximum of log data	5.181784	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.838619	95% H-UCL	1.35E+24
Standard Deviation of log data	3.063326	95% Chebyshev (MVUE) UCL	917.8752
Variance of log data	9.383966	97.5% Chebyshev (MVUE) UCL	1235.387
		99% Chebyshev (MVUE) UCL	1859.078
		95% Non-parametric UCLs	
		CLT UCL	132.7565
		Adj-CLT UCL (Adjusted for skewness)	160.1143
		Mod-t UCL (Adjusted for skewness)	164.0138
		Jackknife UCL	159.7465
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	236.1455
		97.5% Chebyshev (Mean, Sd) UCL	307.9947
		99% Chebyshev (Mean, Sd) UCL	449.1285

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_6
1,2,3,4,7,8,9-HpCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.927307
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2085	Data are normal at 5% significance level	
Maximum	8.51		
Mean	3.553375	95% UCL (Assuming Normal Distribution)	
Median	2.7475	Student's-t UCL	7.933529
Standard Deviation	3.722464		
Variance	13.85673	Gamma Distribution Test	
Coefficient of Variation	1.047585	A-D Test Statistic	0.213539
Skewness	0.935607	A-D 5% Critical Value	0.669064
		K-S Test Statistic	0.203124
Gamma Statistics		K-S 5% Critical Value	0.404139
k hat	0.833729	Data follow gamma distribution	
k star (bias corrected)	0.375099	at 5% significance level	
Theta hat	4.262024		
Theta star	9.473165	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.669836	Approximate Gamma UCL	28.62701
nu star	3.000792	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.372478		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.956875
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.567816		
Maximum of log data	2.141242	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.55987	95% H-UCL	5190828
Standard Deviation of log data	1.625909	95% Chebyshev (MVUE) UCL	16.09602
Variance of log data	2.643581	97.5% Chebyshev (MVUE) UCL	21.2948
		99% Chebyshev (MVUE) UCL	31.50681
		95% Non-parametric UCLs	
		CLT UCL	6.614829
		Adj-CLT UCL (Adjusted for skewness)	7.545175
		Mod-t UCL (Adjusted for skewness)	8.078645
		Jackknife UCL	7.933529
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	11.6663
		97.5% Chebyshev (Mean, Sd) UCL	15.17676
		99% Chebyshev (Mean, Sd) UCL	22.0724

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t			Variable:	_7		
1,2,3,4,7,8-HxCDD							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.713629
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.1915	Data not normal at 5% significance level			
Maximum			16.4				
Mean			5.030375	95% UCL (Assuming Normal Distribution)			
Median			1.765	Student's-t UCL			13.99194
Standard Deviation			7.615967				
Variance			58.00296	Gamma Distribution Test			
Coefficient of Variation			1.513996	A-D Test Statistic			0.392906
Skewness			1.941968	A-D 5% Critical Value			0.676996
				K-S Test Statistic			0.338496
Gamma Statistics				K-S 5% Critical Value			0.408316
k hat			0.592222	Data follow gamma distribution			
k star (bias corrected)			0.314722	at 5% significance level			
Theta hat			8.494075				
Theta star			15.98355	95% UCLs (Assuming Gamma Distribution)			
nu hat			4.737773	Approximate Gamma UCL			51.68354
nu star			2.517777	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.245056				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.946234
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.652868				
Maximum of log data			2.797281	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			0.570161	95% H-UCL			2.09E+08
Standard Deviation of log data			1.81678	95% Chebyshev (MVUE) UCL			20.5046
Variance of log data			3.300691	97.5% Chebyshev (MVUE) UCL			27.24373
				99% Chebyshev (MVUE) UCL			40.48143
				95% Non-parametric UCLs			
				CLT UCL			11.29395
				Adj-CLT UCL (Adjusted for skewness)			15.24477
				Mod-t UCL (Adjusted for skewness)			14.60819
				Jackknife UCL			13.99194
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			21.62899
				97.5% Chebyshev (Mean, Sd) UCL			28.81123
				99% Chebyshev (Mean, Sd) UCL			42.91933
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_8
1,2,3,4,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.935236
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1595	Data are normal at 5% significance level	
Maximum	2.46		
Mean	1.088625	95% UCL (Assuming Normal Distribution)	
Median	0.8675	Student's-t UCL	2.263393
Standard Deviation	0.998373		
Variance	0.996749	Gamma Distribution Test	
Coefficient of Variation	0.917096	A-D Test Statistic	0.189932
Skewness	1.109988	A-D 5% Critical Value	0.663687
		K-S Test Statistic	0.166042
Gamma Statistics		K-S 5% Critical Value	0.40041
k hat	1.344638	Data follow gamma distribution	
k star (bias corrected)	0.502826	at 5% significance level	
Theta hat	0.809604		
Theta star	2.165012	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.75711	Approximate Gamma UCL	5.995863
nu star	4.02261	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.730356		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.982092
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.835711		
Maximum of log data	0.900161	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.330929	95% H-UCL	1444.272
Standard Deviation of log data	1.15885	95% Chebyshev (MVUE) UCL	3.745045
Variance of log data	1.342934	97.5% Chebyshev (MVUE) UCL	4.872804
		99% Chebyshev (MVUE) UCL	7.088069
		95% Non-parametric UCLs	
		CLT UCL	1.909714
		Adj-CLT UCL (Adjusted for skewness)	2.205741
		Mod-t UCL (Adjusted for skewness)	2.309567
		Jackknife UCL	2.263393
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.264529
		97.5% Chebyshev (Mean, Sd) UCL	4.206045
		99% Chebyshev (Mean, Sd) UCL	6.055469

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_9
1,2,3,6,7,8-HxCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.7472
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1855	Data not normal at 5% significance level	
Maximum	73.5		
Mean	22.75387	95% UCL (Assuming Normal Distribution)	
Median	8.665	Student's-t UCL	62.88646
Standard Deviation	34.10658		
Variance	1163.259	Gamma Distribution Test	
Coefficient of Variation	1.498935	A-D Test Statistic	0.253583
Skewness	1.902835	A-D 5% Critical Value	0.685789
		K-S Test Statistic	0.226573
Gamma Statistics		K-S 5% Critical Value	0.411901
k hat	0.457976	Data follow gamma distribution	
k star (bias corrected)	0.281161	at 5% significance level	
Theta hat	49.68359		
Theta star	80.9284	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.663805	Approximate Gamma UCL	269.6367
nu star	2.249285	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.189811		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.939988
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.6847		
Maximum of log data	4.297285	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.718608	95% H-UCL	9.03E+15
Standard Deviation of log data	2.495773	95% Chebyshev (MVUE) UCL	148.2611
Variance of log data	6.228881	97.5% Chebyshev (MVUE) UCL	198.8041
		99% Chebyshev (MVUE) UCL	298.0859
		95% Non-parametric UCLs	
		CLT UCL	50.80404
		Adj-CLT UCL (Adjusted for skewness)	68.14047
		Mod-t UCL (Adjusted for skewness)	65.59059
		Jackknife UCL	62.88646
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Adjusted Gamma UCL not available		95% Chebyshev (Mean, Sd) UCL	97.08744
try Approximate Gamma UCL		97.5% Chebyshev (Mean, Sd) UCL	129.2516
		99% Chebyshev (Mean, Sd) UCL	192.432
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_10
1,2,3,6,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.883881
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2555	Data are normal at 5% significance level	
Maximum	16.8		
Mean	6.341375	95% UCL (Assuming Normal Distribution)	
Median	4.155	Student's-t UCL	15.03562
Standard Deviation	7.388785		
Variance	54.59414	Gamma Distribution Test	
Coefficient of Variation	1.165171	A-D Test Statistic	0.189507
Skewness	1.39902	A-D 5% Critical Value	0.67153
		K-S Test Statistic	0.165614
Gamma Statistics		K-S 5% Critical Value	0.405601
k hat	0.721014	Data follow gamma distribution	
k star (bias corrected)	0.34692	at 5% significance level	
Theta hat	8.79508		
Theta star	18.27906	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.768111	Approximate Gamma UCL	56.96506
nu star	2.775361	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.308954		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.967177
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.364533		
Maximum of log data	2.821379	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.012341	95% H-UCL	1.91E+08
Standard Deviation of log data	1.790513	95% Chebyshev (MVUE) UCL	30.90466
Variance of log data	3.205937	97.5% Chebyshev (MVUE) UCL	41.04019
		99% Chebyshev (MVUE) UCL	60.94948
		95% Non-parametric UCLs	
		CLT UCL	12.41811
		Adj-CLT UCL (Adjusted for skewness)	15.17943
		Mod-t UCL (Adjusted for skewness)	15.46633
		Jackknife UCL	15.03562
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	22.44486
		97.5% Chebyshev (Mean, Sd) UCL	29.41285
		99% Chebyshev (Mean, Sd) UCL	43.10011

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_11
1,2,3,7,8,9-HxCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.699058
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.159	Data not normal at 5% significance level	
Maximum	41.4		
Mean	11.94475	95% UCL (Assuming Normal Distribution)	
Median	3.11	Student's-t UCL	35.11435
Standard Deviation	19.69063		
Variance	387.7207	Gamma Distribution Test	
Coefficient of Variation	1.648475	A-D Test Statistic	0.329856
Skewness	1.966971	A-D 5% Critical Value	0.687149
		K-S Test Statistic	0.305708
Gamma Statistics		K-S 5% Critical Value	0.412358
k hat	0.446263	Data follow gamma distribution	
k star (bias corrected)	0.278232	at 5% significance level	
Theta hat	26.76616		
Theta star	42.93083	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.570105	Approximate Gamma UCL	143.2479
nu star	2.225859	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.185604		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.967124
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.838851		
Maximum of log data	3.723281	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.03133	95% H-UCL	1.3E+13
Standard Deviation of log data	2.277235	95% Chebyshev (MVUE) UCL	57.02209
Variance of log data	5.1858	97.5% Chebyshev (MVUE) UCL	76.29332
		99% Chebyshev (MVUE) UCL	114.1479
		95% Non-parametric UCLs	
		CLT UCL	28.13885
		Adj-CLT UCL (Adjusted for skewness)	38.48498
		Mod-t UCL (Adjusted for skewness)	36.72813
		Jackknife UCL	35.11435
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Adjusted Gamma UCL not available		95% Chebyshev (Mean, Sd) UCL	54.85947
try Approximate Gamma UCL		97.5% Chebyshev (Mean, Sd) UCL	73.42871
		99% Chebyshev (Mean, Sd) UCL	109.9044
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_12
1,2,3,7,8,9-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.71327
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.248	Data not normal at 5% significance level	
Maximum	8.75		
Mean	2.6795	95% UCL (Assuming Normal Distribution)	
Median	0.86	Student's-t UCL	7.462896
Standard Deviation	4.065158		
Variance	16.52551	Gamma Distribution Test	
Coefficient of Variation	1.517133	A-D Test Statistic	0.425927
Skewness	1.94736	A-D 5% Critical Value	0.673545
		K-S Test Statistic	0.317324
Gamma Statistics		K-S 5% Critical Value	0.406602
k hat	0.673529	Data follow gamma distribution	
k star (bias corrected)	0.335049	at 5% significance level	
Theta hat	3.978298		
Theta star	7.997338	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.388234	Approximate Gamma UCL	25.26651
nu star	2.680392	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.284254		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.94706
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.394327		
Maximum of log data	2.169054	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.083473	95% H-UCL	569084
Standard Deviation of log data	1.527867	95% Chebyshev (MVUE) UCL	8.874865
Variance of log data	2.334376	97.5% Chebyshev (MVUE) UCL	11.7102
		99% Chebyshev (MVUE) UCL	17.27968
		95% Non-parametric UCLs	
		CLT UCL	6.022795
		Adj-CLT UCL (Adjusted for skewness)	8.137472
		Mod-t UCL (Adjusted for skewness)	7.792743
		Jackknife UCL	7.462896
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	11.53931
		97.5% Chebyshev (Mean, Sd) UCL	15.37295
		99% Chebyshev (Mean, Sd) UCL	22.9034
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_13
1,2,3,7,8-PeCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.667757
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.3125	Data not normal at 5% significance level	
Maximum	15.3		
Mean	4.333125	95% UCL (Assuming Normal Distribution)	
Median	0.86	Student's-t UCL	12.94305
Standard Deviation	7.317121		
Variance	53.54026	Gamma Distribution Test	
Coefficient of Variation	1.688648	A-D Test Statistic	0.584373
Skewness	1.990374	A-D 5% Critical Value	0.679179
		K-S Test Statistic	0.394865
Gamma Statistics		K-S 5% Critical Value	0.4094
k hat	0.540784	Data follow gamma distribution	
k star (bias corrected)	0.301863	at 5% significance level	
Theta hat	8.012667		
Theta star	14.35462	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.326275	Approximate Gamma UCL	47.04652
nu star	2.414902	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.22242		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.877891
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.163151		
Maximum of log data	2.727853	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.305799	95% H-UCL	13023859
Standard Deviation of log data	1.689044	95% Chebyshev (MVUE) UCL	13.47895
Variance of log data	2.85287	97.5% Chebyshev (MVUE) UCL	17.85985
		99% Chebyshev (MVUE) UCL	26.46529
		95% Non-parametric UCLs	
		CLT UCL	10.35092
		Adj-CLT UCL (Adjusted for skewness)	14.24133
		Mod-t UCL (Adjusted for skewness)	13.54987
		Jackknife UCL	12.94305
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	20.28042
		97.5% Chebyshev (Mean, Sd) UCL	27.18083
		99% Chebyshev (Mean, Sd) UCL	40.73534
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_14
1,2,4-Trichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.352228
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.908
Minimum	2	Data not normal at 5% significance level	
Maximum	2100		
Mean	204.119	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	435.2113
Standard Deviation	614.0122		
Variance	377011	Gamma Distribution Test	
Coefficient of Variation	3.008108	A-D Test Statistic	5.611244
Skewness	2.975838	A-D 5% Critical Value	0.868637
		K-S Test Statistic	0.472719
Gamma Statistics		K-S 5% Critical Value	0.207615
k hat	0.248601	Data do not follow gamma distribution	
k star (bias corrected)	0.244833	at 5% significance level	
Theta hat	821.0693		
Theta star	833.7072	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.44126	Approximate Gamma UCL	509.6359
nu star	10.28299	Adjusted Gamma UCL	549.1035
Approx.Chi Square Value (.05)	4.118535		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	3.82251	Shapiro-Wilk Test Statisitic	0.571087
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	7.649693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.458976	95% H-UCL	316.8377
Standard Deviation of log data	1.844305	95% Chebyshev (MVUE) UCL	169.3269
Variance of log data	3.401461	97.5% Chebyshev (MVUE) UCL	219.5097
		99% Chebyshev (MVUE) UCL	318.084
		95% Non-parametric UCLs	
		CLT UCL	424.5104
		Adj-CLT UCL (Adjusted for skewness)	517.4814
		Mod-t UCL (Adjusted for skewness)	449.7129
		Jackknife UCL	435.2113
		Standard Bootstrap UCL	423.0845
		Bootstrap-t UCL	10109.52
RECOMMENDATION		Hall's Bootstrap UCL	13394.49
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	405.1667
		BCA Bootstrap UCL	504.619
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	788.1611
		97.5% Chebyshev (Mean, Sd) UCL	1040.877
		99% Chebyshev (Mean, Sd) UCL	1537.287

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t			Variable:	_15		
1,2-Dichlorobenzene							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			21	Shapiro-Wilk Test Statisitic			0.561818
Number of Unique Samples			14	Shapiro-Wilk 5% Critical Value			0.908
Minimum			5	Data not normal at 5% significance level			
Maximum			110000				
Mean			12984.19	95% UCL (Assuming Normal Distribution)			
Median			6.5	Student's-t UCL			23182.28
Standard Deviation			27096.32				
Variance			7.34E+08	Gamma Distribution Test			
Coefficient of Variation			2.08687	A-D Test Statistic			2.271205
Skewness			2.784703	A-D 5% Critical Value			0.901848
				K-S Test Statistic			0.32786
Gamma Statistics				K-S 5% Critical Value			0.210765
k hat			0.169934	Data do not follow gamma distribution			
k star (bias corrected)			0.177404	at 5% significance level			
Theta hat			76407.27				
Theta star			73190.07	95% UCLs (Assuming Gamma Distribution)			
nu hat			7.137226	Approximate Gamma UCL			39965.39
nu star			7.450956	Adjusted Gamma UCL			43854.7
Approx.Chi Square Value (.05)			2.42071				
Adjusted Level of Significance			0.0383	Lognormal Distribution Test			
Adjusted Chi Square Value			2.206026	Shapiro-Wilk Test Statisitic			0.743023
				Shapiro-Wilk 5% Critical Value			0.908
Log-transformed Statistics				Data not lognormal at 5% significance level			
Minimum of log data			1.609438				
Maximum of log data			11.60824	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			5.031366	95% H-UCL			6.95E+08
Standard Deviation of log data			4.055699	95% Chebyshev (MVUE) UCL			390558.5
Variance of log data			16.4487	97.5% Chebyshev (MVUE) UCL			526007
				99% Chebyshev (MVUE) UCL			792069.6
				95% Non-parametric UCLs			
				CLT UCL			22710.05
				Adj-CLT UCL (Adjusted for skewness)			26549.33
				Mod-t UCL (Adjusted for skewness)			23781.13
				Jackknife UCL			23182.28
				Standard Bootstrap UCL			22553.02
				Bootstrap-t UCL			37521.62
RECOMMENDATION				Hall's Bootstrap UCL			56448.35
Data are Non-parametric (0.05)				Percentile Bootstrap UCL			23658.79
				BCA Bootstrap UCL			26297.6
Use Hall's Bootstrap UCL				95% Chebyshev (Mean, Sd) UCL			38757.93
				97.5% Chebyshev (Mean, Sd) UCL			49910.24
In case Hall's Bootstrap method yields				99% Chebyshev (Mean, Sd) UCL			71816.81
an erratic, unreasonably large UCL value,							
use 99% Chebyshev (Mean, Sd) UCL							

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_16
1,2-Dichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.23438
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	220		
Mean	16.04762	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	33.63655
Standard Deviation	46.7338		
Variance	2184.048	Gamma Distribution Test	
Coefficient of Variation	2.912195	A-D Test Statistic	7.24312
Skewness	4.581785	A-D 5% Critical Value	0.78575
		K-S Test Statistic	0.532496
Gamma Statistics		K-S 5% Critical Value	0.197369
k hat	0.717398	Data do not follow gamma distribution	
k star (bias corrected)	0.646658	at 5% significance level	
Theta hat	22.3692		
Theta star	24.81622	95% UCLs (Assuming Gamma Distribution)	
nu hat	30.13071	Approximate Gamma UCL	26.78285
nu star	27.15966	Adjusted Gamma UCL	27.89167
Approx.Chi Square Value (.05)	16.27339		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	15.62645	Shapiro-Wilk Test Statisitic	0.311063
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	5.393628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.936016	95% H-UCL	14.34202
Standard Deviation of log data	0.796396	95% Chebyshev (MVUE) UCL	17.01823
Variance of log data	0.634246	97.5% Chebyshev (MVUE) UCL	20.34175
		99% Chebyshev (MVUE) UCL	26.87015
		95% Non-parametric UCLs	
		CLT UCL	32.82208
		Adj-CLT UCL (Adjusted for skewness)	43.71707
		Mod-t UCL (Adjusted for skewness)	35.33595
		Jackknife UCL	33.63655
		Standard Bootstrap UCL	31.99364
		Bootstrap-t UCL	1284.531
RECOMMENDATION		Hall's Bootstrap UCL	391.7769
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	36.42857
		BCA Bootstrap UCL	46.64286
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	60.50033
		97.5% Chebyshev (Mean, Sd) UCL	79.73505
		99% Chebyshev (Mean, Sd) UCL	117.5179

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_17
1,3-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.299307
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	3800		
Mean	232.7381	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	543.397
Standard Deviation	825.4207		
Variance	681319.4	Gamma Distribution Test	
Coefficient of Variation	3.546565	A-D Test Statistic	3.860521
Skewness	4.445077	A-D 5% Critical Value	0.85728
		K-S Test Statistic	0.370297
Gamma Statistics		K-S 5% Critical Value	0.206515
k hat	0.274119	Data do not follow gamma distribution	
k star (bias corrected)	0.266705	at 5% significance level	
Theta hat	849.0416		
Theta star	872.6429	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.51298	Approximate Gamma UCL	554.0952
nu star	11.2016	Adjusted Gamma UCL	594.558
Approx.Chi Square Value (.05)	4.70504		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.384837	Shapiro-Wilk Test Statisitic	0.705758
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	8.242756	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.897097	95% H-UCL	579.898
Standard Deviation of log data	1.892535	95% Chebyshev (MVUE) UCL	288.5962
Variance of log data	3.581688	97.5% Chebyshev (MVUE) UCL	374.8862
		99% Chebyshev (MVUE) UCL	544.3862
		95% Non-parametric UCLs	
		CLT UCL	529.0117
		Adj-CLT UCL (Adjusted for skewness)	715.6995
		Mod-t UCL (Adjusted for skewness)	572.5165
		Jackknife UCL	543.397
		Standard Bootstrap UCL	517.4886
		Bootstrap-t UCL	3908.688
RECOMMENDATION		Hall's Bootstrap UCL	2295.016
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	583.2857
		BCA Bootstrap UCL	793.3333
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1017.87
		97.5% Chebyshev (Mean, Sd) UCL	1357.597
		99% Chebyshev (Mean, Sd) UCL	2024.925

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_18
1,4-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.368991
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	4	Data not normal at 5% significance level	
Maximum	44000		
Mean	3263.238	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	7110.833
Standard Deviation	10223.06		
Variance	1.05E+08	Gamma Distribution Test	
Coefficient of Variation	3.132796	A-D Test Statistic	3.553734
Skewness	3.668029	A-D 5% Critical Value	0.901644
		K-S Test Statistic	0.342515
Gamma Statistics		K-S 5% Critical Value	0.210747
k hat	0.170465	Data do not follow gamma distribution	
k star (bias corrected)	0.177859	at 5% significance level	
Theta hat	19143.19		
Theta star	18347.37	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.159517	Approximate Gamma UCL	10025.43
nu star	7.470062	Adjusted Gamma UCL	10999.26
Approx.Chi Square Value (.05)	2.431476		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.216203	Shapiro-Wilk Test Statisitic	0.738654
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.386294		
Maximum of log data	10.69194	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.666254	95% H-UCL	152292.8
Standard Deviation of log data	2.964516	95% Chebyshev (MVUE) UCL	6450.185
Variance of log data	8.788354	97.5% Chebyshev (MVUE) UCL	8607.323
		99% Chebyshev (MVUE) UCL	12844.6
		95% Non-parametric UCLs	
		CLT UCL	6932.667
		Adj-CLT UCL (Adjusted for skewness)	8840.651
		Mod-t UCL (Adjusted for skewness)	7408.44
		Jackknife UCL	7110.833
		Standard Bootstrap UCL	6893.104
		Bootstrap-t UCL	110922
RECOMMENDATION		Hall's Bootstrap UCL	43944.69
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	7257.381
		BCA Bootstrap UCL	9725.262
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	12987.31
		97.5% Chebyshev (Mean, Sd) UCL	17194.92
		99% Chebyshev (Mean, Sd) UCL	25459.96

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_20
2,3,4,6,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.870196
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.141	Data are normal at 5% significance level	
Maximum	16.9		
Mean	6.15025	95% UCL (Assuming Normal Distribution)	
Median	3.78	Student's-t UCL	15.07734
Standard Deviation	7.586668		
Variance	57.55752	Gamma Distribution Test	
Coefficient of Variation	1.233554	A-D Test Statistic	0.192993
Skewness	1.41849	A-D 5% Critical Value	0.676865
		K-S Test Statistic	0.163555
Gamma Statistics		K-S 5% Critical Value	0.408251
k hat	0.595305	Data follow gamma distribution	
k star (bias corrected)	0.315493	at 5% significance level	
Theta hat	10.33127		
Theta star	19.49411	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.762436	Approximate Gamma UCL	62.98143
nu star	2.523942	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.246468		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.962883
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.958995		
Maximum of log data	2.827314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.777371	95% H-UCL	6.05E+10
Standard Deviation of log data	2.067368	95% Chebyshev (MVUE) UCL	34.22544
Variance of log data	4.274012	97.5% Chebyshev (MVUE) UCL	45.66856
		99% Chebyshev (MVUE) UCL	68.14637
		95% Non-parametric UCLs	
		CLT UCL	12.38973
		Adj-CLT UCL (Adjusted for skewness)	15.26446
		Mod-t UCL (Adjusted for skewness)	15.52574
		Jackknife UCL	15.07734
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	22.68501
		97.5% Chebyshev (Mean, Sd) UCL	29.83961
		99% Chebyshev (Mean, Sd) UCL	43.89344

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_21
2,3,4,7,8-PeCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.777852
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1745	Data are normal at 5% significance level	
Maximum	42.4		
Mean	13.94863	95% UCL (Assuming Normal Distribution)	
Median	6.61	Student's-t UCL	36.57404
Standard Deviation	19.22815		
Variance	369.7218	Gamma Distribution Test	
Coefficient of Variation	1.378498	A-D Test Statistic	0.266951
Skewness	1.835928	A-D 5% Critical Value	0.679792
		K-S Test Statistic	0.216992
Gamma Statistics		K-S 5% Critical Value	0.409705
k hat	0.526341	Data follow gamma distribution	
k star (bias corrected)	0.298252	at 5% significance level	
Theta hat	26.50112		
Theta star	46.76793	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.210728	Approximate Gamma UCL	153.8093
nu star	2.386015	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.216383		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.921862
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.745831		
Maximum of log data	3.747148	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.438108	95% H-UCL	3.74E+13
Standard Deviation of log data	2.302476	95% Chebyshev (MVUE) UCL	88.33509
Variance of log data	5.301396	97.5% Chebyshev (MVUE) UCL	118.2223
		99% Chebyshev (MVUE) UCL	176.93
		95% Non-parametric UCLs	
		CLT UCL	29.76237
		Adj-CLT UCL (Adjusted for skewness)	39.19241
		Mod-t UCL (Adjusted for skewness)	38.04493
		Jackknife UCL	36.57404
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	55.85541
		97.5% Chebyshev (Mean, Sd) UCL	73.98851
		99% Chebyshev (Mean, Sd) UCL	109.6075

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_22
2,3,7,8-TCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.769885
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.158	Data are normal at 5% significance level	
Maximum	5.36		
Mean	1.774875	95% UCL (Assuming Normal Distribution)	
Median	0.79075	Student's-t UCL	4.625608
Standard Deviation	2.422688		
Variance	5.869417	Gamma Distribution Test	
Coefficient of Variation	1.364991	A-D Test Statistic	0.295027
Skewness	1.844616	A-D 5% Critical Value	0.670036
		K-S Test Statistic	0.244322
Gamma Statistics		K-S 5% Critical Value	0.404809
k hat	0.767855	Data follow gamma distribution	
k star (bias corrected)	0.35863	at 5% significance level	
Theta hat	2.311471		
Theta star	4.949036	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.14284	Approximate Gamma UCL	15.22127
nu star	2.869043	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.334545		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.991998
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.84516		
Maximum of log data	1.678964	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.203418	95% H-UCL	214298
Standard Deviation of log data	1.487074	95% Chebyshev (MVUE) UCL	6.339781
Variance of log data	2.21139	97.5% Chebyshev (MVUE) UCL	8.355081
		99% Chebyshev (MVUE) UCL	12.31375
		95% Non-parametric UCLs	
		CLT UCL	3.767359
		Adj-CLT UCL (Adjusted for skewness)	4.961137
		Mod-t UCL (Adjusted for skewness)	4.811813
		Jackknife UCL	4.625608
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.055001
		97.5% Chebyshev (Mean, Sd) UCL	9.339716
		99% Chebyshev (Mean, Sd) UCL	13.8276

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_23
2-Methylnaphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.617544
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	130	Data not normal at 5% significance level	
Maximum	380000		
Mean	74467.14	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	123172
Standard Deviation	129408.9		
Variance	1.67E+10	Gamma Distribution Test	
Coefficient of Variation	1.737799	A-D Test Statistic	1.811307
Skewness	1.858022	A-D 5% Critical Value	0.873721
		K-S Test Statistic	0.313066
Gamma Statistics		K-S 5% Critical Value	0.208107
k hat	0.237181	Data do not follow gamma distribution	
k star (bias corrected)	0.235044	at 5% significance level	
Theta hat	313967		
Theta star	316821.6	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.96162	Approximate Gamma UCL	190398.7
nu star	9.871865	Adjusted Gamma UCL	205566.8
Approx.Chi Square Value (.05)	3.861002		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	3.57611	Shapiro-Wilk Test Statisitic	0.796425
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	12.84793	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.19795	95% H-UCL	50132410
Standard Deviation of log data	3.187574	95% Chebyshev (MVUE) UCL	1021630
Variance of log data	10.16063	97.5% Chebyshev (MVUE) UCL	1367114
		99% Chebyshev (MVUE) UCL	2045751
		95% Non-parametric UCLs	
		CLT UCL	120916.7
		Adj-CLT UCL (Adjusted for skewness)	133150.9
		Mod-t UCL (Adjusted for skewness)	125080.3
		Jackknife UCL	123172
		Standard Bootstrap UCL	119484.4
		Bootstrap-t UCL	141242.7
RECOMMENDATION		Hall's Bootstrap UCL	113904.7
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	121451.2
		BCA Bootstrap UCL	136200
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	197559.6
		97.5% Chebyshev (Mean, Sd) UCL	250821.7
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	355445
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_24
2-Methylphenol			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.704418
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2390.238	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3445.606
Standard Deviation	2804.113		
Variance	7863049	Gamma Distribution Test	
Coefficient of Variation	1.173152	A-D Test Statistic	1.959928
Skewness	0.729322	A-D 5% Critical Value	0.793384
		K-S Test Statistic	0.228846
Gamma Statistics		K-S 5% Critical Value	0.198537
k hat	0.632466	Data do not follow gamma distribution	
k star (bias corrected)	0.57386	at 5% significance level	
Theta hat	3779.233		
Theta star	4165.193	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.56359	Approximate Gamma UCL	4137.261
nu star	24.10212	Adjusted Gamma UCL	4321.496
Approx.Chi Square Value (.05)	13.92463		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.33099	Shapiro-Wilk Test Statisitic	0.806081
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.809718	95% H-UCL	9188.739
Standard Deviation of log data	1.528735	95% Chebyshev (MVUE) UCL	7231.811
Variance of log data	2.337031	97.5% Chebyshev (MVUE) UCL	9225.796
		99% Chebyshev (MVUE) UCL	13142.59
		95% Non-parametric UCLs	
		CLT UCL	3396.737
		Adj-CLT UCL (Adjusted for skewness)	3500.795
		Mod-t UCL (Adjusted for skewness)	3461.837
		Jackknife UCL	3445.606
		Standard Bootstrap UCL	3377.957
		Bootstrap-t UCL	3533.853
RECOMMENDATION		Hall's Bootstrap UCL	3357.358
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3434.286
		BCA Bootstrap UCL	3485.476
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5057.481
		97.5% Chebyshev (Mean, Sd) UCL	6211.6
		99% Chebyshev (Mean, Sd) UCL	8478.642
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_25
4,4'-DDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.716316
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.55	Data not normal at 5% significance level	
Maximum	20000		
Mean	3550.326	95% UCL (Assuming Normal Distribution)	
Median	390	Student's-t UCL	5588.709
Standard Deviation	5415.982		
Variance	29332861	Gamma Distribution Test	
Coefficient of Variation	1.525489	A-D Test Statistic	0.586493
Skewness	1.838692	A-D 5% Critical Value	0.859686
		K-S Test Statistic	0.166581
Gamma Statistics		K-S 5% Critical Value	0.206748
k hat	0.268712	Data follow gamma distribution	
k star (bias corrected)	0.262071	at 5% significance level	
Theta hat	13212.37		
Theta star	13547.2	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.28592	Approximate Gamma UCL	8533.194
nu star	11.00698	Adjusted Gamma UCL	9163.832
Approx.Chi Square Value (.05)	4.579571		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.264413	Shapiro-Wilk Test Statisitic	0.916938
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.597837		
Maximum of log data	9.903488	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.562179	95% H-UCL	9622861
Standard Deviation of log data	3.351032	95% Chebyshev (MVUE) UCL	109208.1
Variance of log data	11.22941	97.5% Chebyshev (MVUE) UCL	146385.6
		99% Chebyshev (MVUE) UCL	219413.6
		95% Non-parametric UCLs	
		CLT UCL	5494.32
		Adj-CLT UCL (Adjusted for skewness)	6001.016
		Mod-t UCL (Adjusted for skewness)	5667.743
		Jackknife UCL	5588.709
		Standard Bootstrap UCL	5454.316
		Bootstrap-t UCL	6863.141
RECOMMENDATION		Hall's Bootstrap UCL	6083.842
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	5558.36
		BCA Bootstrap UCL	5986.667
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	8701.953
		97.5% Chebyshev (Mean, Sd) UCL	10931.07
		99% Chebyshev (Mean, Sd) UCL	15309.73

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_26
4,4-'DDE			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.664965
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.6	Data not normal at 5% significance level	
Maximum	10000		
Mean	1485.888	95% UCL (Assuming Normal Distribution)	
Median	280	Student's-t UCL	2413.311
Standard Deviation	2464.162		
Variance	6072095	Gamma Distribution Test	
Coefficient of Variation	1.658377	A-D Test Statistic	0.510668
Skewness	2.428305	A-D 5% Critical Value	0.843273
		K-S Test Statistic	0.16446
Gamma Statistics		K-S 5% Critical Value	0.20509
k hat	0.312289	Data follow gamma distribution	
k star (bias corrected)	0.299423	at 5% significance level	
Theta hat	4758.051		
Theta star	4962.513	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.11615	Approximate Gamma UCL	3332.308
nu star	12.57575	Adjusted Gamma UCL	3557.349
Approx.Chi Square Value (.05)	5.60757		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	5.252831	Shapiro-Wilk Test Statisitic	0.927806
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	9.21034	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.110092	95% H-UCL	296931.2
Standard Deviation of log data	2.818985	95% Chebyshev (MVUE) UCL	19452.06
Variance of log data	7.946674	97.5% Chebyshev (MVUE) UCL	25900.55
		99% Chebyshev (MVUE) UCL	38567.37
		95% Non-parametric UCLs	
		CLT UCL	2370.366
		Adj-CLT UCL (Adjusted for skewness)	2674.828
		Mod-t UCL (Adjusted for skewness)	2460.801
		Jackknife UCL	2413.311
		Standard Bootstrap UCL	2361.4
		Bootstrap-t UCL	3113.756
RECOMMENDATION		Hall's Bootstrap UCL	3390.094
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	2376.698
		BCA Bootstrap UCL	2747.552
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	3829.774
		97.5% Chebyshev (Mean, Sd) UCL	4843.975
		99% Chebyshev (Mean, Sd) UCL	6836.177

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_27
4,4'-DDT			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.449449
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.5	Data not normal at 5% significance level	
Maximum	560		
Mean	52.9	95% UCL (Assuming Normal Distribution)	
Median	12	Student's-t UCL	100.143
Standard Deviation	125.5246		
Variance	15756.43	Gamma Distribution Test	
Coefficient of Variation	2.372866	A-D Test Statistic	1.583001
Skewness	3.684474	A-D 5% Critical Value	0.82293
		K-S Test Statistic	0.220542
Gamma Statistics		K-S 5% Critical Value	0.202557
k hat	0.412824	Data do not follow gamma distribution	
k star (bias corrected)	0.385595	at 5% significance level	
Theta hat	128.1417		
Theta star	137.1904	95% UCLs (Assuming Gamma Distribution)	
nu hat	17.33862	Approximate Gamma UCL	105.7849
nu star	16.19501	Adjusted Gamma UCL	111.8346
Approx.Chi Square Value (.05)	8.098659		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	7.660561	Shapiro-Wilk Test Statisitic	0.897692
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.405465		
Maximum of log data	6.327937	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.382483	95% H-UCL	218.9399
Standard Deviation of log data	1.75611	95% Chebyshev (MVUE) UCL	132.1693
Variance of log data	3.083921	97.5% Chebyshev (MVUE) UCL	170.6596
		99% Chebyshev (MVUE) UCL	246.2662
		95% Non-parametric UCLs	
		CLT UCL	97.95536
		Adj-CLT UCL (Adjusted for skewness)	121.4877
		Mod-t UCL (Adjusted for skewness)	103.8136
		Jackknife UCL	100.143
		Standard Bootstrap UCL	97.20262
		Bootstrap-t UCL	192.3839
RECOMMENDATION		Hall's Bootstrap UCL	225.1592
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	103.4643
		BCA Bootstrap UCL	131.7619
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	172.2977
		97.5% Chebyshev (Mean, Sd) UCL	223.9612
		99% Chebyshev (Mean, Sd) UCL	325.4441

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t		Variable:	_28		
4-Chloro-3-methylphenol						
Raw Statistics			Normal Distribution Test			
Number of Valid Samples		21	Shapiro-Wilk Test Statisitic			0.724867
Number of Unique Samples		13	Shapiro-Wilk 5% Critical Value			0.908
Minimum		175	Data not normal at 5% significance level			
Maximum		7200				
Mean		2447.857	95% UCL (Assuming Normal Distribution)			
Median		700	Student's-t UCL			3503.245
Standard Deviation		2804.165				
Variance		7863339	Gamma Distribution Test			
Coefficient of Variation		1.145559	A-D Test Statistic			1.852553
Skewness		0.701232	A-D 5% Critical Value			0.792814
			K-S Test Statistic			0.224609
Gamma Statistics			K-S 5% Critical Value			0.19845
k hat		0.638807	Data do not follow gamma distribution			
k star (bias corrected)		0.579295	at 5% significance level			
Theta hat		3831.918				
Theta star		4225.579	95% UCLs (Assuming Gamma Distribution)			
nu hat		26.8299	Approximate Gamma UCL			4224.386
nu star		24.33039	Adjusted Gamma UCL			4411.415
Approx.Chi Square Value (.05)		14.09846				
Adjusted Level of Significance		0.0383	Lognormal Distribution Test			
Adjusted Chi Square Value		13.50073	Shapiro-Wilk Test Statisitic			0.807874
			Shapiro-Wilk 5% Critical Value			0.908
Log-transformed Statistics			Data not lognormal at 5% significance level			
Minimum of log data		5.164786				
Maximum of log data		8.881836	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data		6.844545	95% H-UCL			9831.242
Standard Deviation of log data		1.540281	95% Chebyshev (MVUE) UCL			7646.929
Variance of log data		2.372467	97.5% Chebyshev (MVUE) UCL			9762.039
			99% Chebyshev (MVUE) UCL			13916.76
			95% Non-parametric UCLs			
			CLT UCL			3454.374
			Adj-CLT UCL (Adjusted for skewness)			3554.426
			Mod-t UCL (Adjusted for skewness)			3518.851
			Jackknife UCL			3503.245
			Standard Bootstrap UCL			3432.255
			Bootstrap-t UCL			3576.845
RECOMMENDATION			Hall's Bootstrap UCL			3429.016
Data are Non-parametric (0.05)			Percentile Bootstrap UCL			3442.143
			BCA Bootstrap UCL			3525.714
Use 99% Chebyshev (Mean, Sd) UCL			95% Chebyshev (Mean, Sd) UCL			5115.15
			97.5% Chebyshev (Mean, Sd) UCL			6269.289
			99% Chebyshev (Mean, Sd) UCL			8536.373
Recommended UCL exceeds the maximum observation						
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL						

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_29
4-Methylphenol			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.720947
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	6500		
Mean	2252.619	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3233.728
Standard Deviation	2606.806		
Variance	6795437	Gamma Distribution Test	
Coefficient of Variation	1.157233	A-D Test Statistic	1.719501
Skewness	0.78929	A-D 5% Critical Value	0.790836
		K-S Test Statistic	0.211756
Gamma Statistics		K-S 5% Critical Value	0.198147
k hat	0.660815	Data do not follow gamma distribution	
k star (bias corrected)	0.598158	at 5% significance level	
Theta hat	3408.852		
Theta star	3765.923	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.75421	Approximate Gamma UCL	3848.795
nu star	25.12266	Adjusted Gamma UCL	4015.883
Approx.Chi Square Value (.05)	14.70376		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	14.09199	Shapiro-Wilk Test Statisitic	0.81722
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.779557	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.797839	95% H-UCL	8265.268
Standard Deviation of log data	1.495113	95% Chebyshev (MVUE) UCL	6725.296
Variance of log data	2.235364	97.5% Chebyshev (MVUE) UCL	8562.172
		99% Chebyshev (MVUE) UCL	12170.36
		95% Non-parametric UCLs	
		CLT UCL	3188.297
		Adj-CLT UCL (Adjusted for skewness)	3292.987
		Mod-t UCL (Adjusted for skewness)	3250.057
		Jackknife UCL	3233.728
		Standard Bootstrap UCL	3166.685
		Bootstrap-t UCL	3376.284
RECOMMENDATION		Hall's Bootstrap UCL	3145.807
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3174.524
		BCA Bootstrap UCL	3267.381
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4732.186
		97.5% Chebyshev (Mean, Sd) UCL	5805.097
		99% Chebyshev (Mean, Sd) UCL	7912.622
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_30
Acenaphthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.769611
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	10000		
Mean	2528.81	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3682.034
Standard Deviation	3064.119		
Variance	9388822	Gamma Distribution Test	
Coefficient of Variation	1.211684	A-D Test Statistic	1.474607
Skewness	1.081964	A-D 5% Critical Value	0.794139
		K-S Test Statistic	0.22203
Gamma Statistics		K-S 5% Critical Value	0.198653
k hat	0.624063	Data do not follow gamma distribution	
k star (bias corrected)	0.566657	at 5% significance level	
Theta hat	4052.173		
Theta star	4462.683	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.21063	Approximate Gamma UCL	4394.757
nu star	23.79959	Adjusted Gamma UCL	4591.983
Approx.Chi Square Value (.05)	13.69464		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.10646	Shapiro-Wilk Test Statisitic	0.836853
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.21034	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.851108	95% H-UCL	10194.94
Standard Deviation of log data	1.550698	95% Chebyshev (MVUE) UCL	7844.852
Variance of log data	2.404664	97.5% Chebyshev (MVUE) UCL	10020.81
		99% Chebyshev (MVUE) UCL	14295.06
		95% Non-parametric UCLs	
		CLT UCL	3628.633
		Adj-CLT UCL (Adjusted for skewness)	3797.32
		Mod-t UCL (Adjusted for skewness)	3708.346
		Jackknife UCL	3682.034
		Standard Bootstrap UCL	3642.882
		Bootstrap-t UCL	3914.774
RECOMMENDATION		Hall's Bootstrap UCL	3674.055
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3672.381
		BCA Bootstrap UCL	3742.143
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5443.368
		97.5% Chebyshev (Mean, Sd) UCL	6704.499
		99% Chebyshev (Mean, Sd) UCL	9181.748

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_31
Acetone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.645059
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	860		
Mean	133.7857	95% UCL (Assuming Normal Distribution)	
Median	80	Student's-t UCL	205.8469
Standard Deviation	191.4665		
Variance	36659.41	Gamma Distribution Test	
Coefficient of Variation	1.431143	A-D Test Statistic	0.385744
Skewness	3.012249	A-D 5% Critical Value	0.788599
		K-S Test Statistic	0.132419
Gamma Statistics		K-S 5% Critical Value	0.197805
k hat	0.6857	Data follow gamma distribution	
k star (bias corrected)	0.619489	at 5% significance level	
Theta hat	195.1083		
Theta star	215.9615	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.7994	Approximate Gamma UCL	226.1533
nu star	26.01853	Adjusted Gamma UCL	235.7636
Approx.Chi Square Value (.05)	15.39181		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	14.7644	Shapiro-Wilk Test Statisitic	0.925238
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.756932	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.012333	95% H-UCL	568.4087
Standard Deviation of log data	1.533853	95% Chebyshev (MVUE) UCL	445.036
Variance of log data	2.352706	97.5% Chebyshev (MVUE) UCL	567.9157
		99% Chebyshev (MVUE) UCL	809.2891
		95% Non-parametric UCLs	
		CLT UCL	202.51
		Adj-CLT UCL (Adjusted for skewness)	231.8557
		Mod-t UCL (Adjusted for skewness)	210.4242
		Jackknife UCL	205.8469
		Standard Bootstrap UCL	200.1722
		Bootstrap-t UCL	277.1434
RECOMMENDATION		Hall's Bootstrap UCL	508.9074
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	208.4762
		BCA Bootstrap UCL	234.8095
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	315.9067
		97.5% Chebyshev (Mean, Sd) UCL	394.7105
		99% Chebyshev (Mean, Sd) UCL	549.5055

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_32
Aldrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.313273
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.83	Data not normal at 5% significance level	
Maximum	2400		
Mean	150.5871	95% UCL (Assuming Normal Distribution)	
Median	3.6	Student's-t UCL	347.315
Standard Deviation	522.706		
Variance	273221.6	Gamma Distribution Test	
Coefficient of Variation	3.47112	A-D Test Statistic	2.536294
Skewness	4.389399	A-D 5% Critical Value	0.874306
		K-S Test Statistic	0.237943
Gamma Statistics		K-S 5% Critical Value	0.208164
k hat	0.235867	Data do not follow gamma distribution	
k star (bias corrected)	0.233918	at 5% significance level	
Theta hat	638.4414		
Theta star	643.7616	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.906406	Approximate Gamma UCL	386.1213
nu star	9.824538	Adjusted Gamma UCL	416.9847
Approx.Chi Square Value (.05)	3.831566		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	3.54797	Shapiro-Wilk Test Statisitic	0.847553
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.18633		
Maximum of log data	7.783224	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.974839	95% H-UCL	1515.841
Standard Deviation of log data	2.37134	95% Chebyshev (MVUE) UCL	310.1419
Variance of log data	5.623251	97.5% Chebyshev (MVUE) UCL	409.1993
		99% Chebyshev (MVUE) UCL	603.7782
		95% Non-parametric UCLs	
		CLT UCL	338.2054
		Adj-CLT UCL (Adjusted for skewness)	454.9465
		Mod-t UCL (Adjusted for skewness)	365.5243
		Jackknife UCL	347.315
		Standard Bootstrap UCL	336.3888
		Bootstrap-t UCL	2145.969
RECOMMENDATION		Hall's Bootstrap UCL	1658.424
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	372.631
		BCA Bootstrap UCL	503.4667
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	647.7797
		97.5% Chebyshev (Mean, Sd) UCL	862.9154
		99% Chebyshev (Mean, Sd) UCL	1285.508

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_33
Aluminum			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.930913
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5400	Data are normal at 5% significance level	
Maximum	20700		
Mean	10991.9	95% UCL (Assuming Normal Distribution)	
Median	10700	Student's-t UCL	12556.41
Standard Deviation	4156.902		
Variance	17279836	Gamma Distribution Test	
Coefficient of Variation	0.378179	A-D Test Statistic	0.211531
Skewness	0.880185	A-D 5% Critical Value	0.743792
		K-S Test Statistic	0.083766
Gamma Statistics		K-S 5% Critical Value	0.189656
k hat	7.832541	Data follow gamma distribution	
k star (bias corrected)	6.745353	at 5% significance level	
Theta hat	1403.364		
Theta star	1629.552	95% UCLs (Assuming Gamma Distribution)	
nu hat	328.9667	Approximate Gamma UCL	12694.22
nu star	283.3048	Adjusted Gamma UCL	12836.14
Approx.Chi Square Value (.05)	245.3132		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	242.6009	Shapiro-Wilk Test Statisitic	0.977965
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.594154		
Maximum of log data	9.937889	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.239722	95% H-UCL	12876.51
Standard Deviation of log data	0.369122	95% Chebyshev (MVUE) UCL	14925.71
Variance of log data	0.136251	97.5% Chebyshev (MVUE) UCL	16630.25
		99% Chebyshev (MVUE) UCL	19978.49
		95% Non-parametric UCLs	
		CLT UCL	12483.97
		Adj-CLT UCL (Adjusted for skewness)	12670.14
		Mod-t UCL (Adjusted for skewness)	12585.45
		Jackknife UCL	12556.41
		Standard Bootstrap UCL	12449.09
		Bootstrap-t UCL	12852.66
RECOMMENDATION		Hall's Bootstrap UCL	12792.95
Data are normal (0.05)		Percentile Bootstrap UCL	12492.38
		BCA Bootstrap UCL	12652.38
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	14945.91
		97.5% Chebyshev (Mean, Sd) UCL	16656.81
		99% Chebyshev (Mean, Sd) UCL	20017.54

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_34
Anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.712219
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	77	Data not normal at 5% significance level	
Maximum	7000		
Mean	2387.238	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3444.221
Standard Deviation	2808.402		
Variance	7887124	Gamma Distribution Test	
Coefficient of Variation	1.176423	A-D Test Statistic	1.640322
Skewness	0.724476	A-D 5% Critical Value	0.796047
		K-S Test Statistic	0.227117
Gamma Statistics		K-S 5% Critical Value	0.198945
k hat	0.602835	Data do not follow gamma distribution	
k star (bias corrected)	0.548462	at 5% significance level	
Theta hat	3960.019		
Theta star	4352.606	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.31907	Approximate Gamma UCL	4192.716
nu star	23.03539	Adjusted Gamma UCL	4384.698
Approx.Chi Square Value (.05)	13.11583		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	12.54156	Shapiro-Wilk Test Statisitic	0.860188
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.343805		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.753654	95% H-UCL	10912.02
Standard Deviation of log data	1.607374	95% Chebyshev (MVUE) UCL	7898.422
Variance of log data	2.583652	97.5% Chebyshev (MVUE) UCL	10121.62
		99% Chebyshev (MVUE) UCL	14488.66
		95% Non-parametric UCLs	
		CLT UCL	3395.276
		Adj-CLT UCL (Adjusted for skewness)	3498.801
		Mod-t UCL (Adjusted for skewness)	3460.368
		Jackknife UCL	3444.221
		Standard Bootstrap UCL	3379.218
		Bootstrap-t UCL	3528.388
RECOMMENDATION		Hall's Bootstrap UCL	3340.571
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3450.476
		BCA Bootstrap UCL	3458.905
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5058.562
		97.5% Chebyshev (Mean, Sd) UCL	6214.445
		99% Chebyshev (Mean, Sd) UCL	8484.955
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_35
Antimony			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.494411
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.3	Data not normal at 5% significance level	
Maximum	49		
Mean	6.406667	95% UCL (Assuming Normal Distribution)	
Median	3.3	Student's-t UCL	10.34329
Standard Deviation	10.45961		
Variance	109.4033	Gamma Distribution Test	
Coefficient of Variation	1.632613	A-D Test Statistic	1.041696
Skewness	3.739633	A-D 5% Critical Value	0.775261
		K-S Test Statistic	0.255016
Gamma Statistics		K-S 5% Critical Value	0.195757
k hat	0.893166	Data do not follow gamma distribution	
k star (bias corrected)	0.797317	at 5% significance level	
Theta hat	7.172983		
Theta star	8.03528	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.51299	Approximate Gamma UCL	10.09474
nu star	33.48732	Adjusted Gamma UCL	10.46331
Approx.Chi Square Value (.05)	21.25287		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	20.50422	Shapiro-Wilk Test Statisitic	0.951915
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.203973		
Maximum of log data	3.89182	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.202181	95% H-UCL	12.7872
Standard Deviation of log data	1.136666	95% Chebyshev (MVUE) UCL	13.57262
Variance of log data	1.29201	97.5% Chebyshev (MVUE) UCL	16.82441
		99% Chebyshev (MVUE) UCL	23.21193
		95% Non-parametric UCLs	
		CLT UCL	10.161
		Adj-CLT UCL (Adjusted for skewness)	12.15124
		Mod-t UCL (Adjusted for skewness)	10.65373
		Jackknife UCL	10.34329
		Standard Bootstrap UCL	10.02491
		Bootstrap-t UCL	20.17725
RECOMMENDATION		Hall's Bootstrap UCL	27.57806
Data are lognormal (0.05)		Percentile Bootstrap UCL	10.49571
		BCA Bootstrap UCL	13.99381
Use 95% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	16.35574
		97.5% Chebyshev (Mean, Sd) UCL	20.66071
		99% Chebyshev (Mean, Sd) UCL	29.11699

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_36
Aroclor-1260			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.451235
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	17.5	Data not normal at 5% significance level	
Maximum	1800		
Mean	176.4762	95% UCL (Assuming Normal Distribution)	
Median	20.5	Student's-t UCL	328.1557
Standard Deviation	403.0125		
Variance	162419	Gamma Distribution Test	
Coefficient of Variation	2.283665	A-D Test Statistic	2.91785
Skewness	3.66044	A-D 5% Critical Value	0.805613
		K-S Test Statistic	0.345276
Gamma Statistics		K-S 5% Critical Value	0.2004
k hat	0.498404	Data do not follow gamma distribution	
k star (bias corrected)	0.458949	at 5% significance level	
Theta hat	354.0828		
Theta star	384.5222	95% UCLs (Assuming Gamma Distribution)	
nu hat	20.93296	Approximate Gamma UCL	329.7003
nu star	19.27587	Adjusted Gamma UCL	346.5725
Approx.Chi Square Value (.05)	10.31765		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	9.815354	Shapiro-Wilk Test Statisitic	0.746461
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	7.495542	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.898122	95% H-UCL	365.3914
Standard Deviation of log data	1.413814	95% Chebyshev (MVUE) UCL	320.3586
Variance of log data	1.99887	97.5% Chebyshev (MVUE) UCL	405.7331
		99% Chebyshev (MVUE) UCL	573.4346
		95% Non-parametric UCLs	
		CLT UCL	321.1321
		Adj-CLT UCL (Adjusted for skewness)	396.1928
		Mod-t UCL (Adjusted for skewness)	339.8637
		Jackknife UCL	328.1557
		Standard Bootstrap UCL	318.1166
		Bootstrap-t UCL	708.9672
RECOMMENDATION		Hall's Bootstrap UCL	808.1784
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	328.7619
		BCA Bootstrap UCL	413.381
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	559.8175
		97.5% Chebyshev (Mean, Sd) UCL	725.6896
		99% Chebyshev (Mean, Sd) UCL	1051.513

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_37
Arsenic			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.826621
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.8	Data not normal at 5% significance level	
Maximum	15		
Mean	6.119048	95% UCL (Assuming Normal Distribution)	
Median	4.9	Student's-t UCL	7.570888
Standard Deviation	3.857541		
Variance	14.88062	Gamma Distribution Test	
Coefficient of Variation	0.630415	A-D Test Statistic	0.507216
Skewness	1.400559	A-D 5% Critical Value	0.74909
		K-S Test Statistic	0.15236
Gamma Statistics		K-S 5% Critical Value	0.190837
k hat	3.155506	Data follow gamma distribution	
k star (bias corrected)	2.736466	at 5% significance level	
Theta hat	1.939165		
Theta star	2.236113	95% UCLs (Assuming Gamma Distribution)	
nu hat	132.5313	Approximate Gamma UCL	7.713295
nu star	114.9316	Adjusted Gamma UCL	7.85324
Approx.Chi Square Value (.05)	91.17656		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	89.55178	Shapiro-Wilk Test Statisitic	0.961427
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.587787		
Maximum of log data	2.70805	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.644665	95% H-UCL	8.074176
Standard Deviation of log data	0.586812	95% Chebyshev (MVUE) UCL	9.6687
Variance of log data	0.344348	97.5% Chebyshev (MVUE) UCL	11.21512
		99% Chebyshev (MVUE) UCL	14.25276
		95% Non-parametric UCLs	
		CLT UCL	7.50366
		Adj-CLT UCL (Adjusted for skewness)	7.778559
		Mod-t UCL (Adjusted for skewness)	7.613767
		Jackknife UCL	7.570888
		Standard Bootstrap UCL	7.457017
		Bootstrap-t UCL	7.970826
RECOMMENDATION		Hall's Bootstrap UCL	7.990339
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	7.457143
		BCA Bootstrap UCL	7.771429
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	9.788301
		97.5% Chebyshev (Mean, Sd) UCL	11.37599
		99% Chebyshev (Mean, Sd) UCL	14.4947

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_38
Barium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.778
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.908
Minimum	68	Data not normal at 5% significance level	
Maximum	1460		
Mean	359.881	95% UCL (Assuming Normal Distribution)	
Median	171	Student's-t UCL	493.5075
Standard Deviation	355.0456		
Variance	126057.4	Gamma Distribution Test	
Coefficient of Variation	0.986564	A-D Test Statistic	0.726766
Skewness	1.81946	A-D 5% Critical Value	0.760161
		K-S Test Statistic	0.212111
Gamma Statistics		K-S 5% Critical Value	0.193126
k hat	1.414151	Data follow approximate gamma distibution	
k star (bias corrected)	1.243876	at 5% significance level	
Theta hat	254.4855		
Theta star	289.3223	95% UCLs (Assuming Gamma Distribution)	
nu hat	59.39435	Approximate Gamma UCL	513.1641
nu star	52.24277	Adjusted Gamma UCL	527.6238
Approx.Chi Square Value (.05)	36.63775		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	35.63368	Shapiro-Wilk Test Statisitic	0.94611
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.219508		
Maximum of log data	7.286192	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.492271	95% H-UCL	586.2729
Standard Deviation of log data	0.892392	95% Chebyshev (MVUE) UCL	682.7248
Variance of log data	0.796364	97.5% Chebyshev (MVUE) UCL	825.5881
		99% Chebyshev (MVUE) UCL	1106.215
		95% Non-parametric UCLs	
		CLT UCL	487.3198
		Adj-CLT UCL (Adjusted for skewness)	520.1889
		Mod-t UCL (Adjusted for skewness)	498.6344
		Jackknife UCL	493.5075
		Standard Bootstrap UCL	481.7905
		Bootstrap-t UCL	561.5356
RECOMMENDATION		Hall's Bootstrap UCL	550.4399
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	492.8286
		BCA Bootstrap UCL	518.3143
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	697.5967
		97.5% Chebyshev (Mean, Sd) UCL	843.7266
		99% Chebyshev (Mean, Sd) UCL	1130.77

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_39
Benzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.380134
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	3500		
Mean	265.4048	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	554.2745
Standard Deviation	767.5268		
Variance	589097.4	Gamma Distribution Test	
Coefficient of Variation	2.89191	A-D Test Statistic	3.164711
Skewness	4.115325	A-D 5% Critical Value	0.852888
		K-S Test Statistic	0.348455
Gamma Statistics		K-S 5% Critical Value	0.20609
k hat	0.283986	Data do not follow gamma distribution	
k star (bias corrected)	0.275163	at 5% significance level	
Theta hat	934.5693		
Theta star	964.5373	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.92742	Approximate Gamma UCL	621.4489
nu star	11.55684	Adjusted Gamma UCL	665.8768
Approx.Chi Square Value (.05)	4.935626		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.606317	Shapiro-Wilk Test Statisitic	0.736202
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	8.160518	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.131278	95% H-UCL	1460.654
Standard Deviation of log data	2.080639	95% Chebyshev (MVUE) UCL	533.3792
Variance of log data	4.329057	97.5% Chebyshev (MVUE) UCL	697.7465
		99% Chebyshev (MVUE) UCL	1020.614
		95% Non-parametric UCLs	
		CLT UCL	540.8981
		Adj-CLT UCL (Adjusted for skewness)	701.614
		Mod-t UCL (Adjusted for skewness)	579.3429
		Jackknife UCL	554.2745
		Standard Bootstrap UCL	528.337
		Bootstrap-t UCL	1335.763
RECOMMENDATION		Hall's Bootstrap UCL	1421.131
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	567.5
		BCA Bootstrap UCL	789.1429
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	995.4684
		97.5% Chebyshev (Mean, Sd) UCL	1311.367
		99% Chebyshev (Mean, Sd) UCL	1931.89

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t			Variable:	_40		
Benzo(a)anthracene							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			21	Shapiro-Wilk Test Statisitic			0.699969
Number of Unique Samples			15	Shapiro-Wilk 5% Critical Value			0.908
Minimum			150	Data not normal at 5% significance level			
Maximum			7000				
Mean			2380.714	95% UCL (Assuming Normal Distribution)			
Median			600	Student's-t UCL			3437.584
Standard Deviation			2808.102				
Variance			7885438	Gamma Distribution Test			
Coefficient of Variation			1.179521	A-D Test Statistic			1.931573
Skewness			0.736198	A-D 5% Critical Value			0.792977
				K-S Test Statistic			0.262387
Gamma Statistics				K-S 5% Critical Value			0.198475
k hat			0.636989	Data do not follow gamma distribution			
k star (bias corrected)			0.577736	at 5% significance level			
Theta hat			3737.451				
Theta star			4120.762	95% UCLs (Assuming Gamma Distribution)			
nu hat			26.75353	Approximate Gamma UCL			4112.008
nu star			24.26493	Adjusted Gamma UCL			4294.362
Approx.Chi Square Value (.05)			14.04858				
Adjusted Level of Significance			0.0383	Lognormal Distribution Test			
Adjusted Chi Square Value			13.45202	Shapiro-Wilk Test Statisitic			0.825962
				Shapiro-Wilk 5% Critical Value			0.908
Log-transformed Statistics				Data not lognormal at 5% significance level			
Minimum of log data			5.010635				
Maximum of log data			8.853665	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			6.8136	95% H-UCL			8818.36
Standard Deviation of log data			1.512724	95% Chebyshev (MVUE) UCL			7052.474
Variance of log data			2.288333	97.5% Chebyshev (MVUE) UCL			8988.37
				99% Chebyshev (MVUE) UCL			12791.07
				95% Non-parametric UCLs			
				CLT UCL			3388.645
				Adj-CLT UCL (Adjusted for skewness)			3493.833
				Mod-t UCL (Adjusted for skewness)			3453.991
				Jackknife UCL			3437.584
				Standard Bootstrap UCL			3348.582
				Bootstrap-t UCL			3496.493
RECOMMENDATION				Hall's Bootstrap UCL			3310.828
Data are Non-parametric (0.05)				Percentile Bootstrap UCL			3397.619
				BCA Bootstrap UCL			3419.524
Use 99% Chebyshev (Mean, Sd) UCL				95% Chebyshev (Mean, Sd) UCL			5051.752
				97.5% Chebyshev (Mean, Sd) UCL			6207.513
				99% Chebyshev (Mean, Sd) UCL			8477.78
Recommended UCL exceeds the maximum observation							
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL							

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_41
Benzo(a)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.709597
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	130	Data not normal at 5% significance level	
Maximum	7000		
Mean	2402.619	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3454.52
Standard Deviation	2794.901		
Variance	7811472	Gamma Distribution Test	
Coefficient of Variation	1.163273	A-D Test Statistic	1.735664
Skewness	0.729616	A-D 5% Critical Value	0.792162
		K-S Test Statistic	0.228747
Gamma Statistics		K-S 5% Critical Value	0.19835
k hat	0.646065	Data do not follow gamma distribution	
k star (bias corrected)	0.585516	at 5% significance level	
Theta hat	3718.848		
Theta star	4103.419	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.13475	Approximate Gamma UCL	4132.429
nu star	24.59169	Adjusted Gamma UCL	4314.192
Approx.Chi Square Value (.05)	14.29776		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.69537	Shapiro-Wilk Test Statisitic	0.84383
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.838201	95% H-UCL	9122.363
Standard Deviation of log data	1.516042	95% Chebyshev (MVUE) UCL	7271.604
Variance of log data	2.298383	97.5% Chebyshev (MVUE) UCL	9269.51
		99% Chebyshev (MVUE) UCL	13194.01
		95% Non-parametric UCLs	
		CLT UCL	3405.811
		Adj-CLT UCL (Adjusted for skewness)	3509.569
		Mod-t UCL (Adjusted for skewness)	3470.704
		Jackknife UCL	3454.52
		Standard Bootstrap UCL	3385.216
		Bootstrap-t UCL	3499.291
RECOMMENDATION		Hall's Bootstrap UCL	3391.605
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3448.81
		BCA Bootstrap UCL	3535.238
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5061.1
		97.5% Chebyshev (Mean, Sd) UCL	6211.427
		99% Chebyshev (Mean, Sd) UCL	8471.022
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_42
Benzo(b)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.709597
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	110	Data not normal at 5% significance level	
Maximum	7000		
Mean	2397.857	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3451.109
Standard Deviation	2798.491		
Variance	7831554	Gamma Distribution Test	
Coefficient of Variation	1.16708	A-D Test Statistic	1.717208
Skewness	0.729381	A-D 5% Critical Value	0.792917
		K-S Test Statistic	0.228576
Gamma Statistics		K-S 5% Critical Value	0.198466
k hat	0.637666	Data do not follow gamma distribution	
k star (bias corrected)	0.578317	at 5% significance level	
Theta hat	3760.367		
Theta star	4146.271	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.78196	Approximate Gamma UCL	4140.305
nu star	24.2893	Adjusted Gamma UCL	4323.802
Approx.Chi Square Value (.05)	14.06714		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.47015	Shapiro-Wilk Test Statisitic	0.850338
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.70048		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.821943	95% H-UCL	9368.94
Standard Deviation of log data	1.531279	95% Chebyshev (MVUE) UCL	7354.65
Variance of log data	2.344814	97.5% Chebyshev (MVUE) UCL	9383.923
		99% Chebyshev (MVUE) UCL	13370.04
		95% Non-parametric UCLs	
		CLT UCL	3402.338
		Adj-CLT UCL (Adjusted for skewness)	3506.196
		Mod-t UCL (Adjusted for skewness)	3467.309
		Jackknife UCL	3451.109
		Standard Bootstrap UCL	3385.447
		Bootstrap-t UCL	3519.691
RECOMMENDATION		Hall's Bootstrap UCL	3331.597
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3318.333
		BCA Bootstrap UCL	3509.762
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5059.753
		97.5% Chebyshev (Mean, Sd) UCL	6211.558
		99% Chebyshev (Mean, Sd) UCL	8474.055
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_43
Benzo(g,h,i)perylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.706631
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2402.143	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3454.051
Standard Deviation	2794.92		
Variance	7811579	Gamma Distribution Test	
Coefficient of Variation	1.163511	A-D Test Statistic	1.854065
Skewness	0.730462	A-D 5% Critical Value	0.79156
		K-S Test Statistic	0.229229
Gamma Statistics		K-S 5% Critical Value	0.198258
k hat	0.652759	Data do not follow gamma distribution	
k star (bias corrected)	0.591254	at 5% significance level	
Theta hat	3679.983		
Theta star	4062.794	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.41589	Approximate Gamma UCL	4119.059
nu star	24.83267	Adjusted Gamma UCL	4299.155
Approx.Chi Square Value (.05)	14.48185		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.87519	Shapiro-Wilk Test Statisitic	0.822488
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.84909	95% H-UCL	8747.238
Standard Deviation of log data	1.49707	95% Chebyshev (MVUE) UCL	7103.909
Variance of log data	2.241217	97.5% Chebyshev (MVUE) UCL	9045.284
		99% Chebyshev (MVUE) UCL	12858.74
		95% Non-parametric UCLs	
		CLT UCL	3405.342
		Adj-CLT UCL (Adjusted for skewness)	3509.221
		Mod-t UCL (Adjusted for skewness)	3470.254
		Jackknife UCL	3454.051
		Standard Bootstrap UCL	3363.849
		Bootstrap-t UCL	3500.486
RECOMMENDATION		Hall's Bootstrap UCL	3314.898
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3439.048
		BCA Bootstrap UCL	3507.143
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5060.642
		97.5% Chebyshev (Mean, Sd) UCL	6210.977
		99% Chebyshev (Mean, Sd) UCL	8470.587
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_44
Benzo(k)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.708868
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	130	Data not normal at 5% significance level	
Maximum	7000		
Mean	2399.286	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3452.099
Standard Deviation	2797.324		
Variance	7825023	Gamma Distribution Test	
Coefficient of Variation	1.165899	A-D Test Statistic	1.754363
Skewness	0.729682	A-D 5% Critical Value	0.792471
		K-S Test Statistic	0.228789
Gamma Statistics		K-S 5% Critical Value	0.198397
k hat	0.642627	Data do not follow gamma distribution	
k star (bias corrected)	0.582569	at 5% significance level	
Theta hat	3733.56		
Theta star	4118.457	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.99033	Approximate Gamma UCL	4133.23
nu star	24.4679	Adjusted Gamma UCL	4315.591
Approx.Chi Square Value (.05)	14.2033		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.60312	Shapiro-Wilk Test Statisitic	0.842155
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.831019	95% H-UCL	9145.341
Standard Deviation of log data	1.519497	95% Chebyshev (MVUE) UCL	7264.842
Variance of log data	2.308872	97.5% Chebyshev (MVUE) UCL	9262.816
		99% Chebyshev (MVUE) UCL	13187.45
		95% Non-parametric UCLs	
		CLT UCL	3403.347
		Adj-CLT UCL (Adjusted for skewness)	3507.205
		Mod-t UCL (Adjusted for skewness)	3468.298
		Jackknife UCL	3452.099
		Standard Bootstrap UCL	3393.671
		Bootstrap-t UCL	3558.477
RECOMMENDATION		Hall's Bootstrap UCL	3345.626
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3430
		BCA Bootstrap UCL	3578.095
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5060.072
		97.5% Chebyshev (Mean, Sd) UCL	6211.396
		99% Chebyshev (Mean, Sd) UCL	8472.95
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_45
Benzyl butyl phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.729739
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7600		
Mean	2705	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3835.226
Standard Deviation	3003.01		
Variance	9018068	Gamma Distribution Test	
Coefficient of Variation	1.11017	A-D Test Statistic	2.072242
Skewness	0.539062	A-D 5% Critical Value	0.794714
		K-S Test Statistic	0.250426
Gamma Statistics		K-S 5% Critical Value	0.198741
k hat	0.617668	Data do not follow gamma distribution	
k star (bias corrected)	0.561176	at 5% significance level	
Theta hat	4379.372		
Theta star	4820.233	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.94208	Approximate Gamma UCL	4715.632
nu star	23.5694	Adjusted Gamma UCL	4928.529
Approx.Chi Square Value (.05)	13.51997		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	12.93595	Shapiro-Wilk Test Statisitic	0.789536
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.935904	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.906775	95% H-UCL	12359.96
Standard Deviation of log data	1.597744	95% Chebyshev (MVUE) UCL	9042.713
Variance of log data	2.552786	97.5% Chebyshev (MVUE) UCL	11581.84
		99% Chebyshev (MVUE) UCL	16569.47
		95% Non-parametric UCLs	
		CLT UCL	3782.89
		Adj-CLT UCL (Adjusted for skewness)	3865.257
		Mod-t UCL (Adjusted for skewness)	3848.073
		Jackknife UCL	3835.226
		Standard Bootstrap UCL	3728.403
		Bootstrap-t UCL	3953.075
RECOMMENDATION		Hall's Bootstrap UCL	3739.468
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3838.333
		BCA Bootstrap UCL	3863.095
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5561.432
		97.5% Chebyshev (Mean, Sd) UCL	6797.412
		99% Chebyshev (Mean, Sd) UCL	9225.257
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_46
Beryllium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.749053
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.19	Data not normal at 5% significance level	
Maximum	1.7		
Mean	0.485238	95% UCL (Assuming Normal Distribution)	
Median	0.36	Student's-t UCL	0.616036
Standard Deviation	0.347529		
Variance	0.120776	Gamma Distribution Test	
Coefficient of Variation	0.716202	A-D Test Statistic	0.600202
Skewness	2.376712	A-D 5% Critical Value	0.749336
		K-S Test Statistic	0.143953
Gamma Statistics		K-S 5% Critical Value	0.190914
k hat	3.039566	Data follow gamma distribution	
k star (bias corrected)	2.637088	at 5% significance level	
Theta hat	0.159641		
Theta star	0.184005	95% UCLs (Assuming Gamma Distribution)	
nu hat	127.6618	Approximate Gamma UCL	0.614491
nu star	110.7577	Adjusted Gamma UCL	0.625868
Approx.Chi Square Value (.05)	87.46075		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	85.87091	Shapiro-Wilk Test Statisitic	0.946433
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.660731		
Maximum of log data	0.530628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.896539	95% H-UCL	0.622927
Standard Deviation of log data	0.569003	95% Chebyshev (MVUE) UCL	0.745126
Variance of log data	0.323764	97.5% Chebyshev (MVUE) UCL	0.861802
		99% Chebyshev (MVUE) UCL	1.090989
		95% Non-parametric UCLs	
		CLT UCL	0.609979
		Adj-CLT UCL (Adjusted for skewness)	0.652006
		Mod-t UCL (Adjusted for skewness)	0.622591
		Jackknife UCL	0.616036
		Standard Bootstrap UCL	0.607934
		Bootstrap-t UCL	0.691654
RECOMMENDATION		Hall's Bootstrap UCL	1.143723
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.61381
		BCA Bootstrap UCL	0.677143
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.815804
		97.5% Chebyshev (Mean, Sd) UCL	0.95884
		99% Chebyshev (Mean, Sd) UCL	1.239807

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_47
Biphenyl (diphenyl)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.753945
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2019.286	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	2933.824
Standard Deviation	2429.929		
Variance	5904553	Gamma Distribution Test	
Coefficient of Variation	1.20336	A-D Test Statistic	1.292487
Skewness	1.127654	A-D 5% Critical Value	0.787887
		K-S Test Statistic	0.205475
Gamma Statistics		K-S 5% Critical Value	0.197696
k hat	0.693621	Data do not follow gamma distribution	
k star (bias corrected)	0.626279	at 5% significance level	
Theta hat	2911.222		
Theta star	3224.261	95% UCLs (Assuming Gamma Distribution)	
nu hat	29.13209	Approximate Gamma UCL	3402.261
nu star	26.3037	Adjusted Gamma UCL	3545.882
Approx.Chi Square Value (.05)	15.61158		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	14.97926	Shapiro-Wilk Test Statisitic	0.850783
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.738095	95% H-UCL	6541.662
Standard Deviation of log data	1.430889	95% Chebyshev (MVUE) UCL	5650.351
Variance of log data	2.047444	97.5% Chebyshev (MVUE) UCL	7164.267
		99% Chebyshev (MVUE) UCL	10138.06
		95% Non-parametric UCLs	
		CLT UCL	2891.476
		Adj-CLT UCL (Adjusted for skewness)	3030.897
		Mod-t UCL (Adjusted for skewness)	2955.571
		Jackknife UCL	2933.824
		Standard Bootstrap UCL	2889.127
		Bootstrap-t UCL	3198.438
RECOMMENDATION		Hall's Bootstrap UCL	2884.2
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2919.286
		BCA Bootstrap UCL	3036.905
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4330.609
		97.5% Chebyshev (Mean, Sd) UCL	5330.72
		99% Chebyshev (Mean, Sd) UCL	7295.245
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_48
Cadmium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.569367
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.17	Data not normal at 5% significance level	
Maximum	6.4		
Mean	1.050952	95% UCL (Assuming Normal Distribution)	
Median	0.62	Student's-t UCL	1.564359
Standard Deviation	1.364122		
Variance	1.860829	Gamma Distribution Test	
Coefficient of Variation	1.297987	A-D Test Statistic	1.095103
Skewness	3.354878	A-D 5% Critical Value	0.7625
		K-S Test Statistic	0.215084
Gamma Statistics		K-S 5% Critical Value	0.193562
k hat	1.311755	Data do not follow gamma distribution	
k star (bias corrected)	1.156107	at 5% significance level	
Theta hat	0.80118		
Theta star	0.909044	95% UCLs (Assuming Gamma Distribution)	
nu hat	55.0937	Approximate Gamma UCL	1.520654
nu star	48.55651	Adjusted Gamma UCL	1.56534
Approx.Chi Square Value (.05)	33.55831		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	32.60031	Shapiro-Wilk Test Statisitic	0.943128
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.771957		
Maximum of log data	1.856298	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.377609	95% H-UCL	1.582248
Standard Deviation of log data	0.865369	95% Chebyshev (MVUE) UCL	1.854151
Variance of log data	0.748863	97.5% Chebyshev (MVUE) UCL	2.235088
		99% Chebyshev (MVUE) UCL	2.983366
		95% Non-parametric UCLs	
		CLT UCL	1.540586
		Adj-CLT UCL (Adjusted for skewness)	1.773444
		Mod-t UCL (Adjusted for skewness)	1.60068
		Jackknife UCL	1.564359
		Standard Bootstrap UCL	1.521428
		Bootstrap-t UCL	2.231463
RECOMMENDATION		Hall's Bootstrap UCL	3.310423
Data are lognormal (0.05)		Percentile Bootstrap UCL	1.586667
		BCA Bootstrap UCL	1.849048
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	2.348491
		97.5% Chebyshev (Mean, Sd) UCL	2.909937
		99% Chebyshev (Mean, Sd) UCL	4.01279

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_49
Calcium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.901618
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3000	Data not normal at 5% significance level	
Maximum	50200		
Mean	18018.1	95% UCL (Assuming Normal Distribution)	
Median	13600	Student's-t UCL	23103.58
Standard Deviation	13512.14		
Variance	1.83E+08	Gamma Distribution Test	
Coefficient of Variation	0.74992	A-D Test Statistic	0.33751
Skewness	0.87163	A-D 5% Critical Value	0.755446
		K-S Test Statistic	0.136837
Gamma Statistics		K-S 5% Critical Value	0.192126
k hat	1.813723	Data follow gamma distribution	
k star (bias corrected)	1.586366	at 5% significance level	
Theta hat	9934.314		
Theta star	11358.1	95% UCLs (Assuming Gamma Distribution)	
nu hat	76.17637	Approximate Gamma UCL	24580.47
nu star	66.62737	Adjusted Gamma UCL	25183.79
Approx.Chi Square Value (.05)	48.83951		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	47.66949	Shapiro-Wilk Test Statisitic	0.961553
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.006368		
Maximum of log data	10.82377	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.498806	95% H-UCL	29158.59
Standard Deviation of log data	0.831452	95% Chebyshev (MVUE) UCL	34401.51
Variance of log data	0.691312	97.5% Chebyshev (MVUE) UCL	41300.32
		99% Chebyshev (MVUE) UCL	54851.7
		95% Non-parametric UCLs	
		CLT UCL	22868.09
		Adj-CLT UCL (Adjusted for skewness)	23467.36
		Mod-t UCL (Adjusted for skewness)	23197.06
		Jackknife UCL	23103.58
		Standard Bootstrap UCL	22661.18
		Bootstrap-t UCL	24107.84
RECOMMENDATION		Hall's Bootstrap UCL	23669.65
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	22934.29
		BCA Bootstrap UCL	23446.19
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	30870.7
		97.5% Chebyshev (Mean, Sd) UCL	36432.04
		99% Chebyshev (Mean, Sd) UCL	47356.2

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._1EPCs3.t	Variable:	_50
Caprolactam			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.708316
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	95	Data not normal at 5% significance level	
Maximum	7000		
Mean	2386.19	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3442.896
Standard Deviation	2807.666		
Variance	7882990	Gamma Distribution Test	
Coefficient of Variation	1.176631	A-D Test Statistic	1.780045
Skewness	0.727886	A-D 5% Critical Value	0.794916
		K-S Test Statistic	0.228037
Gamma Statistics		K-S 5% Critical Value	0.198772
k hat	0.615415	Data do not follow gamma distribution	
k star (bias corrected)	0.559245	at 5% significance level	
Theta hat	3877.368		
Theta star	4266.81	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.84743	Approximate Gamma UCL	4164.474
nu star	23.48827	Adjusted Gamma UCL	4352.887
Approx.Chi Square Value (.05)	13.45848		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	12.87594	Shapiro-Wilk Test Statisitic	0.842328
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.553877		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.777189	95% H-UCL	10042.67
Standard Deviation of log data	1.5711	95% Chebyshev (MVUE) UCL	7563.161
Variance of log data	2.468354	97.5% Chebyshev (MVUE) UCL	9672.345
		99% Chebyshev (MVUE) UCL	13815.43
		95% Non-parametric UCLs	
		CLT UCL	3393.964
		Adj-CLT UCL (Adjusted for skewness)	3497.949
		Mod-t UCL (Adjusted for skewness)	3459.115
		Jackknife UCL	3442.896
		Standard Bootstrap UCL	3390.277
		Bootstrap-t UCL	3498.541
RECOMMENDATION		Hall's Bootstrap UCL	3364.468
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3429.524
		BCA Bootstrap UCL	3499.286
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5056.814
		97.5% Chebyshev (Mean, Sd) UCL	6212.395
		99% Chebyshev (Mean, Sd) UCL	8482.309
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_51
Carbazole			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.706531
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2395.476	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3449.849
Standard Deviation	2801.468		
Variance	7848222	Gamma Distribution Test	
Coefficient of Variation	1.169483	A-D Test Statistic	1.935961
Skewness	0.726692	A-D 5% Critical Value	0.793239
		K-S Test Statistic	0.228531
Gamma Statistics		K-S 5% Critical Value	0.198515
k hat	0.634082	Data do not follow gamma distribution	
k star (bias corrected)	0.575245	at 5% significance level	
Theta hat	3777.863		
Theta star	4164.269	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.63146	Approximate Gamma UCL	4143.162
nu star	24.1603	Adjusted Gamma UCL	4327.386
Approx.Chi Square Value (.05)	13.9689		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.37422	Shapiro-Wilk Test Statisitic	0.807046
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.814735	95% H-UCL	9247.393
Standard Deviation of log data	1.529211	95% Chebyshev (MVUE) UCL	7274.468
Variance of log data	2.338487	97.5% Chebyshev (MVUE) UCL	9280.477
		99% Chebyshev (MVUE) UCL	13220.89
		95% Non-parametric UCLs	
		CLT UCL	3401.025
		Adj-CLT UCL (Adjusted for skewness)	3504.61
		Mod-t UCL (Adjusted for skewness)	3466.006
		Jackknife UCL	3449.849
		Standard Bootstrap UCL	3364.974
		Bootstrap-t UCL	3589.951
RECOMMENDATION		Hall's Bootstrap UCL	3345.176
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3388.095
		BCA Bootstrap UCL	3445.476
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5060.204
		97.5% Chebyshev (Mean, Sd) UCL	6213.233
		99% Chebyshev (Mean, Sd) UCL	8478.137
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_52
Carbon disulfide			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.933812
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3	Data are normal at 5% significance level	
Maximum	9		
Mean	5.761905	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	6.292896
Standard Deviation	1.410842		
Variance	1.990476	Gamma Distribution Test	
Coefficient of Variation	0.244857	A-D Test Statistic	0.869498
Skewness	0.009226	A-D 5% Critical Value	0.742565
		K-S Test Statistic	0.177211
Gamma Statistics		K-S 5% Critical Value	0.189288
k hat	15.88465	Data follow approximate gamma distibution	
k star (bias corrected)	13.64716	at 5% significance level	
Theta hat	0.362734		
Theta star	0.422205	95% UCLs (Assuming Gamma Distribution)	
nu hat	667.1552	Approximate Gamma UCL	6.367857
nu star	573.1807	Adjusted Gamma UCL	6.417081
Approx.Chi Square Value (.05)	518.6379		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	514.6596	Shapiro-Wilk Test Statisitic	0.887638
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	2.197225	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.719461	95% H-UCL	6.450236
Standard Deviation of log data	0.268242	95% Chebyshev (MVUE) UCL	7.266295
Variance of log data	0.071954	97.5% Chebyshev (MVUE) UCL	7.911246
		99% Chebyshev (MVUE) UCL	9.178128
		95% Non-parametric UCLs	
		CLT UCL	6.268308
		Adj-CLT UCL (Adjusted for skewness)	6.26897
		Mod-t UCL (Adjusted for skewness)	6.292999
		Jackknife UCL	6.292896
		Standard Bootstrap UCL	6.250721
		Bootstrap-t UCL	6.294342
RECOMMENDATION		Hall's Bootstrap UCL	6.346336
Data are normal (0.05)		Percentile Bootstrap UCL	6.261905
		BCA Bootstrap UCL	6.261905
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.103884
		97.5% Chebyshev (Mean, Sd) UCL	7.684559
		99% Chebyshev (Mean, Sd) UCL	8.825183

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_53
Chlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.289675
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	19000		
Mean	1100.714	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	2659.036
Standard Deviation	4140.461		
Variance	17143419	Gamma Distribution Test	
Coefficient of Variation	3.761613	A-D Test Statistic	4.141837
Skewness	4.449681	A-D 5% Critical Value	0.8926
		K-S Test Statistic	0.374381
Gamma Statistics		K-S 5% Critical Value	0.209922
k hat	0.19395	Data do not follow gamma distribution	
k star (bias corrected)	0.197989	at 5% significance level	
Theta hat	5675.253		
Theta star	5559.479	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.145892	Approximate Gamma UCL	3136.354
nu star	8.315527	Adjusted Gamma UCL	3418.35
Approx.Chi Square Value (.05)	2.918363		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.677613	Shapiro-Wilk Test Statisitic	0.688548
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	9.852194	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.191163	95% H-UCL	6988.555
Standard Deviation of log data	2.441584	95% Chebyshev (MVUE) UCL	1219.711
Variance of log data	5.961333	97.5% Chebyshev (MVUE) UCL	1612.045
		99% Chebyshev (MVUE) UCL	2382.71
		95% Non-parametric UCLs	
		CLT UCL	2586.877
		Adj-CLT UCL (Adjusted for skewness)	3524.307
		Mod-t UCL (Adjusted for skewness)	2805.256
		Jackknife UCL	2659.036
		Standard Bootstrap UCL	2560.198
		Bootstrap-t UCL	22589.32
RECOMMENDATION		Hall's Bootstrap UCL	22842.14
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2863.952
		BCA Bootstrap UCL	4535.881
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5039.078
		97.5% Chebyshev (Mean, Sd) UCL	6743.212
		99% Chebyshev (Mean, Sd) UCL	10090.65

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_54
Chloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.291247
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	75		
Mean	9.595238	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	15.27778
Standard Deviation	15.09853		
Variance	227.9655	Gamma Distribution Test	
Coefficient of Variation	1.573544	A-D Test Statistic	5.44967
Skewness	4.477471	A-D 5% Critical Value	0.756554
		K-S Test Statistic	0.454209
Gamma Statistics		K-S 5% Critical Value	0.192381
k hat	1.687496	Data do not follow gamma distribution	
k star (bias corrected)	1.478171	at 5% significance level	
Theta hat	5.68608		
Theta star	6.49129	95% UCLs (Assuming Gamma Distribution)	
nu hat	70.87483	Approximate Gamma UCL	13.25059
nu star	62.08319	Adjusted Gamma UCL	13.58905
Approx.Chi Square Value (.05)	44.95671		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	43.837	Shapiro-Wilk Test Statisitic	0.454327
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	4.317488	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.936603	95% H-UCL	10.7758
Standard Deviation of log data	0.584009	95% Chebyshev (MVUE) UCL	12.90187
Variance of log data	0.341066	97.5% Chebyshev (MVUE) UCL	14.95864
		99% Chebyshev (MVUE) UCL	18.99877
		95% Non-parametric UCLs	
		CLT UCL	15.01465
		Adj-CLT UCL (Adjusted for skewness)	18.45441
		Mod-t UCL (Adjusted for skewness)	15.81432
		Jackknife UCL	15.27778
		Standard Bootstrap UCL	14.91838
		Bootstrap-t UCL	117.002
RECOMMENDATION		Hall's Bootstrap UCL	46.66409
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.95238
		BCA Bootstrap UCL	19.66667
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	23.9568
		97.5% Chebyshev (Mean, Sd) UCL	30.17106
		99% Chebyshev (Mean, Sd) UCL	42.37777

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_55
Chloromethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.229724
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	480		
Mean	28.40476	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	67.34886
Standard Deviation	103.4745		
Variance	10706.97	Gamma Distribution Test	
Coefficient of Variation	3.642856	A-D Test Statistic	7.633336
Skewness	4.582429	A-D 5% Critical Value	0.812115
		K-S Test Statistic	0.555187
Gamma Statistics		K-S 5% Critical Value	0.20121
k hat	0.466273	Data do not follow gamma distribution	
k star (bias corrected)	0.431408	at 5% significance level	
Theta hat	60.91876		
Theta star	65.84192	95% UCLs (Assuming Gamma Distribution)	
nu hat	19.58346	Approximate Gamma UCL	54.31505
nu star	18.11915	Adjusted Gamma UCL	57.2057
Approx.Chi Square Value (.05)	9.475648		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	8.996836	Shapiro-Wilk Test Statisitic	0.291014
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.969355	95% H-UCL	19.7033
Standard Deviation of log data	0.966486	95% Chebyshev (MVUE) UCL	22.46582
Variance of log data	0.934095	97.5% Chebyshev (MVUE) UCL	27.39035
		99% Chebyshev (MVUE) UCL	37.06362
		95% Non-parametric UCLs	
		CLT UCL	65.54552
		Adj-CLT UCL (Adjusted for skewness)	89.67179
		Mod-t UCL (Adjusted for skewness)	71.11207
		Jackknife UCL	67.34886
		Standard Bootstrap UCL	63.33082
		Bootstrap-t UCL	6663.034
RECOMMENDATION		Hall's Bootstrap UCL	2185.917
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	73.57143
		BCA Bootstrap UCL	96.14286
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	126.8286
		97.5% Chebyshev (Mean, Sd) UCL	169.4167
		99% Chebyshev (Mean, Sd) UCL	253.0727

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_56
Chromium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.264683
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	22.1	Data not normal at 5% significance level	
Maximum	2650		
Mean	173.6714	95% UCL (Assuming Normal Distribution)	
Median	35.2	Student's-t UCL	387.5176
Standard Deviation	568.1893		
Variance	322839.1	Gamma Distribution Test	
Coefficient of Variation	3.271634	A-D Test Statistic	4.592496
Skewness	4.561671	A-D 5% Critical Value	0.802869
		K-S Test Statistic	0.349694
Gamma Statistics		K-S 5% Critical Value	0.199989
k hat	0.526938	Data do not follow gamma distribution	
k star (bias corrected)	0.483407	at 5% significance level	
Theta hat	329.5864		
Theta star	359.2656	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.13138	Approximate Gamma UCL	318.4276
nu star	20.30308	Adjusted Gamma UCL	334.1995
Approx.Chi Square Value (.05)	11.07337		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.55078	Shapiro-Wilk Test Statisitic	0.666205
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	3.095578		
Maximum of log data	7.882315	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.961455	95% H-UCL	163.3175
Standard Deviation of log data	1.031992	95% Chebyshev (MVUE) UCL	181.8655
Variance of log data	1.065007	97.5% Chebyshev (MVUE) UCL	223.2282
		99% Chebyshev (MVUE) UCL	304.4771
		95% Non-parametric UCLs	
		CLT UCL	377.6153
		Adj-CLT UCL (Adjusted for skewness)	509.4951
		Mod-t UCL (Adjusted for skewness)	408.0882
		Jackknife UCL	387.5176
		Standard Bootstrap UCL	376.4714
		Bootstrap-t UCL	3448.673
RECOMMENDATION		Hall's Bootstrap UCL	1863.556
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	419.9619
		BCA Bootstrap UCL	554.7381
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	714.1273
		97.5% Chebyshev (Mean, Sd) UCL	947.983
		99% Chebyshev (Mean, Sd) UCL	1407.347

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_57
Chyrsene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.705639
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2401.667	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3453.411
Standard Deviation	2794.485		
Variance	7809146	Gamma Distribution Test	
Coefficient of Variation	1.163561	A-D Test Statistic	1.858687
Skewness	0.732205	A-D 5% Critical Value	0.791349
		K-S Test Statistic	0.229423
Gamma Statistics		K-S 5% Critical Value	0.198226
k hat	0.655108	Data do not follow gamma distribution	
k star (bias corrected)	0.593268	at 5% significance level	
Theta hat	3666.06		
Theta star	4048.202	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.51456	Approximate Gamma UCL	4113.895
nu star	24.91724	Adjusted Gamma UCL	4293.391
Approx.Chi Square Value (.05)	14.54653		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.93837	Shapiro-Wilk Test Statisitic	0.82312
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.852724	95% H-UCL	8681.46
Standard Deviation of log data	1.493034	95% Chebyshev (MVUE) UCL	7078.232
Variance of log data	2.229151	97.5% Chebyshev (MVUE) UCL	9010.349
		99% Chebyshev (MVUE) UCL	12805.62
		95% Non-parametric UCLs	
		CLT UCL	3404.709
		Adj-CLT UCL (Adjusted for skewness)	3508.82
		Mod-t UCL (Adjusted for skewness)	3469.65
		Jackknife UCL	3453.411
		Standard Bootstrap UCL	3369.183
		Bootstrap-t UCL	3497.594
RECOMMENDATION		Hall's Bootstrap UCL	3335.699
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3349.048
		BCA Bootstrap UCL	3552.619
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5059.752
		97.5% Chebyshev (Mean, Sd) UCL	6209.908
		99% Chebyshev (Mean, Sd) UCL	8469.166
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_58
Cobalt			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.895084
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3.8	Data not normal at 5% significance level	
Maximum	16.5		
Mean	7.6	95% UCL (Assuming Normal Distribution)	
Median	6.9	Student's-t UCL	8.685079
Standard Deviation	2.883054		
Variance	8.312	Gamma Distribution Test	
Coefficient of Variation	0.379349	A-D Test Statistic	0.259695
Skewness	1.365476	A-D 5% Critical Value	0.743624
		K-S Test Statistic	0.097295
Gamma Statistics		K-S 5% Critical Value	0.189619
k hat	8.146175	Data follow gamma distribution	
k star (bias corrected)	7.014182	at 5% significance level	
Theta hat	0.932953		
Theta star	1.083519	95% UCLs (Assuming Gamma Distribution)	
nu hat	342.1394	Approximate Gamma UCL	8.751596
nu star	294.5956	Adjusted Gamma UCL	8.847443
Approx.Chi Square Value (.05)	255.8307		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	253.0592	Shapiro-Wilk Test Statisitic	0.969868
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.335001		
Maximum of log data	2.80336	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.965516	95% H-UCL	8.859391
Standard Deviation of log data	0.360272	95% Chebyshev (MVUE) UCL	10.24698
Variance of log data	0.129796	97.5% Chebyshev (MVUE) UCL	11.39561
		99% Chebyshev (MVUE) UCL	13.65187
		95% Non-parametric UCLs	
		CLT UCL	8.634833
		Adj-CLT UCL (Adjusted for skewness)	8.835141
		Mod-t UCL (Adjusted for skewness)	8.716323
		Jackknife UCL	8.685079
		Standard Bootstrap UCL	8.584339
		Bootstrap-t UCL	9.015964
RECOMMENDATION		Hall's Bootstrap UCL	9.216062
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	8.72381
		BCA Bootstrap UCL	8.833333
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	10.34233
		97.5% Chebyshev (Mean, Sd) UCL	11.52894
		99% Chebyshev (Mean, Sd) UCL	13.8598

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_59
Copper			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.625545
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	8.8	Data not normal at 5% significance level	
Maximum	672		
Mean	109.1714	95% UCL (Assuming Normal Distribution)	
Median	48.9	Student's-t UCL	164.4217
Standard Deviation	146.8		
Variance	21550.24	Gamma Distribution Test	
Coefficient of Variation	1.344674	A-D Test Statistic	0.779992
Skewness	3.066735	A-D 5% Critical Value	0.770333
		K-S Test Statistic	0.243771
Gamma Statistics		K-S 5% Critical Value	0.195
k hat	0.986501	Data do not follow gamma distribution	
k star (bias corrected)	0.877318	at 5% significance level	
Theta hat	110.6653		
Theta star	124.4377	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.43303	Approximate Gamma UCL	167.9652
nu star	36.84736	Adjusted Gamma UCL	173.7608
Approx.Chi Square Value (.05)	23.94949		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	23.15068	Shapiro-Wilk Test Statisitic	0.965169
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.174752		
Maximum of log data	6.510258	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.106868	95% H-UCL	210.879
Standard Deviation of log data	1.087592	95% Chebyshev (MVUE) UCL	229.2888
Variance of log data	1.182855	97.5% Chebyshev (MVUE) UCL	282.951
		99% Chebyshev (MVUE) UCL	388.3601
		95% Non-parametric UCLs	
		CLT UCL	161.8633
		Adj-CLT UCL (Adjusted for skewness)	184.77
		Mod-t UCL (Adjusted for skewness)	167.9947
		Jackknife UCL	164.4217
		Standard Bootstrap UCL	160.7552
		Bootstrap-t UCL	217.8069
RECOMMENDATION		Hall's Bootstrap UCL	368.6972
Data are lognormal (0.05)		Percentile Bootstrap UCL	163.0571
		BCA Bootstrap UCL	179.7333
Use 95% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	248.8061
		97.5% Chebyshev (Mean, Sd) UCL	309.2261
		99% Chebyshev (Mean, Sd) UCL	427.9095

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_60
Cyclohexane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.470512
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	3300		
Mean	419.7143	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	788.6519
Standard Deviation	980.2672		
Variance	960923.8	Gamma Distribution Test	
Coefficient of Variation	2.335558	A-D Test Statistic	2.782552
Skewness	2.746146	A-D 5% Critical Value	0.859282
		K-S Test Statistic	0.361251
Gamma Statistics		K-S 5% Critical Value	0.206709
k hat	0.26962	Data do not follow gamma distribution	
k star (bias corrected)	0.262849	at 5% significance level	
Theta hat	1556.691		
Theta star	1596.791	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.32402	Approximate Gamma UCL	1007.154
nu star	11.03964	Adjusted Gamma UCL	1081.436
Approx.Chi Square Value (.05)	4.600582		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.284575	Shapiro-Wilk Test Statisitic	0.743159
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	8.101678	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.437174	95% H-UCL	6364.041
Standard Deviation of log data	2.365014	95% Chebyshev (MVUE) UCL	1320.374
Variance of log data	5.593291	97.5% Chebyshev (MVUE) UCL	1741.813
		99% Chebyshev (MVUE) UCL	2569.648
		95% Non-parametric UCLs	
		CLT UCL	771.568
		Adj-CLT UCL (Adjusted for skewness)	908.5391
		Mod-t UCL (Adjusted for skewness)	810.0166
		Jackknife UCL	788.6519
		Standard Bootstrap UCL	759.9556
		Bootstrap-t UCL	2008.555
RECOMMENDATION		Hall's Bootstrap UCL	2415.761
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	774.0952
		BCA Bootstrap UCL	909.8095
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1352.134
		97.5% Chebyshev (Mean, Sd) UCL	1755.593
		99% Chebyshev (Mean, Sd) UCL	2548.11

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_61
Di-n-butyl phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.711831
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2220.714	95% UCL (Assuming Normal Distribution)	
Median	600	Student's-t UCL	3235.457
Standard Deviation	2696.171		
Variance	7269338	Gamma Distribution Test	
Coefficient of Variation	1.214101	A-D Test Statistic	1.836101
Skewness	0.88658	A-D 5% Critical Value	0.792909
		K-S Test Statistic	0.248361
Gamma Statistics		K-S 5% Critical Value	0.198465
k hat	0.63775	Data do not follow gamma distribution	
k star (bias corrected)	0.578389	at 5% significance level	
Theta hat	3482.106		
Theta star	3839.481	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.78551	Approximate Gamma UCL	3834.287
nu star	24.29234	Adjusted Gamma UCL	4004.207
Approx.Chi Square Value (.05)	14.06946		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.47242	Shapiro-Wilk Test Statisitic	0.816857
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.745343	95% H-UCL	7845.267
Standard Deviation of log data	1.495238	95% Chebyshev (MVUE) UCL	6382.777
Variance of log data	2.235735	97.5% Chebyshev (MVUE) UCL	8126.163
		99% Chebyshev (MVUE) UCL	11550.71
		95% Non-parametric UCLs	
		CLT UCL	3188.468
		Adj-CLT UCL (Adjusted for skewness)	3310.094
		Mod-t UCL (Adjusted for skewness)	3254.428
		Jackknife UCL	3235.457
		Standard Bootstrap UCL	3187.486
		Bootstrap-t UCL	3403.483
RECOMMENDATION		Hall's Bootstrap UCL	3166.392
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3200.238
		BCA Bootstrap UCL	3302.143
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4785.284
		97.5% Chebyshev (Mean, Sd) UCL	5894.976
		99% Chebyshev (Mean, Sd) UCL	8074.75
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_62
Dibenz(a,h)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.707272
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	120	Data not normal at 5% significance level	
Maximum	7000		
Mean	2387.381	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3443.704
Standard Deviation	2806.651		
Variance	7877292	Gamma Distribution Test	
Coefficient of Variation	1.175619	A-D Test Statistic	1.834989
Skewness	0.728243	A-D 5% Critical Value	0.794399
		K-S Test Statistic	0.228325
Gamma Statistics		K-S 5% Critical Value	0.198693
k hat	0.621177	Data do not follow gamma distribution	
k star (bias corrected)	0.564183	at 5% significance level	
Theta hat	3843.321		
Theta star	4231.571	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.08942	Approximate Gamma UCL	4154.788
nu star	23.69569	Adjusted Gamma UCL	4341.748
Approx.Chi Square Value (.05)	13.61577		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.02946	Shapiro-Wilk Test Statisitic	0.830837
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.787492		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.788314	95% H-UCL	9702.283
Standard Deviation of log data	1.555318	95% Chebyshev (MVUE) UCL	7429.833
Variance of log data	2.419013	97.5% Chebyshev (MVUE) UCL	9493.223
		99% Chebyshev (MVUE) UCL	13546.35
		95% Non-parametric UCLs	
		CLT UCL	3394.791
		Adj-CLT UCL (Adjusted for skewness)	3498.789
		Mod-t UCL (Adjusted for skewness)	3459.926
		Jackknife UCL	3443.704
		Standard Bootstrap UCL	3379.847
		Bootstrap-t UCL	3520.2
RECOMMENDATION		Hall's Bootstrap UCL	3343.757
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3346.19
		BCA Bootstrap UCL	3482.381
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5057.039
		97.5% Chebyshev (Mean, Sd) UCL	6212.202
		99% Chebyshev (Mean, Sd) UCL	8481.296
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_63
Dibenzofuran			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.741008
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2347.857	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3362.324
Standard Deviation	2695.439		
Variance	7265389	Gamma Distribution Test	
Coefficient of Variation	1.148042	A-D Test Statistic	1.685522
Skewness	0.76223	A-D 5% Critical Value	0.791624
		K-S Test Statistic	0.217299
Gamma Statistics		K-S 5% Critical Value	0.198268
k hat	0.652052	Data do not follow gamma distribution	
k star (bias corrected)	0.590647	at 5% significance level	
Theta hat	3600.723		
Theta star	3975.057	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.38617	Approximate Gamma UCL	4027.259
nu star	24.80719	Adjusted Gamma UCL	4203.452
Approx.Chi Square Value (.05)	14.46238		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.85617	Shapiro-Wilk Test Statisitic	0.817618
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.825071	95% H-UCL	9041.775
Standard Deviation of log data	1.517559	95% Chebyshev (MVUE) UCL	7196.481
Variance of log data	2.302986	97.5% Chebyshev (MVUE) UCL	9174.585
		99% Chebyshev (MVUE) UCL	13060.19
		95% Non-parametric UCLs	
		CLT UCL	3315.348
		Adj-CLT UCL (Adjusted for skewness)	3419.887
		Mod-t UCL (Adjusted for skewness)	3378.63
		Jackknife UCL	3362.324
		Standard Bootstrap UCL	3309.716
		Bootstrap-t UCL	3539.85
RECOMMENDATION		Hall's Bootstrap UCL	3276.933
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3337.143
		BCA Bootstrap UCL	3385
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4911.731
		97.5% Chebyshev (Mean, Sd) UCL	6021.121
		99% Chebyshev (Mean, Sd) UCL	8200.303
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_64
Dieldrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.680037
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.87	Data not normal at 5% significance level	
Maximum	2400		
Mean	541.2676	95% UCL (Assuming Normal Distribution)	
Median	49	Student's-t UCL	857.0297
Standard Deviation	838.9799		
Variance	703887.2	Gamma Distribution Test	
Coefficient of Variation	1.550028	A-D Test Statistic	0.800898
Skewness	1.374951	A-D 5% Critical Value	0.849177
		K-S Test Statistic	0.151152
Gamma Statistics		K-S 5% Critical Value	0.205731
k hat	0.292322	Data follow gamma distribution	
k star (bias corrected)	0.282308	at 5% significance level	
Theta hat	1851.611		
Theta star	1917.294	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.27754	Approximate Gamma UCL	1250.552
nu star	11.85694	Adjusted Gamma UCL	1338.416
Approx.Chi Square Value (.05)	5.131957		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.795055	Shapiro-Wilk Test Statisitic	0.900747
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.139262		
Maximum of log data	7.783224	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.924997	95% H-UCL	131094.5
Standard Deviation of log data	2.888818	95% Chebyshev (MVUE) UCL	6995.028
Variance of log data	8.34527	97.5% Chebyshev (MVUE) UCL	9324.107
		99% Chebyshev (MVUE) UCL	13899.13
		95% Non-parametric UCLs	
		CLT UCL	842.4081
		Adj-CLT UCL (Adjusted for skewness)	901.1029
		Mod-t UCL (Adjusted for skewness)	866.1849
		Jackknife UCL	857.0297
		Standard Bootstrap UCL	836.7809
		Bootstrap-t UCL	949.867
RECOMMENDATION		Hall's Bootstrap UCL	816.4271
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	844.2605
		BCA Bootstrap UCL	925.7057
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	1339.297
		97.5% Chebyshev (Mean, Sd) UCL	1684.604
		99% Chebyshev (Mean, Sd) UCL	2362.895

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_65
Endosulfan sulfate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.374995
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.6	Data not normal at 5% significance level	
Maximum	180		
Mean	15.05	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	29.69183
Standard Deviation	38.90334		
Variance	1513.47	Gamma Distribution Test	
Coefficient of Variation	2.58494	A-D Test Statistic	3.010153
Skewness	4.196842	A-D 5% Critical Value	0.803631
		K-S Test Statistic	0.333839
Gamma Statistics		K-S 5% Critical Value	0.200106
k hat	0.518454	Data do not follow gamma distribution	
k star (bias corrected)	0.476135	at 5% significance level	
Theta hat	29.0286		
Theta star	31.60866	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.77507	Approximate Gamma UCL	27.74399
nu star	19.99768	Adjusted Gamma UCL	29.1313
Approx.Chi Square Value (.05)	10.84794		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.33133	Shapiro-Wilk Test Statisitic	0.751543
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.493072	95% H-UCL	25.30876
Standard Deviation of log data	1.308891	95% Chebyshev (MVUE) UCL	24.12162
Variance of log data	1.713195	97.5% Chebyshev (MVUE) UCL	30.32411
		99% Chebyshev (MVUE) UCL	42.50771
		95% Non-parametric UCLs	
		CLT UCL	29.01383
		Adj-CLT UCL (Adjusted for skewness)	37.32134
		Mod-t UCL (Adjusted for skewness)	30.98763
		Jackknife UCL	29.69183
		Standard Bootstrap UCL	28.73097
		Bootstrap-t UCL	90.9226
RECOMMENDATION		Hall's Bootstrap UCL	78.99757
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	31.33095
		BCA Bootstrap UCL	40.24286
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	52.05446
		97.5% Chebyshev (Mean, Sd) UCL	68.06632
		99% Chebyshev (Mean, Sd) UCL	99.51851

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_66
Endrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.372531
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.2	Data not normal at 5% significance level	
Maximum	180		
Mean	14.77619	95% UCL (Assuming Normal Distribution)	
Median	2.05	Student's-t UCL	29.44219
Standard Deviation	38.96755		
Variance	1518.47	Gamma Distribution Test	
Coefficient of Variation	2.637185	A-D Test Statistic	2.950493
Skewness	4.198083	A-D 5% Critical Value	0.805057
		K-S Test Statistic	0.323249
Gamma Statistics		K-S 5% Critical Value	0.200324
k hat	0.502589	Data do not follow gamma distribution	
k star (bias corrected)	0.462537	at 5% significance level	
Theta hat	29.40012		
Theta star	31.94597	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.10875	Approximate Gamma UCL	27.52675
nu star	19.42655	Adjusted Gamma UCL	28.92852
Approx.Chi Square Value (.05)	10.42805		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	9.922748	Shapiro-Wilk Test Statisitic	0.785497
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.182322		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.430211	95% H-UCL	24.54417
Standard Deviation of log data	1.322084	95% Chebyshev (MVUE) UCL	23.16661
Variance of log data	1.747906	97.5% Chebyshev (MVUE) UCL	29.15202
		99% Chebyshev (MVUE) UCL	40.9092
		95% Non-parametric UCLs	
		CLT UCL	28.76306
		Adj-CLT UCL (Adjusted for skewness)	37.08674
		Mod-t UCL (Adjusted for skewness)	30.74051
		Jackknife UCL	29.44219
		Standard Bootstrap UCL	28.46472
		Bootstrap-t UCL	86.87515
RECOMMENDATION		Hall's Bootstrap UCL	79.0191
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	29.85952
		BCA Bootstrap UCL	41.22143
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	51.84172
		97.5% Chebyshev (Mean, Sd) UCL	67.88
		99% Chebyshev (Mean, Sd) UCL	99.38411

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_67
Endrin aldehyde			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.376512
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.1	Data not normal at 5% significance level	
Maximum	180		
Mean	15.03095	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	29.67547
Standard Deviation	38.91048		
Variance	1514.025	Gamma Distribution Test	
Coefficient of Variation	2.58869	A-D Test Statistic	2.865417
Skewness	4.195941	A-D 5% Critical Value	0.8041
		K-S Test Statistic	0.331061
Gamma Statistics		K-S 5% Critical Value	0.200178
k hat	0.513235	Data do not follow gamma distribution	
k star (bias corrected)	0.471662	at 5% significance level	
Theta hat	29.28669		
Theta star	31.86808	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.55587	Approximate Gamma UCL	27.80321
nu star	19.80979	Adjusted Gamma UCL	29.20175
Approx.Chi Square Value (.05)	10.70956		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.19665	Shapiro-Wilk Test Statisitic	0.785308
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.09531		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.477498	95% H-UCL	25.89565
Standard Deviation of log data	1.324657	95% Chebyshev (MVUE) UCL	24.39531
Variance of log data	1.754715	97.5% Chebyshev (MVUE) UCL	30.70398
		99% Chebyshev (MVUE) UCL	43.09614
		95% Non-parametric UCLs	
		CLT UCL	28.99734
		Adj-CLT UCL (Adjusted for skewness)	37.30459
		Mod-t UCL (Adjusted for skewness)	30.97123
		Jackknife UCL	29.67547
		Standard Bootstrap UCL	28.76082
		Bootstrap-t UCL	92.4572
RECOMMENDATION		Hall's Bootstrap UCL	79.64157
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	30.84048
		BCA Bootstrap UCL	41.00238
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	52.0422
		97.5% Chebyshev (Mean, Sd) UCL	68.05699
		99% Chebyshev (Mean, Sd) UCL	99.51496

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_68
Endrin ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.364876
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1.1	Data not normal at 5% significance level	
Maximum	180		
Mean	14.69762	95% UCL (Assuming Normal Distribution)	
Median	2.15	Student's-t UCL	29.33583
Standard Deviation	38.89372		
Variance	1512.722	Gamma Distribution Test	
Coefficient of Variation	2.64626	A-D Test Statistic	2.939454
Skewness	4.22991	A-D 5% Critical Value	0.803748
		K-S Test Statistic	0.320106
Gamma Statistics		K-S 5% Critical Value	0.200124
k hat	0.517159	Data do not follow gamma distribution	
k star (bias corrected)	0.475025	at 5% significance level	
Theta hat	28.41994		
Theta star	30.94074	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.72066	Approximate Gamma UCL	27.11712
nu star	19.95104	Adjusted Gamma UCL	28.47508
Approx.Chi Square Value (.05)	10.81357		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.29788	Shapiro-Wilk Test Statisitic	0.787658
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.09531		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.465857	95% H-UCL	23.78998
Standard Deviation of log data	1.294532	95% Chebyshev (MVUE) UCL	22.90953
Variance of log data	1.675812	97.5% Chebyshev (MVUE) UCL	28.76929
		99% Chebyshev (MVUE) UCL	40.27966
		95% Non-parametric UCLs	
		CLT UCL	28.658
		Adj-CLT UCL (Adjusted for skewness)	37.02889
		Mod-t UCL (Adjusted for skewness)	30.64152
		Jackknife UCL	29.33583
		Standard Bootstrap UCL	28.13776
		Bootstrap-t UCL	100.6503
RECOMMENDATION		Hall's Bootstrap UCL	82.5186
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	30.37143
		BCA Bootstrap UCL	41.25
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	51.69293
		97.5% Chebyshev (Mean, Sd) UCL	67.70083
		99% Chebyshev (Mean, Sd) UCL	99.14525

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_69
Ethylbenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.599752
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3	Data not normal at 5% significance level	
Maximum	89000		
Mean	12600.05	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	21725.69
Standard Deviation	24246.82		
Variance	5.88E+08	Gamma Distribution Test	
Coefficient of Variation	1.924343	A-D Test Statistic	2.75048
Skewness	2.112199	A-D 5% Critical Value	0.905336
		K-S Test Statistic	0.381803
Gamma Statistics		K-S 5% Critical Value	0.211083
k hat	0.160878	Data do not follow gamma distribution	
k star (bias corrected)	0.169642	at 5% significance level	
Theta hat	78320.49		
Theta star	74274.55	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.756878	Approximate Gamma UCL	40099.95
nu star	7.124943	Adjusted Gamma UCL	44131.74
Approx.Chi Square Value (.05)	2.238771		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.034242	Shapiro-Wilk Test Statisitic	0.715771
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	11.39639	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.71289	95% H-UCL	7.19E+08
Standard Deviation of log data	4.102594	95% Chebyshev (MVUE) UCL	321711.4
Variance of log data	16.83128	97.5% Chebyshev (MVUE) UCL	433373.4
		99% Chebyshev (MVUE) UCL	652711.6
		95% Non-parametric UCLs	
		CLT UCL	21303.12
		Adj-CLT UCL (Adjusted for skewness)	23908.97
		Mod-t UCL (Adjusted for skewness)	22132.15
		Jackknife UCL	21725.69
		Standard Bootstrap UCL	20996.99
		Bootstrap-t UCL	28344.2
RECOMMENDATION		Hall's Bootstrap UCL	22441.44
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	21765.29
		BCA Bootstrap UCL	23678.31
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	35663.37
		97.5% Chebyshev (Mean, Sd) UCL	45642.89
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	65245.72
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_70
Fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.768853
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.908
Minimum	77	Data not normal at 5% significance level	
Maximum	7000		
Mean	2487.476	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3500.728
Standard Deviation	2692.209		
Variance	7247989	Gamma Distribution Test	
Coefficient of Variation	1.082305	A-D Test Statistic	1.29047
Skewness	0.630405	A-D 5% Critical Value	0.789359
		K-S Test Statistic	0.190152
Gamma Statistics		K-S 5% Critical Value	0.197921
k hat	0.677252	Data follow approximate gamma distibution	
k star (bias corrected)	0.612248	at 5% significance level	
Theta hat	3672.896		
Theta star	4062.859	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.44459	Approximate Gamma UCL	4219.866
nu star	25.71441	Adjusted Gamma UCL	4400.477
Approx.Chi Square Value (.05)	15.15782		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	14.53569	Shapiro-Wilk Test Statisitic	0.879758
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.343805		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.922526	95% H-UCL	10458.41
Standard Deviation of log data	1.534604	95% Chebyshev (MVUE) UCL	8182.162
Variance of log data	2.355008	97.5% Chebyshev (MVUE) UCL	10441.82
		99% Chebyshev (MVUE) UCL	14880.47
		95% Non-parametric UCLs	
		CLT UCL	3453.808
		Adj-CLT UCL (Adjusted for skewness)	3540.164
		Mod-t UCL (Adjusted for skewness)	3514.197
		Jackknife UCL	3500.728
		Standard Bootstrap UCL	3444.494
		Bootstrap-t UCL	3649.235
RECOMMENDATION		Hall's Bootstrap UCL	3454.199
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	3479.048
		BCA Bootstrap UCL	3469.476
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5048.278
		97.5% Chebyshev (Mean, Sd) UCL	6156.339
		99% Chebyshev (Mean, Sd) UCL	8332.91

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_71
Fluorene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.77496
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	8900		
Mean	2309.762	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3349.76
Standard Deviation	2763.276		
Variance	7635694	Gamma Distribution Test	
Coefficient of Variation	1.196347	A-D Test Statistic	1.386607
Skewness	1.092833	A-D 5% Critical Value	0.791446
		K-S Test Statistic	0.214625
Gamma Statistics		K-S 5% Critical Value	0.198241
k hat	0.654029	Data do not follow gamma distribution	
k star (bias corrected)	0.592343	at 5% significance level	
Theta hat	3531.587		
Theta star	3899.368	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.46923	Approximate Gamma UCL	3958.386
nu star	24.87839	Adjusted Gamma UCL	4131.262
Approx.Chi Square Value (.05)	14.51682		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.90935	Shapiro-Wilk Test Statisitic	0.842012
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.093807	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.811949	95% H-UCL	8586.427
Standard Deviation of log data	1.503761	95% Chebyshev (MVUE) UCL	6927.868
Variance of log data	2.261296	97.5% Chebyshev (MVUE) UCL	8824.752
		99% Chebyshev (MVUE) UCL	12550.81
		95% Non-parametric UCLs	
		CLT UCL	3301.602
		Adj-CLT UCL (Adjusted for skewness)	3455.255
		Mod-t UCL (Adjusted for skewness)	3373.727
		Jackknife UCL	3349.76
		Standard Bootstrap UCL	3285.071
		Bootstrap-t UCL	3552.46
RECOMMENDATION		Hall's Bootstrap UCL	3327.044
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3323.095
		BCA Bootstrap UCL	3376.429
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4938.162
		97.5% Chebyshev (Mean, Sd) UCL	6075.472
		99% Chebyshev (Mean, Sd) UCL	8309.499

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_72
HPCDD (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.882449
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.199	Data are normal at 5% significance level	
Maximum	1890		
Mean	726.2998	95% UCL (Assuming Normal Distribution)	
Median	507.5	Student's-t UCL	1684.529
Standard Deviation	814.3488		
Variance	663163.9	Gamma Distribution Test	
Coefficient of Variation	1.12123	A-D Test Statistic	0.498563
Skewness	1.436944	A-D 5% Critical Value	0.699651
		K-S Test Statistic	0.368735
Gamma Statistics		K-S 5% Critical Value	0.416563
k hat	0.338583	Data follow gamma distribution	
k star (bias corrected)	0.251312	at 5% significance level	
Theta hat	2145.117		
Theta star	2890.028	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.708663	Approximate Gamma UCL	9602.881
nu star	2.010499	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.152061		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.76613
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.61445		
Maximum of log data	7.544332	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.591165	95% H-UCL	5.36E+44
Standard Deviation of log data	4.186036	95% Chebyshev (MVUE) UCL	21941.69
Variance of log data	17.5229	97.5% Chebyshev (MVUE) UCL	29623.97
		99% Chebyshev (MVUE) UCL	44714.3
		95% Non-parametric UCLs	
		CLT UCL	1396.042
		Adj-CLT UCL (Adjusted for skewness)	1708.629
		Mod-t UCL (Adjusted for skewness)	1733.286
		Jackknife UCL	1684.529
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2501.132
		97.5% Chebyshev (Mean, Sd) UCL	3269.103
		99% Chebyshev (Mean, Sd) UCL	4777.634

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_73
HPCDF (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.912444
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.199	Data are normal at 5% significance level	
Maximum	489		
Mean	203.3247	95% UCL (Assuming Normal Distribution)	
Median	162.05	Student's-t UCL	470.8343
Standard Deviation	227.3424		
Variance	51684.54	Gamma Distribution Test	
Coefficient of Variation	1.118124	A-D Test Statistic	0.331039
Skewness	0.637117	A-D 5% Critical Value	0.696485
		K-S Test Statistic	0.273342
Gamma Statistics		K-S 5% Critical Value	0.415499
k hat	0.365847	Data follow gamma distribution	
k star (bias corrected)	0.258128	at 5% significance level	
Theta hat	555.7649		
Theta star	787.6886	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.926773	Approximate Gamma UCL	2630.08
nu star	2.065027	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.159642		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.848994
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.61445		
Maximum of log data	6.192362	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.489967	95% H-UCL	2.86E+32
Standard Deviation of log data	3.561433	95% Chebyshev (MVUE) UCL	3290.865
Variance of log data	12.6838	97.5% Chebyshev (MVUE) UCL	4437.384
		99% Chebyshev (MVUE) UCL	6689.498
		95% Non-parametric UCLs	
		CLT UCL	390.2972
		Adj-CLT UCL (Adjusted for skewness)	428.9891
		Mod-t UCL (Adjusted for skewness)	476.8695
		Jackknife UCL	470.8343
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	698.8059
		97.5% Chebyshev (Mean, Sd) UCL	913.201
		99% Chebyshev (Mean, Sd) UCL	1334.339

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_74
Heptachlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.373763
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.9	Data not normal at 5% significance level	
Maximum	90		
Mean	7.559524	95% UCL (Assuming Normal Distribution)	
Median	1.05	Student's-t UCL	14.87753
Standard Deviation	19.44393		
Variance	378.0664	Gamma Distribution Test	
Coefficient of Variation	2.57211	A-D Test Statistic	3.041631
Skewness	4.197459	A-D 5% Critical Value	0.802671
		K-S Test Statistic	0.336461
Gamma Statistics		K-S 5% Critical Value	0.199959
k hat	0.529141	Data do not follow gamma distribution	
k star (bias corrected)	0.485296	at 5% significance level	
Theta hat	14.28639		
Theta star	15.57714	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.22394	Approximate Gamma UCL	13.84127
nu star	20.38243	Adjusted Gamma UCL	14.52516
Approx.Chi Square Value (.05)	11.13203		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.6079	Shapiro-Wilk Test Statisitic	0.745581
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	4.49981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.832839	95% H-UCL	12.41899
Standard Deviation of log data	1.287426	95% Chebyshev (MVUE) UCL	12.01952
Variance of log data	1.657465	97.5% Chebyshev (MVUE) UCL	15.08571
		99% Chebyshev (MVUE) UCL	21.10863
		95% Non-parametric UCLs	
		CLT UCL	14.53866
		Adj-CLT UCL (Adjusted for skewness)	18.69137
		Mod-t UCL (Adjusted for skewness)	15.52526
		Jackknife UCL	14.87753
		Standard Bootstrap UCL	14.29073
		Bootstrap-t UCL	47.50221
RECOMMENDATION		Hall's Bootstrap UCL	40.16998
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.3381
		BCA Bootstrap UCL	20.45476
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	26.05439
		97.5% Chebyshev (Mean, Sd) UCL	34.05713
		99% Chebyshev (Mean, Sd) UCL	49.77697

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_75
HxCDD (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.715624
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1785	Data not normal at 5% significance level	
Maximum	650		
Mean	192.7946	95% UCL (Assuming Normal Distribution)	
Median	60.5	Student's-t UCL	553.0565
Standard Deviation	306.1676		
Variance	93738.63	Gamma Distribution Test	
Coefficient of Variation	1.588051	A-D Test Statistic	0.304929
Skewness	1.945805	A-D 5% Critical Value	0.700112
		K-S Test Statistic	0.246758
Gamma Statistics		K-S 5% Critical Value	0.416719
k hat	0.334609	Data follow gamma distribution	
k star (bias corrected)	0.250319	at 5% significance level	
Theta hat	576.1788		
Theta star	770.1959	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.676872	Approximate Gamma UCL	2556.651
nu star	2.002551	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.15101		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.878044
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.723167		
Maximum of log data	6.476972	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.237219	95% H-UCL	1.47E+31
Standard Deviation of log data	3.492954	95% Chebyshev (MVUE) UCL	2344.148
Variance of log data	12.20073	97.5% Chebyshev (MVUE) UCL	3160.208
		99% Chebyshev (MVUE) UCL	4763.2
		95% Non-parametric UCLs	
		CLT UCL	444.5951
		Adj-CLT UCL (Adjusted for skewness)	603.735
		Mod-t UCL (Adjusted for skewness)	577.8791
		Jackknife UCL	553.0565
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Adjusted Gamma UCL not available		95% Chebyshev (Mean, Sd) UCL	860.0715
try Approximate Gamma UCL		97.5% Chebyshev (Mean, Sd) UCL	1148.803
		99% Chebyshev (Mean, Sd) UCL	1715.959
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_76
HxCDF (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.835005
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.201	Data are normal at 5% significance level	
Maximum	527		
Mean	185.4253	95% UCL (Assuming Normal Distribution)	
Median	107.25	Student's-t UCL	460.9884
Standard Deviation	234.1867		
Variance	54843.4	Gamma Distribution Test	
Coefficient of Variation	1.262971	A-D Test Statistic	0.340045
Skewness	1.673024	A-D 5% Critical Value	0.694582
		K-S Test Statistic	0.29403
Gamma Statistics		K-S 5% Critical Value	0.414859
k hat	0.382236	Data follow gamma distribution	
k star (bias corrected)	0.262226	at 5% significance level	
Theta hat	485.1071		
Theta star	707.1211	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.057885	Approximate Gamma UCL	2364.583
nu star	2.097805	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.164505		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.827204
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.60445		
Maximum of log data	6.267201	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.488426	95% H-UCL	1.44E+31
Standard Deviation of log data	3.485993	95% Chebyshev (MVUE) UCL	2987.229
Variance of log data	12.15214	97.5% Chebyshev (MVUE) UCL	4027.078
		99% Chebyshev (MVUE) UCL	6069.66
		95% Non-parametric UCLs	
		CLT UCL	378.0267
		Adj-CLT UCL (Adjusted for skewness)	482.6876
		Mod-t UCL (Adjusted for skewness)	477.3134
		Jackknife UCL	460.9884
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	695.8233
		97.5% Chebyshev (Mean, Sd) UCL	916.6729
		99% Chebyshev (Mean, Sd) UCL	1350.489

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_77
Indeno(1,2,3-c,d)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.706737
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	7000		
Mean	2402.619	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3454.395
Standard Deviation	2794.568		
Variance	7809612	Gamma Distribution Test	
Coefficient of Variation	1.163134	A-D Test Statistic	1.850843
Skewness	0.730467	A-D 5% Critical Value	0.791511
		K-S Test Statistic	0.229227
Gamma Statistics		K-S 5% Critical Value	0.19825
k hat	0.653307	Data do not follow gamma distribution	
k star (bias corrected)	0.591724	at 5% significance level	
Theta hat	3677.625		
Theta star	4060.374	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.4389	Approximate Gamma UCL	4118.859
nu star	24.85239	Adjusted Gamma UCL	4298.858
Approx.Chi Square Value (.05)	14.49693		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	13.88993	Shapiro-Wilk Test Statisitic	0.822812
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.850185	95% H-UCL	8742.384
Standard Deviation of log data	1.496475	95% Chebyshev (MVUE) UCL	7104.087
Variance of log data	2.239437	97.5% Chebyshev (MVUE) UCL	9045.18
		99% Chebyshev (MVUE) UCL	12858.08
		95% Non-parametric UCLs	
		CLT UCL	3405.692
		Adj-CLT UCL (Adjusted for skewness)	3509.558
		Mod-t UCL (Adjusted for skewness)	3470.596
		Jackknife UCL	3454.395
		Standard Bootstrap UCL	3389.27
		Bootstrap-t UCL	3513.699
RECOMMENDATION		Hall's Bootstrap UCL	3350.081
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3430.714
		BCA Bootstrap UCL	3496.905
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5060.784
		97.5% Chebyshev (Mean, Sd) UCL	6210.974
		99% Chebyshev (Mean, Sd) UCL	8470.299
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_78
Iron			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.777088
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	8130	Data not normal at 5% significance level	
Maximum	66200		
Mean	21295.24	95% UCL (Assuming Normal Distribution)	
Median	19100	Student's-t UCL	26144.92
Standard Deviation	12885.61		
Variance	1.66E+08	Gamma Distribution Test	
Coefficient of Variation	0.605094	A-D Test Statistic	0.427677
Skewness	2.31874	A-D 5% Critical Value	0.747232
		K-S Test Statistic	0.136887
Gamma Statistics		K-S 5% Critical Value	0.19027
k hat	4.034315	Data follow gamma distribution	
k star (bias corrected)	3.48973	at 5% significance level	
Theta hat	5278.527		
Theta star	6102.259	95% UCLs (Assuming Gamma Distribution)	
nu hat	169.4412	Approximate Gamma UCL	26100.75
nu star	146.5687	Adjusted Gamma UCL	26515.69
Approx.Chi Square Value (.05)	119.5833		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	117.712	Shapiro-Wilk Test Statisitic	0.971835
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.003316		
Maximum of log data	11.10044	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.837212	95% H-UCL	26405.47
Standard Deviation of log data	0.496871	95% Chebyshev (MVUE) UCL	31353.6
Variance of log data	0.246881	97.5% Chebyshev (MVUE) UCL	35816.54
		99% Chebyshev (MVUE) UCL	44583.12
		95% Non-parametric UCLs	
		CLT UCL	25920.36
		Adj-CLT UCL (Adjusted for skewness)	27440.62
		Mod-t UCL (Adjusted for skewness)	26382.05
		Jackknife UCL	26144.92
		Standard Bootstrap UCL	25713.8
		Bootstrap-t UCL	29567.29
RECOMMENDATION		Hall's Bootstrap UCL	47385.53
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	26268.1
		BCA Bootstrap UCL	27226.19
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	33551.9
		97.5% Chebyshev (Mean, Sd) UCL	38855.37
		99% Chebyshev (Mean, Sd) UCL	49273.01

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_79
Isopropylbenzene (cumene)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.661683
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	17000		
Mean	3340.429	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	5412.768
Standard Deviation	5506.206		
Variance	30318306	Gamma Distribution Test	
Coefficient of Variation	1.648353	A-D Test Statistic	2.724544
Skewness	1.392142	A-D 5% Critical Value	0.890256
		K-S Test Statistic	0.34497
Gamma Statistics		K-S 5% Critical Value	0.209709
k hat	0.200031	Data do not follow gamma distribution	
k star (bias corrected)	0.203201	at 5% significance level	
Theta hat	16699.55		
Theta star	16439.02	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.401305	Approximate Gamma UCL	9354.601
nu star	8.534452	Adjusted Gamma UCL	10180.24
Approx.Chi Square Value (.05)	3.047562		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.800397	Shapiro-Wilk Test Statisitic	0.718166
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	9.740969	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.434913	95% H-UCL	6726769
Standard Deviation of log data	3.473273	95% Chebyshev (MVUE) UCL	47934.99
Variance of log data	12.06362	97.5% Chebyshev (MVUE) UCL	64323.48
		99% Chebyshev (MVUE) UCL	96515.52
		95% Non-parametric UCLs	
		CLT UCL	5316.807
		Adj-CLT UCL (Adjusted for skewness)	5706.836
		Mod-t UCL (Adjusted for skewness)	5473.605
		Jackknife UCL	5412.768
		Standard Bootstrap UCL	5312.365
		Bootstrap-t UCL	6014.109
RECOMMENDATION		Hall's Bootstrap UCL	5299.817
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5340.976
		BCA Bootstrap UCL	5812.524
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	8577.875
		97.5% Chebyshev (Mean, Sd) UCL	10844.12
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	15295.73
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_80
Lead			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.80651
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	8.2	Data not normal at 5% significance level	
Maximum	1710		
Mean	382.4429	95% UCL (Assuming Normal Distribution)	
Median	174	Student's-t UCL	547.6172
Standard Deviation	438.8683		
Variance	192605.4	Gamma Distribution Test	
Coefficient of Variation	1.14754	A-D Test Statistic	0.226247
Skewness	1.715998	A-D 5% Critical Value	0.786529
		K-S Test Statistic	0.108074
Gamma Statistics		K-S 5% Critical Value	0.197488
k hat	0.708737	Data follow gamma distribution	
k star (bias corrected)	0.639235	at 5% significance level	
Theta hat	539.6115		
Theta star	598.2818	95% UCLs (Assuming Gamma Distribution)	
nu hat	29.76697	Approximate Gamma UCL	640.4565
nu star	26.84788	Adjusted Gamma UCL	667.158
Approx.Chi Square Value (.05)	16.03197		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	15.39033	Shapiro-Wilk Test Statisitic	0.937297
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.104134		
Maximum of log data	7.444249	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.095345	95% H-UCL	1984.856
Standard Deviation of log data	1.591812	95% Chebyshev (MVUE) UCL	1461.659
Variance of log data	2.533866	97.5% Chebyshev (MVUE) UCL	1871.465
		99% Chebyshev (MVUE) UCL	2676.449
		95% Non-parametric UCLs	
		CLT UCL	539.9687
		Adj-CLT UCL (Adjusted for skewness)	578.2875
		Mod-t UCL (Adjusted for skewness)	553.5942
		Jackknife UCL	547.6172
		Standard Bootstrap UCL	537.4254
		Bootstrap-t UCL	618.4933
RECOMMENDATION		Hall's Bootstrap UCL	667.4563
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	540.8857
		BCA Bootstrap UCL	589.2095
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	799.8899
		97.5% Chebyshev (Mean, Sd) UCL	980.5196
		99% Chebyshev (Mean, Sd) UCL	1335.332

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_81
Magnesium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.901013
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	1270	Data not normal at 5% significance level	
Maximum	6430		
Mean	3181.905	95% UCL (Assuming Normal Distribution)	
Median	2360	Student's-t UCL	3776.642
Standard Deviation	1580.217		
Variance	2497086	Gamma Distribution Test	
Coefficient of Variation	0.496626	A-D Test Statistic	0.653079
Skewness	0.645121	A-D 5% Critical Value	0.746499
		K-S Test Statistic	0.196016
Gamma Statistics		K-S 5% Critical Value	0.190163
k hat	4.402641	Data follow approximate gamma distibution	
k star (bias corrected)	3.805438	at 5% significance level	
Theta hat	722.7264		
Theta star	836.1468	95% UCLs (Assuming Gamma Distribution)	
nu hat	184.9109	Approximate Gamma UCL	3864.585
nu star	159.8284	Adjusted Gamma UCL	3923.218
Approx.Chi Square Value (.05)	131.5946		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	129.628	Shapiro-Wilk Test Statisitic	0.938751
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	7.146772		
Maximum of log data	8.76873	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.947389	95% H-UCL	4001.787
Standard Deviation of log data	0.499741	95% Chebyshev (MVUE) UCL	4753.493
Variance of log data	0.249742	97.5% Chebyshev (MVUE) UCL	5432.909
		99% Chebyshev (MVUE) UCL	6767.49
		95% Non-parametric UCLs	
		CLT UCL	3749.102
		Adj-CLT UCL (Adjusted for skewness)	3800.973
		Mod-t UCL (Adjusted for skewness)	3784.733
		Jackknife UCL	3776.642
		Standard Bootstrap UCL	3748.79
		Bootstrap-t UCL	3845.806
RECOMMENDATION		Hall's Bootstrap UCL	3763.396
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	3734.286
		BCA Bootstrap UCL	3753.81
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	4684.991
		97.5% Chebyshev (Mean, Sd) UCL	5335.378
		99% Chebyshev (Mean, Sd) UCL	6612.936

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_82
Manganese			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.580025
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	79.7	Data not normal at 5% significance level	
Maximum	2450		
Mean	508.081	95% UCL (Assuming Normal Distribution)	
Median	264	Student's-t UCL	757.7991
Standard Deviation	663.5011		
Variance	440233.7	Gamma Distribution Test	
Coefficient of Variation	1.305896	A-D Test Statistic	1.981887
Skewness	2.401103	A-D 5% Critical Value	0.765256
		K-S Test Statistic	0.263811
Gamma Statistics		K-S 5% Critical Value	0.194076
k hat	1.191059	Data do not follow gamma distribution	
k star (bias corrected)	1.052653	at 5% significance level	
Theta hat	426.5793		
Theta star	482.6669	95% UCLs (Assuming Gamma Distribution)	
nu hat	50.02446	Approximate Gamma UCL	749.7866
nu star	44.21144	Adjusted Gamma UCL	773.0459
Approx.Chi Square Value (.05)	29.95918		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	29.05777	Shapiro-Wilk Test Statisitic	0.883836
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.37827		
Maximum of log data	7.803843	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.755367	95% H-UCL	754.16
Standard Deviation of log data	0.885701	95% Chebyshev (MVUE) UCL	879.6624
Variance of log data	0.784465	97.5% Chebyshev (MVUE) UCL	1062.915
		99% Chebyshev (MVUE) UCL	1422.88
		95% Non-parametric UCLs	
		CLT UCL	746.2357
		Adj-CLT UCL (Adjusted for skewness)	827.297
		Mod-t UCL (Adjusted for skewness)	770.443
		Jackknife UCL	757.7991
		Standard Bootstrap UCL	742.3884
		Bootstrap-t UCL	1072.754
RECOMMENDATION		Hall's Bootstrap UCL	841.2409
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	750.4762
		BCA Bootstrap UCL	824.9381
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1139.196
		97.5% Chebyshev (Mean, Sd) UCL	1412.281
		99% Chebyshev (Mean, Sd) UCL	1948.702

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_83
Methoxychlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.380958
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3.9	Data not normal at 5% significance level	
Maximum	900		
Mean	75.87619	95% UCL (Assuming Normal Distribution)	
Median	10.5	Student's-t UCL	149.118
Standard Deviation	194.6035		
Variance	37870.52	Gamma Distribution Test	
Coefficient of Variation	2.56475	A-D Test Statistic	2.718754
Skewness	4.181505	A-D 5% Critical Value	0.804094
		K-S Test Statistic	0.329197
Gamma Statistics		K-S 5% Critical Value	0.200177
k hat	0.513301	Data do not follow gamma distribution	
k star (bias corrected)	0.471719	at 5% significance level	
Theta hat	147.82		
Theta star	160.8505	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.55866	Approximate Gamma UCL	140.3444
nu star	19.81218	Adjusted Gamma UCL	147.4033
Approx.Chi Square Value (.05)	10.71132		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.19836	Shapiro-Wilk Test Statisitic	0.814624
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.360977		
Maximum of log data	6.802395	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.096673	95% H-UCL	135.9233
Standard Deviation of log data	1.340378	95% Chebyshev (MVUE) UCL	126.5305
Variance of log data	1.796612	97.5% Chebyshev (MVUE) UCL	159.4339
		99% Chebyshev (MVUE) UCL	224.0662
		95% Non-parametric UCLs	
		CLT UCL	145.7265
		Adj-CLT UCL (Adjusted for skewness)	187.1307
		Mod-t UCL (Adjusted for skewness)	155.5762
		Jackknife UCL	149.118
		Standard Bootstrap UCL	142.1894
		Bootstrap-t UCL	435.3697
RECOMMENDATION		Hall's Bootstrap UCL	398.415
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	154.2381
		BCA Bootstrap UCL	196.5476
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	260.981
		97.5% Chebyshev (Mean, Sd) UCL	341.076
		99% Chebyshev (Mean, Sd) UCL	498.4072

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_84
Methyl ethyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.354397
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	570		
Mean	44.7381	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	91.48876
Standard Deviation	124.2165		
Variance	15429.74	Gamma Distribution Test	
Coefficient of Variation	2.776526	A-D Test Statistic	3.807295
Skewness	4.177736	A-D 5% Critical Value	0.808593
		K-S Test Statistic	0.350554
Gamma Statistics		K-S 5% Critical Value	0.200771
k hat	0.483676	Data do not follow gamma distribution	
k star (bias corrected)	0.446325	at 5% significance level	
Theta hat	92.49609		
Theta star	100.2366	95% UCLs (Assuming Gamma Distribution)	
nu hat	20.31437	Approximate Gamma UCL	84.45175
nu star	18.74565	Adjusted Gamma UCL	88.85038
Approx.Chi Square Value (.05)	9.93046		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	9.438842	Shapiro-Wilk Test Statisitic	0.694154
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.345636	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.480783	95% H-UCL	63.4014
Standard Deviation of log data	1.280002	95% Chebyshev (MVUE) UCL	61.68035
Variance of log data	1.638404	97.5% Chebyshev (MVUE) UCL	77.37104
		99% Chebyshev (MVUE) UCL	108.1924
		95% Non-parametric UCLs	
		CLT UCL	89.32393
		Adj-CLT UCL (Adjusted for skewness)	115.7286
		Mod-t UCL (Adjusted for skewness)	95.60736
		Jackknife UCL	91.48876
		Standard Bootstrap UCL	87.67705
		Bootstrap-t UCL	369.1737
RECOMMENDATION		Hall's Bootstrap UCL	280.5691
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	94.04762
		BCA Bootstrap UCL	125.4762
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	162.8916
		97.5% Chebyshev (Mean, Sd) UCL	214.0167
		99% Chebyshev (Mean, Sd) UCL	314.442

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_85
Methyl isobutyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.226483
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	11000		
Mean	529.3333	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	1432.281
Standard Deviation	2399.131		
Variance	5755830	Gamma Distribution Test	
Coefficient of Variation	4.532364	A-D Test Statistic	8.090622
Skewness	4.582575	A-D 5% Critical Value	0.89799
		K-S Test Statistic	0.592295
Gamma Statistics		K-S 5% Critical Value	0.210414
k hat	0.179954	Data do not follow gamma distribution	
k star (bias corrected)	0.185993	at 5% significance level	
Theta hat	2941.484		
Theta star	2845.989	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.558089	Approximate Gamma UCL	1574.755
nu star	7.811695	Adjusted Gamma UCL	1722.846
Approx.Chi Square Value (.05)	2.6258		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.400092	Shapiro-Wilk Test Statisitic	0.260235
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	9.305651	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.114963	95% H-UCL	119.636
Standard Deviation of log data	1.649085	95% Chebyshev (MVUE) UCL	82.55325
Variance of log data	2.719481	97.5% Chebyshev (MVUE) UCL	106.0273
		99% Chebyshev (MVUE) UCL	152.1375
		95% Non-parametric UCLs	
		CLT UCL	1390.469
		Adj-CLT UCL (Adjusted for skewness)	1949.872
		Mod-t UCL (Adjusted for skewness)	1519.536
		Jackknife UCL	1432.281
		Standard Bootstrap UCL	1348.66
		Bootstrap-t UCL	3716510
R		Hall's Bootstrap UCL	1083810
Data		Percentile Bootstrap UCL	1576.405
		BCA Bootstrap UCL	2099.952
Use 99%		95% Chebyshev (Mean, Sd) UCL	2811.362
		97.5% Chebyshev (Mean, Sd) UCL	3798.798
		99% Ch	5738.424

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_86
Methyl tert-butyl ether			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.893362
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	4	Data not normal at 5% significance level	
Maximum	7		
Mean	5.761905	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	5.997088
Standard Deviation	0.624881		
Variance	0.390476	Gamma Distribution Test	
Coefficient of Variation	0.10845	A-D Test Statistic	1.131644
Skewness	-0.824034	A-D 5% Critical Value	0.740126
		K-S Test Statistic	0.229331
Gamma Statistics		K-S 5% Critical Value	0.188898
k hat	82.44067	Data do not follow gamma distribution	
k star (bias corrected)	70.69518	at 5% significance level	
Theta hat	0.069892		
Theta star	0.081504	95% UCLs (Assuming Gamma Distribution)	
nu hat	3462.508	Approximate Gamma UCL	6.016476
nu star	2969.198	Adjusted Gamma UCL	6.036471
Approx.Chi Square Value (.05)	2843.564		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2834.145	Shapiro-Wilk Test Statisitic	0.854122
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.386294		
Maximum of log data	1.94591	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.745191	95% H-UCL	6.028924
Standard Deviation of log data	0.115617	95% Chebyshev (MVUE) UCL	6.398763
Variance of log data	0.013367	97.5% Chebyshev (MVUE) UCL	6.673618
		99% Chebyshev (MVUE) UCL	7.213518
		95% Non-parametric UCLs	
		CLT UCL	5.986197
		Adj-CLT UCL (Adjusted for skewness)	5.959997
		Mod-t UCL (Adjusted for skewness)	5.993001
		Jackknife UCL	5.997088
		Standard Bootstrap UCL	5.984432
		Bootstrap-t UCL	5.976672
RECOMMENDATION		Hall's Bootstrap UCL	5.978311
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.97619
		BCA Bootstrap UCL	5.952381
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.356285
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.613474
		99% Chebyshev (Mean, Sd) UCL	7.118672

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_87
Methylcyclohexane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.598714
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	35000		
Mean	5322.905	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	9188.274
Standard Deviation	10270.29		
Variance	1.05E+08	Gamma Distribution Test	
Coefficient of Variation	1.929451	A-D Test Statistic	2.49493
Skewness	2.081531	A-D 5% Critical Value	0.896114
		K-S Test Statistic	0.341744
Gamma Statistics		K-S 5% Critical Value	0.210243
k hat	0.184826	Data do not follow gamma distribution	
k star (bias corrected)	0.190168	at 5% significance level	
Theta hat	28799.58		
Theta star	27990.52	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.762682	Approximate Gamma UCL	15591.02
nu star	7.987061	Adjusted Gamma UCL	17033.95
Approx.Chi Square Value (.05)	2.726849		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	2.49586	Shapiro-Wilk Test Statisitic	0.735274
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	10.4631	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.549171	95% H-UCL	20675906
Standard Deviation of log data	3.627381	95% Chebyshev (MVUE) UCL	79271.46
Variance of log data	13.15789	97.5% Chebyshev (MVUE) UCL	106500.6
		99% Chebyshev (MVUE) UCL	159986.9
		95% Non-parametric UCLs	
		CLT UCL	9009.285
		Adj-CLT UCL (Adjusted for skewness)	10097.03
		Mod-t UCL (Adjusted for skewness)	9357.94
		Jackknife UCL	9188.274
		Standard Bootstrap UCL	8885.042
		Bootstrap-t UCL	12410.22
RECOMMENDATION		Hall's Bootstrap UCL	10101.9
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8956.5
		BCA Bootstrap UCL	10120.45
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	15091.9
		97.5% Chebyshev (Mean, Sd) UCL	19318.95
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	27622.17
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_88
Methylene chloride			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.723564
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.908
Minimum	4	Data not normal at 5% significance level	
Maximum	14		
Mean	7.238095	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	8.380625
Standard Deviation	3.0357		
Variance	9.215476	Gamma Distribution Test	
Coefficient of Variation	0.419406	A-D Test Statistic	2.293369
Skewness	1.478239	A-D 5% Critical Value	0.743915
		K-S Test Statistic	0.329027
Gamma Statistics		K-S 5% Critical Value	0.189683
k hat	7.602851	Data do not follow gamma distribution	
k star (bias corrected)	6.548475	at 5% significance level	
Theta hat	0.952024		
Theta star	1.10531	95% UCLs (Assuming Gamma Distribution)	
nu hat	319.3197	Approximate Gamma UCL	8.377793
nu star	275.036	Adjusted Gamma UCL	8.472939
Approx.Chi Square Value (.05)	237.6206		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	234.9523	Shapiro-Wilk Test Statisitic	0.805444
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.386294		
Maximum of log data	2.639057	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.912154	95% H-UCL	8.367158
Standard Deviation of log data	0.355719	95% Chebyshev (MVUE) UCL	9.666594
Variance of log data	0.126536	97.5% Chebyshev (MVUE) UCL	10.73961
		99% Chebyshev (MVUE) UCL	12.84733
		95% Non-parametric UCLs	
		CLT UCL	8.327719
		Adj-CLT UCL (Adjusted for skewness)	8.55605
		Mod-t UCL (Adjusted for skewness)	8.41624
		Jackknife UCL	8.380625
		Standard Bootstrap UCL	8.273561
		Bootstrap-t UCL	8.726242
RECOMMENDATION		Hall's Bootstrap UCL	8.308257
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8.309524
		BCA Bootstrap UCL	8.47619
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	10.12562
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	11.37506
		99% Chebyshev (Mean, Sd) UCL	13.82933

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_89
Naphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.617966
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	80000		
Mean	10724.05	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	18010.93
Standard Deviation	19361.24		
Variance	3.75E+08	Gamma Distribution Test	
Coefficient of Variation	1.805404	A-D Test Statistic	1.600902
Skewness	2.656252	A-D 5% Critical Value	0.83554
		K-S Test Statistic	0.274622
Gamma Statistics		K-S 5% Critical Value	0.204127
k hat	0.350508	Data do not follow gamma distribution	
k star (bias corrected)	0.332181	at 5% significance level	
Theta hat	30595.75		
Theta star	32283.72	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.72133	Approximate Gamma UCL	22887.49
nu star	13.95161	Adjusted Gamma UCL	24330.11
Approx.Chi Square Value (.05)	6.537097		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	6.149488	Shapiro-Wilk Test Statisitic	0.835258
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	11.28978	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.362231	95% H-UCL	166725.8
Standard Deviation of log data	2.208705	95% Chebyshev (MVUE) UCL	47901.87
Variance of log data	4.878379	97.5% Chebyshev (MVUE) UCL	62919.32
		99% Chebyshev (MVUE) UCL	92418.19
		95% Non-parametric UCLs	
		CLT UCL	17673.5
		Adj-CLT UCL (Adjusted for skewness)	20290.26
		Mod-t UCL (Adjusted for skewness)	18419.09
		Jackknife UCL	18010.93
		Standard Bootstrap UCL	17436.59
		Bootstrap-t UCL	23891.93
RECOMMENDATION		Hall's Bootstrap UCL	44810.47
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	17775.71
		BCA Bootstrap UCL	20686.67
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	29140.26
		97.5% Chebyshev (Mean, Sd) UCL	37108.97
		99% Chebyshev (Mean, Sd) UCL	52761.95

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_90
Nickel			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.583739
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	15.3	Data not normal at 5% significance level	
Maximum	126		
Mean	33.56667	95% UCL (Assuming Normal Distribution)	
Median	27.7	Student's-t UCL	42.20701
Standard Deviation	22.95738		
Variance	527.0413	Gamma Distribution Test	
Coefficient of Variation	0.683934	A-D Test Statistic	1.166419
Skewness	3.535731	A-D 5% Critical Value	0.746825
		K-S Test Statistic	0.209638
Gamma Statistics		K-S 5% Critical Value	0.190211
k hat	4.23851	Data do not follow gamma distribution	
k star (bias corrected)	3.664755	at 5% significance level	
Theta hat	7.919449		
Theta star	9.159321	95% UCLs (Assuming Gamma Distribution)	
nu hat	178.0174	Approximate Gamma UCL	40.92801
nu star	153.9197	Adjusted Gamma UCL	41.5617
Approx.Chi Square Value (.05)	126.2356		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	124.3109	Shapiro-Wilk Test Statisitic	0.880632
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.727853		
Maximum of log data	4.836282	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.390954	95% H-UCL	40.04239
Standard Deviation of log data	0.452031	95% Chebyshev (MVUE) UCL	47.22034
Variance of log data	0.204332	97.5% Chebyshev (MVUE) UCL	53.49687
		99% Chebyshev (MVUE) UCL	65.82591
		95% Non-parametric UCLs	
		CLT UCL	41.80691
		Adj-CLT UCL (Adjusted for skewness)	45.93703
		Mod-t UCL (Adjusted for skewness)	42.85122
		Jackknife UCL	42.20701
		Standard Bootstrap UCL	41.47695
		Bootstrap-t UCL	53.22697
RECOMMENDATION		Hall's Bootstrap UCL	77.32951
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	42.71429
		BCA Bootstrap UCL	47.65238
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	55.40349
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	64.8523
		99% Chebyshev (Mean, Sd) UCL	83.41266

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_91
OCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.982318
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	1.735	Data are normal at 5% significance level	
Maximum	8420		
Mean	3897.934	95% UCL (Assuming Normal Distribution)	
Median	3585	Student's-t UCL	8197.754
Standard Deviation	3654.192		
Variance	13353118	Gamma Distribution Test	
Coefficient of Variation	0.937469	A-D Test Statistic	0.535484
Skewness	0.400181	A-D 5% Critical Value	0.69646
		K-S Test Statistic	0.342067
Gamma Statistics		K-S 5% Critical Value	0.41549
k hat	0.36606	Data follow gamma distribution	
k star (bias corrected)	0.258182	at 5% significance level	
Theta hat	10648.33		
Theta star	15097.63	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.928483	Approximate Gamma UCL	50412.07
nu star	2.065454	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.159704		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.755623
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.551007		
Maximum of log data	9.038365	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.444603	95% H-UCL	1.72E+41
Standard Deviation of log data	3.969778	95% Chebyshev (MVUE) UCL	106138.2
Variance of log data	15.75914	97.5% Chebyshev (MVUE) UCL	143249.1
		99% Chebyshev (MVUE) UCL	216146.3
		95% Non-parametric UCLs	
		CLT UCL	6903.239
		Adj-CLT UCL (Adjusted for skewness)	7293.872
		Mod-t UCL (Adjusted for skewness)	8258.685
		Jackknife UCL	8197.754
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	11862.06
		97.5% Chebyshev (Mean, Sd) UCL	15308.14
		99% Chebyshev (Mean, Sd) UCL	22077.31

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_92
OCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.901929
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2595	Data are normal at 5% significance level	
Maximum	354		
Mean	135.5899	95% UCL (Assuming Normal Distribution)	
Median	94.05	Student's-t UCL	324.5854
Standard Deviation	160.6174		
Variance	25797.94	Gamma Distribution Test	
Coefficient of Variation	1.184582	A-D Test Statistic	0.267499
Skewness	1.095556	A-D 5% Critical Value	0.692788
		K-S Test Statistic	0.232489
Gamma Statistics		K-S 5% Critical Value	0.414255
k hat	0.39769	Data follow gamma distribution	
k star (bias corrected)	0.266089	at 5% significance level	
Theta hat	340.944		
Theta star	509.5658	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.181517	Approximate Gamma UCL	1704.897
nu star	2.128712	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.169296		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.874286
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.348999		
Maximum of log data	5.869297	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.253438	95% H-UCL	7.53E+26
Standard Deviation of log data	3.230533	95% Chebyshev (MVUE) UCL	1712.89
Variance of log data	10.43634	97.5% Chebyshev (MVUE) UCL	2307.092
		99% Chebyshev (MVUE) UCL	3474.287
		95% Non-parametric UCLs	
		CLT UCL	267.6859
		Adj-CLT UCL (Adjusted for skewness)	314.6913
		Mod-t UCL (Adjusted for skewness)	331.9173
		Jackknife UCL	324.5854
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	485.6473
		97.5% Chebyshev (Mean, Sd) UCL	637.1175
		99% Chebyshev (Mean, Sd) UCL	934.6512

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_93
PeCDD (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.72473
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.3125	Data not normal at 5% significance level	
Maximum	173		
Mean	51.10312	95% UCL (Assuming Normal Distribution)	
Median	15.55	Student's-t UCL	147.236
Standard Deviation	81.69829		
Variance	6674.61	Gamma Distribution Test	
Coefficient of Variation	1.598695	A-D Test Statistic	0.244014
Skewness	1.936824	A-D 5% Critical Value	0.691286
		K-S Test Statistic	0.233208
Gamma Statistics		K-S 5% Critical Value	0.41375
k hat	0.410626	Data follow gamma distribution	
k star (bias corrected)	0.269323	at 5% significance level	
Theta hat	124.4516		
Theta star	189.7464	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.285012	Approximate Gamma UCL	634.7778
nu star	2.154586	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.173456		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.962448
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.163151		
Maximum of log data	5.153292	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.338069	95% H-UCL	6.94E+17
Standard Deviation of log data	2.625301	95% Chebyshev (MVUE) UCL	323.1276
Variance of log data	6.892206	97.5% Chebyshev (MVUE) UCL	433.7465
		99% Chebyshev (MVUE) UCL	651.0359
		95% Non-parametric UCLs	
		CLT UCL	118.294
		Adj-CLT UCL (Adjusted for skewness)	160.5631
		Mod-t UCL (Adjusted for skewness)	153.8291
		Jackknife UCL	147.236
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Adjusted Gamma UCL not available		95% Chebyshev (Mean, Sd) UCL	229.1604
try Approximate Gamma UCL		97.5% Chebyshev (Mean, Sd) UCL	306.2059
		99% Chebyshev (Mean, Sd) UCL	457.547
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_94
PeCDF (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.797386
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2135	Data are normal at 5% significance level	
Maximum	468		
Mean	162.5534	95% UCL (Assuming Normal Distribution)	
Median	91	Student's-t UCL	407.3994
Standard Deviation	208.0818		
Variance	43298.02	Gamma Distribution Test	
Coefficient of Variation	1.280083	A-D Test Statistic	0.405172
Skewness	1.737856	A-D 5% Critical Value	0.693458
		K-S Test Statistic	0.333187
Gamma Statistics		K-S 5% Critical Value	0.41448
k hat	0.391924	Data follow gamma distribution	
k star (bias corrected)	0.264648	at 5% significance level	
Theta hat	414.7574		
Theta star	614.2256	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.135392	Approximate Gamma UCL	2054.835
nu star	2.117181	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.167485		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.812052
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.544118		
Maximum of log data	6.148468	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.406481	95% H-UCL	3.22E+29
Standard Deviation of log data	3.389504	95% Chebyshev (MVUE) UCL	2437.165
Variance of log data	11.48873	97.5% Chebyshev (MVUE) UCL	3284.527
		99% Chebyshev (MVUE) UCL	4949.004
		95% Non-parametric UCLs	
		CLT UCL	333.6854
		Adj-CLT UCL (Adjusted for skewness)	430.2834
		Mod-t UCL (Adjusted for skewness)	422.4667
		Jackknife UCL	407.3994
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	616.0571
		97.5% Chebyshev (Mean, Sd) UCL	812.2885
		99% Chebyshev (Mean, Sd) UCL	1197.747

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3_	Variable:	_95
Phenanthrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.741543
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	16000		
Mean	3142.143	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	4695.952
Standard Deviation	4128.471		
Variance	17044269	Gamma Distribution Test	
Coefficient of Variation	1.313903	A-D Test Statistic	1.443185
Skewness	1.699796	A-D 5% Critical Value	0.798466
		K-S Test Statistic	0.242974
Gamma Statistics		K-S 5% Critical Value	0.199315
k hat	0.575926	Data do not follow gamma distribution	
k star (bias corrected)	0.525397	at 5% significance level	
Theta hat	5455.812		
Theta star	5980.515	95% UCLs (Assuming Gamma Distribution)	
nu hat	24.18888	Approximate Gamma UCL	5597.683
nu star	22.06666	Adjusted Gamma UCL	5860.905
Approx.Chi Square Value (.05)	12.38666		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	11.83036	Shapiro-Wilk Test Statisitic	0.8486
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.680344	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.973277	95% H-UCL	14415.13
Standard Deviation of log data	1.627043	95% Chebyshev (MVUE) UCL	10204.51
Variance of log data	2.647267	97.5% Chebyshev (MVUE) UCL	13090.8
		99% Chebyshev (MVUE) UCL	18760.36
		95% Non-parametric UCLs	
		CLT UCL	4624.002
		Adj-CLT UCL (Adjusted for skewness)	4981.066
		Mod-t UCL (Adjusted for skewness)	4751.647
		Jackknife UCL	4695.952
		Standard Bootstrap UCL	4562.791
		Bootstrap-t UCL	5240.556
RECOMMENDATION		Hall's Bootstrap UCL	5357.26
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4698.81
		BCA Bootstrap UCL	4980.952
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7069.102
		97.5% Chebyshev (Mean, Sd) UCL	8768.3
		99% Chebyshev (Mean, Sd) UCL	12106.05

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_96
Potassium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.931739
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.908
Minimum	541	Data are normal at 5% significance level	
Maximum	2250		
Mean	1237.143	95% UCL (Assuming Normal Distribution)	
Median	1160	Student's-t UCL	1413.071
Standard Deviation	467.4411		
Variance	218501.2	Gamma Distribution Test	
Coefficient of Variation	0.377839	A-D Test Statistic	0.275336
Skewness	0.784589	A-D 5% Critical Value	0.743909
		K-S Test Statistic	0.107194
Gamma Statistics		K-S 5% Critical Value	0.189681
k hat	7.614412	Data follow gamma distribution	
k star (bias corrected)	6.558385	at 5% significance level	
Theta hat	162.4738		
Theta star	188.6353	95% UCLs (Assuming Gamma Distribution)	
nu hat	319.8053	Approximate Gamma UCL	1431.776
nu star	275.4522	Adjusted Gamma UCL	1448.024
Approx.Chi Square Value (.05)	238.0076		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	235.3371	Shapiro-Wilk Test Statisitic	0.972442
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.293419		
Maximum of log data	7.718685	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.05346	95% H-UCL	1458.242
Standard Deviation of log data	0.378555	95% Chebyshev (MVUE) UCL	1694.114
Variance of log data	0.143304	97.5% Chebyshev (MVUE) UCL	1891.348
		99% Chebyshev (MVUE) UCL	2278.775
		95% Non-parametric UCLs	
		CLT UCL	1404.925
		Adj-CLT UCL (Adjusted for skewness)	1423.585
		Mod-t UCL (Adjusted for skewness)	1415.982
		Jackknife UCL	1413.071
		Standard Bootstrap UCL	1405.255
		Bootstrap-t UCL	1432.936
RECOMMENDATION		Hall's Bootstrap UCL	1431.246
Data are normal (0.05)		Percentile Bootstrap UCL	1398.81
		BCA Bootstrap UCL	1431.333
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1681.768
		97.5% Chebyshev (Mean, Sd) UCL	1874.158
		99% Chebyshev (Mean, Sd) UCL	2252.07

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_97
Pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.784399
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	95	Data not normal at 5% significance level	
Maximum	7000		
Mean	2365.476	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3340.017
Standard Deviation	2589.355		
Variance	6704757	Gamma Distribution Test	
Coefficient of Variation	1.094644	A-D Test Statistic	1.070023
Skewness	0.754275	A-D 5% Critical Value	0.78723
		K-S Test Statistic	0.187767
Gamma Statistics		K-S 5% Critical Value	0.197595
k hat	0.700937	Data follow approximate gamma distibution	
k star (bias corrected)	0.632549	at 5% significance level	
Theta hat	3374.736		
Theta star	3739.594	95% UCLs (Assuming Gamma Distribution)	
nu hat	29.43934	Approximate Gamma UCL	3973.712
nu star	26.56705	Adjusted Gamma UCL	4140.443
Approx.Chi Square Value (.05)	15.81487		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	15.17802	Shapiro-Wilk Test Statisitic	0.892683
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.553877		
Maximum of log data	8.853665	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.906701	95% H-UCL	9067.058
Standard Deviation of log data	1.489228	95% Chebyshev (MVUE) UCL	7419.901
Variance of log data	2.217801	97.5% Chebyshev (MVUE) UCL	9443.06
		99% Chebyshev (MVUE) UCL	13417.16
		95% Non-parametric UCLs	
		CLT UCL	3294.89
		Adj-CLT UCL (Adjusted for skewness)	3394.266
		Mod-t UCL (Adjusted for skewness)	3355.518
		Jackknife UCL	3340.017
		Standard Bootstrap UCL	3282.042
		Bootstrap-t UCL	3496.816
RECOMMENDATION		Hall's Bootstrap UCL	3295.73
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	3268.333
		BCA Bootstrap UCL	3285.952
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	4828.444
		97.5% Chebyshev (Mean, Sd) UCL	5894.172
		99% Chebyshev (Mean, Sd) UCL	7987.588

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_98
Selenium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.847862
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.31	Data not normal at 5% significance level	
Maximum	3.5		
Mean	2.4	95% UCL (Assuming Normal Distribution)	
Median	2.3	Student's-t UCL	2.806318
Standard Deviation	1.079588		
Variance	1.16551	Gamma Distribution Test	
Coefficient of Variation	0.449828	A-D Test Statistic	1.192748
Skewness	-0.279841	A-D 5% Critical Value	0.748014
		K-S Test Statistic	0.254956
Gamma Statistics		K-S 5% Critical Value	0.190502
k hat	3.663028	Data do not follow gamma distribution	
k star (bias corrected)	3.171484	at 5% significance level	
Theta hat	0.655196		
Theta star	0.756744	95% UCLs (Assuming Gamma Distribution)	
nu hat	153.8472	Approximate Gamma UCL	2.972872
nu star	133.2023	Adjusted Gamma UCL	3.022646
Approx.Chi Square Value (.05)	107.5343		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	105.7635	Shapiro-Wilk Test Statisitic	0.804645
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.171183		
Maximum of log data	1.252763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.732804	95% H-UCL	3.396197
Standard Deviation of log data	0.624662	95% Chebyshev (MVUE) UCL	4.072604
Variance of log data	0.390202	97.5% Chebyshev (MVUE) UCL	4.75222
		99% Chebyshev (MVUE) UCL	6.087195
		95% Non-parametric UCLs	
		CLT UCL	2.787503
		Adj-CLT UCL (Adjusted for skewness)	2.772131
		Mod-t UCL (Adjusted for skewness)	2.803921
		Jackknife UCL	2.806318
		Standard Bootstrap UCL	2.776141
		Bootstrap-t UCL	2.808756
RECOMMENDATION		Hall's Bootstrap UCL	2.764273
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.771429
		BCA Bootstrap UCL	2.761429
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.426893
		97.5% Chebyshev (Mean, Sd) UCL	3.87123
		99% Chebyshev (Mean, Sd) UCL	4.744045

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_99
Silver			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.809601
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.18	Data not normal at 5% significance level	
Maximum	2.2		
Mean	0.642857	95% UCL (Assuming Normal Distribution)	
Median	0.64	Student's-t UCL	0.818451
Standard Deviation	0.466553		
Variance	0.217671	Gamma Distribution Test	
Coefficient of Variation	0.725749	A-D Test Statistic	0.561757
Skewness	1.862382	A-D 5% Critical Value	0.752267
		K-S Test Statistic	0.146349
Gamma Statistics		K-S 5% Critical Value	0.191465
k hat	2.351481	Data follow gamma distribution	
k star (bias corrected)	2.047302	at 5% significance level	
Theta hat	0.273384		
Theta star	0.314002	95% UCLs (Assuming Gamma Distribution)	
nu hat	98.76222	Approximate Gamma UCL	0.84254
nu star	85.98667	Adjusted Gamma UCL	0.860473
Approx.Chi Square Value (.05)	65.60772		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	64.24038	Shapiro-Wilk Test Statisitic	0.932411
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.714798		
Maximum of log data	0.788457	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.669283	95% H-UCL	0.920737
Standard Deviation of log data	0.699088	95% Chebyshev (MVUE) UCL	1.102947
Variance of log data	0.488723	97.5% Chebyshev (MVUE) UCL	1.301228
		99% Chebyshev (MVUE) UCL	1.690711
		95% Non-parametric UCLs	
		CLT UCL	0.81032
		Adj-CLT UCL (Adjusted for skewness)	0.854531
		Mod-t UCL (Adjusted for skewness)	0.825347
		Jackknife UCL	0.818451
		Standard Bootstrap UCL	0.80756
		Bootstrap-t UCL	0.887122
RECOMMENDATION		Hall's Bootstrap UCL	1.066327
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.810476
		BCA Bootstrap UCL	0.855238
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	1.086637
		97.5% Chebyshev (Mean, Sd) UCL	1.278661
		99% Chebyshev (Mean, Sd) UCL	1.655855

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._2EPCs3.t	Variable:	_100
Sodium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.742568
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	108	Data not normal at 5% significance level	
Maximum	2890		
Mean	720.7619	95% UCL (Assuming Normal Distribution)	
Median	408	Student's-t UCL	976.333
Standard Deviation	679.0523		
Variance	461112	Gamma Distribution Test	
Coefficient of Variation	0.942131	A-D Test Statistic	0.98456
Skewness	2.005061	A-D 5% Critical Value	0.756493
		K-S Test Statistic	0.201101
Gamma Statistics		K-S 5% Critical Value	0.192367
k hat	1.694458	Data do not follow gamma distribution	
k star (bias corrected)	1.484139	at 5% significance level	
Theta hat	425.3642		
Theta star	485.6432	95% UCLs (Assuming Gamma Distribution)	
nu hat	71.16725	Approximate Gamma UCL	994.6337
nu star	62.33383	Adjusted Gamma UCL	1019.981
Approx.Chi Square Value (.05)	45.17025		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	44.04772	Shapiro-Wilk Test Statisitic	0.948884
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.682131		
Maximum of log data	7.969012	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.257088	95% H-UCL	1075.609
Standard Deviation of log data	0.794018	95% Chebyshev (MVUE) UCL	1276.758
Variance of log data	0.630465	97.5% Chebyshev (MVUE) UCL	1525.636
		99% Chebyshev (MVUE) UCL	2014.507
		95% Non-parametric UCLs	
		CLT UCL	964.4985
		Adj-CLT UCL (Adjusted for skewness)	1033.776
		Mod-t UCL (Adjusted for skewness)	987.1388
		Jackknife UCL	976.333
		Standard Bootstrap UCL	956.9724
		Bootstrap-t UCL	1140.701
RECOMMENDATION		Hall's Bootstrap UCL	1089.757
Data are lognormal (0.05)		Percentile Bootstrap UCL	976.1429
		BCA Bootstrap UCL	1030.857
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	1366.669
		97.5% Chebyshev (Mean, Sd) UCL	1646.154
		99% Chebyshev (Mean, Sd) UCL	2195.148

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_101
Styrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.22811
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	980		
Mean	52.2381	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	132.2447
Standard Deviation	212.5775		
Variance	45189.19	Gamma Distribution Test	
Coefficient of Variation	4.069396	A-D Test Statistic	7.793658
Skewness	4.582537	A-D 5% Critical Value	0.8365
		K-S Test Statistic	0.569189
Gamma Statistics		K-S 5% Critical Value	0.204247
k hat	0.345763	Data do not follow gamma distribution	
k star (bias corrected)	0.328114	at 5% significance level	
Theta hat	151.0808		
Theta star	159.2071	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.52203	Approximate Gamma UCL	112.1238
nu star	13.78079	Adjusted Gamma UCL	119.2488
Approx.Chi Square Value (.05)	6.420423		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	6.036811	Shapiro-Wilk Test Statisitic	0.285689
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.887553	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.007156	95% H-UCL	27.68329
Standard Deviation of log data	1.121189	95% Chebyshev (MVUE) UCL	29.61694
Variance of log data	1.257064	97.5% Chebyshev (MVUE) UCL	36.66172
		99% Chebyshev (MVUE) UCL	50.49982
		95% Non-parametric UCLs	
		CLT UCL	128.5399
		Adj-CLT UCL (Adjusted for skewness)	178.106
		Mod-t UCL (Adjusted for skewness)	139.976
		Jackknife UCL	132.2447
		Standard Bootstrap UCL	126.9827
		Bootstrap-t UCL	26331.28
RECOMMENDATION		Hall's Bootstrap UCL	7183.844
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	144.9762
		BCA Bootstrap UCL	191.381
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	254.4396
		97.5% Chebyshev (Mean, Sd) UCL	341.9324
		99% Chebyshev (Mean, Sd) UCL	513.795

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_102
TCDD (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.996431
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.4	Data are normal at 5% significance level	
Maximum	35		
Mean	17.825	95% UCL (Assuming Normal Distribution)	
Median	17.95	Student's-t UCL	34.70327
Standard Deviation	14.34396		
Variance	205.7492	Gamma Distribution Test	
Coefficient of Variation	0.80471	A-D Test Statistic	0.471136
Skewness	-0.049129	A-D 5% Critical Value	0.670128
		K-S Test Statistic	0.344516
Gamma Statistics		K-S 5% Critical Value	0.404872
k hat	0.761622	Data follow gamma distribution	
k star (bias corrected)	0.357072	at 5% significance level	
Theta hat	23.40398		
Theta star	49.91986	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.09298	Approximate Gamma UCL	153.7991
nu star	2.856578	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.331072		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.785883
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.916291		
Maximum of log data	3.555348	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.096235	95% H-UCL	1.17E+11
Standard Deviation of log data	2.03877	95% Chebyshev (MVUE) UCL	123.588
Variance of log data	4.156583	97.5% Chebyshev (MVUE) UCL	164.8392
		99% Chebyshev (MVUE) UCL	245.8693
		95% Non-parametric UCLs	
		CLT UCL	29.62186
		Adj-CLT UCL (Adjusted for skewness)	29.43361
		Mod-t UCL (Adjusted for skewness)	34.67391
		Jackknife UCL	34.70327
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	49.08693
		97.5% Chebyshev (Mean, Sd) UCL	62.614
		99% Chebyshev (Mean, Sd) UCL	89.1853

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_103
TCDF (total)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.848957
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.4715	Data are normal at 5% significance level	
Maximum	206		
Mean	74.61788	95% UCL (Assuming Normal Distribution)	
Median	46	Student's-t UCL	181.1303
Standard Deviation	90.5193		
Variance	8193.744	Gamma Distribution Test	
Coefficient of Variation	1.213105	A-D Test Statistic	0.293045
Skewness	1.615665	A-D 5% Critical Value	0.680835
		K-S Test Statistic	0.264453
Gamma Statistics		K-S 5% Critical Value	0.410223
k hat	0.501772	Data follow gamma distribution	
k star (bias corrected)	0.29211	at 5% significance level	
Theta hat	148.7087		
Theta star	255.4447	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.014177	Approximate Gamma UCL	844.6407
nu star	2.336878	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.206446		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.864804
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.751836		
Maximum of log data	5.327876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.047198	95% H-UCL	2.05E+18
Standard Deviation of log data	2.637965	95% Chebyshev (MVUE) UCL	667.0112
Variance of log data	6.95886	97.5% Chebyshev (MVUE) UCL	895.4408
		99% Chebyshev (MVUE) UCL	1344.147
		95% Non-parametric UCLs	
		CLT UCL	149.0634
		Adj-CLT UCL (Adjusted for skewness)	188.1306
		Mod-t UCL (Adjusted for skewness)	187.224
		Jackknife UCL	181.1303
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	271.9001
		97.5% Chebyshev (Mean, Sd) UCL	357.2643
		99% Chebyshev (Mean, Sd) UCL	524.9457

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_104
Tetrachloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.521596
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.908
Minimum	4	Data not normal at 5% significance level	
Maximum	110		
Mean	19.5	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	31.30204
Standard Deviation	31.35801		
Variance	983.325	Gamma Distribution Test	
Coefficient of Variation	1.608103	A-D Test Statistic	3.871469
Skewness	2.338834	A-D 5% Critical Value	0.778176
		K-S Test Statistic	0.389062
Gamma Statistics		K-S 5% Critical Value	0.196206
k hat	0.837955	Data do not follow gamma distribution	
k star (bias corrected)	0.749993	at 5% significance level	
Theta hat	23.27095		
Theta star	26.00025	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.19409	Approximate Gamma UCL	31.22168
nu star	31.4997	Adjusted Gamma UCL	32.40395
Approx.Chi Square Value (.05)	19.67364		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	18.95584	Shapiro-Wilk Test Statisitic	0.67311
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.386294		
Maximum of log data	4.70048	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.266416	95% H-UCL	29.11026
Standard Deviation of log data	1.016582	95% Chebyshev (MVUE) UCL	32.61106
Variance of log data	1.033438	97.5% Chebyshev (MVUE) UCL	39.96628
		99% Chebyshev (MVUE) UCL	54.41417
		95% Non-parametric UCLs	
		CLT UCL	30.75554
		Adj-CLT UCL (Adjusted for skewness)	34.48725
		Mod-t UCL (Adjusted for skewness)	31.88411
		Jackknife UCL	31.30204
		Standard Bootstrap UCL	30.56862
		Bootstrap-t UCL	45.99791
RECOMMENDATION		Hall's Bootstrap UCL	32.77747
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	31.83333
		BCA Bootstrap UCL	35.30952
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	49.32742
		97.5% Chebyshev (Mean, Sd) UCL	62.23377
		99% Chebyshev (Mean, Sd) UCL	87.58579

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_105
Thallium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.852256
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.25	Data not normal at 5% significance level	
Maximum	5.7		
Mean	1.985238	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	2.44907
Standard Deviation	1.232403		
Variance	1.518816	Gamma Distribution Test	
Coefficient of Variation	0.620783	A-D Test Statistic	1.122029
Skewness	1.080437	A-D 5% Critical Value	0.752397
		K-S Test Statistic	0.243431
Gamma Statistics		K-S 5% Critical Value	0.191489
k hat	2.321963	Data do not follow gamma distribution	
k star (bias corrected)	2.022	at 5% significance level	
Theta hat	0.854983		
Theta star	0.981819	95% UCLs (Assuming Gamma Distribution)	
nu hat	97.52245	Approximate Gamma UCL	2.606626
nu star	84.924	Adjusted Gamma UCL	2.662492
Approx.Chi Square Value (.05)	64.67915		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	63.32202	Shapiro-Wilk Test Statisitic	0.879434
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	1.740466	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.455213	95% H-UCL	3.148959
Standard Deviation of log data	0.772945	95% Chebyshev (MVUE) UCL	3.748354
Variance of log data	0.597444	97.5% Chebyshev (MVUE) UCL	4.466849
		99% Chebyshev (MVUE) UCL	5.878193
		95% Non-parametric UCLs	
		CLT UCL	2.427592
		Adj-CLT UCL (Adjusted for skewness)	2.495343
		Mod-t UCL (Adjusted for skewness)	2.459638
		Jackknife UCL	2.44907
		Standard Bootstrap UCL	2.421274
		Bootstrap-t UCL	2.511476
RECOMMENDATION		Hall's Bootstrap UCL	2.654153
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.427143
		BCA Bootstrap UCL	2.485238
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.157487
		97.5% Chebyshev (Mean, Sd) UCL	3.66472
		99% Chebyshev (Mean, Sd) UCL	4.661081

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_106
Toluene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.474556
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3	Data not normal at 5% significance level	
Maximum	530000		
Mean	70866.5	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	134092.4
Standard Deviation	167991.3		
Variance	2.82E+10	Gamma Distribution Test	
Coefficient of Variation	2.370532	A-D Test Statistic	3.156525
Skewness	2.263803	A-D 5% Critical Value	0.919484
		K-S Test Statistic	0.361279
Gamma Statistics		K-S 5% Critical Value	0.212373
k hat	0.124138	Data do not follow gamma distribution	
k star (bias corrected)	0.13815	at 5% significance level	
Theta hat	570867.9		
Theta star	512967.1	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.213803	Approximate Gamma UCL	267143.4
nu star	5.802308	Adjusted Gamma UCL	298409.5
Approx.Chi Square Value (.05)	1.539208		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	1.377936	Shapiro-Wilk Test Statisitic	0.712891
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	13.18063	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.809684	95% H-UCL	3.27E+10
Standard Deviation of log data	4.568135	95% Chebyshev (MVUE) UCL	1254909
Variance of log data	20.86786	97.5% Chebyshev (MVUE) UCL	1693131
		99% Chebyshev (MVUE) UCL	2553933
		95% Non-parametric UCLs	
		CLT UCL	131164.7
		Adj-CLT UCL (Adjusted for skewness)	150515
		Mod-t UCL (Adjusted for skewness)	137110.7
		Jackknife UCL	134092.4
		Standard Bootstrap UCL	130666.2
		Bootstrap-t UCL	173330
RECOMMENDATION		Hall's Bootstrap UCL	116232.6
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	132012.6
		BCA Bootstrap UCL	150626.8
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	230658.1
		97.5% Chebyshev (Mean, Sd) UCL	299800.1
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	435616
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_107
Total dioxin toxicity equivalent			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.755978
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.92	Data are normal at 5% significance level	
Maximum	72.8		
Mean	23.755	95% UCL (Assuming Normal Distribution)	
Median	10.65	Student's-t UCL	62.61765
Standard Deviation	33.02732		
Variance	1090.804	Gamma Distribution Test	
Coefficient of Variation	1.390331	A-D Test Statistic	0.309287
Skewness	1.877946	A-D 5% Critical Value	0.674458
		K-S Test Statistic	0.281991
Gamma Statistics		K-S 5% Critical Value	0.407055
k hat	0.652023	Data follow gamma distribution	
k star (bias corrected)	0.329673	at 5% significance level	
Theta hat	36.43274		
Theta star	72.05636	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.216187	Approximate Gamma UCL	229.0743
nu star	2.63738	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.273496		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.956308
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.083382		
Maximum of log data	4.287716	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.23156	95% H-UCL	6.73E+08
Standard Deviation of log data	1.792454	95% Chebyshev (MVUE) UCL	104.8451
Variance of log data	3.212892	97.5% Chebyshev (MVUE) UCL	139.2358
		99% Chebyshev (MVUE) UCL	206.7895
		95% Non-parametric UCLs	
		CLT UCL	50.91756
		Adj-CLT UCL (Adjusted for skewness)	67.48582
		Mod-t UCL (Adjusted for skewness)	65.20196
		Jackknife UCL	62.61765
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	95.73638
		97.5% Chebyshev (Mean, Sd) UCL	126.8828
		99% Chebyshev (Mean, Sd) UCL	188.0639

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_108
Trichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.397236
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	920		
Mean	75.97619	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	153.1681
Standard Deviation	205.099		
Variance	42065.59	Gamma Distribution Test	
Coefficient of Variation	2.699516	A-D Test Statistic	4.05931
Skewness	3.872881	A-D 5% Critical Value	0.829045
		K-S Test Statistic	0.37395
Gamma Statistics		K-S 5% Critical Value	0.203318
k hat	0.382603	Data do not follow gamma distribution	
k star (bias corrected)	0.359691	at 5% significance level	
Theta hat	198.5773		
Theta star	211.2262	95% UCLs (Assuming Gamma Distribution)	
nu hat	16.06931	Approximate Gamma UCL	156.4822
nu star	15.10702	Adjusted Gamma UCL	165.8441
Approx.Chi Square Value (.05)	7.334857		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	6.920801	Shapiro-Wilk Test Statisitic	0.658012
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.824374	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.598126	95% H-UCL	148.684
Standard Deviation of log data	1.559449	95% Chebyshev (MVUE) UCL	113.3666
Variance of log data	2.431882	97.5% Chebyshev (MVUE) UCL	144.8851
		99% Chebyshev (MVUE) UCL	206.7969
		95% Non-parametric UCLs	
		CLT UCL	149.5937
		Adj-CLT UCL (Adjusted for skewness)	190.0102
		Mod-t UCL (Adjusted for skewness)	159.4723
		Jackknife UCL	153.1681
		Standard Bootstrap UCL	146.4247
		Bootstrap-t UCL	378.6402
RECOMMENDATION		Hall's Bootstrap UCL	396.2249
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	156.3333
		BCA Bootstrap UCL	204.7143
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	271.0642
		97.5% Chebyshev (Mean, Sd) UCL	355.479
		99% Chebyshev (Mean, Sd) UCL	521.2954

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_109
Vanadium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.879747
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	19.6	Data not normal at 5% significance level	
Maximum	68.6		
Mean	36.34762	95% UCL (Assuming Normal Distribution)	
Median	31.7	Student's-t UCL	41.43128
Standard Deviation	13.50728		
Variance	182.4466	Gamma Distribution Test	
Coefficient of Variation	0.371614	A-D Test Statistic	0.502367
Skewness	1.208276	A-D 5% Critical Value	0.743278
		K-S Test Statistic	0.151902
Gamma Statistics		K-S 5% Critical Value	0.189543
k hat	8.790199	Data follow gamma distribution	
k star (bias corrected)	7.566202	at 5% significance level	
Theta hat	4.135017		
Theta star	4.803945	95% UCLs (Assuming Gamma Distribution)	
nu hat	369.1884	Approximate Gamma UCL	41.62775
nu star	317.7805	Adjusted Gamma UCL	42.0658
Approx.Chi Square Value (.05)	277.4727		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	274.5832	Shapiro-Wilk Test Statisitic	0.958899
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.97553		
Maximum of log data	4.228293	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.53517	95% H-UCL	41.86602
Standard Deviation of log data	0.340062	95% Chebyshev (MVUE) UCL	48.17186
Variance of log data	0.115642	97.5% Chebyshev (MVUE) UCL	53.33577
		99% Chebyshev (MVUE) UCL	63.47927
		95% Non-parametric UCLs	
		CLT UCL	41.19587
		Adj-CLT UCL (Adjusted for skewness)	42.02629
		Mod-t UCL (Adjusted for skewness)	41.56081
		Jackknife UCL	41.43128
		Standard Bootstrap UCL	41.05279
		Bootstrap-t UCL	42.76005
RECOMMENDATION		Hall's Bootstrap UCL	42.6386
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	41.45714
		BCA Bootstrap UCL	41.81429
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	49.19561
		97.5% Chebyshev (Mean, Sd) UCL	54.75494
		99% Chebyshev (Mean, Sd) UCL	65.67517

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_110
Vinyl chloride			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.393802
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	2200		
Mean	177.2857	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	368.8344
Standard Deviation	508.9449		
Variance	259024.9	Gamma Distribution Test	
Coefficient of Variation	2.870761	A-D Test Statistic	4.502679
Skewness	3.628055	A-D 5% Critical Value	0.853189
		K-S Test Statistic	0.457994
Gamma Statistics		K-S 5% Critical Value	0.206119
k hat	0.283309	Data do not follow gamma distribution	
k star (bias corrected)	0.274582	at 5% significance level	
Theta hat	625.768		
Theta star	645.6559	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.89898	Approximate Gamma UCL	415.579
nu star	11.53246	Adjusted Gamma UCL	445.3317
Approx.Chi Square Value (.05)	4.919738		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	4.59105	Shapiro-Wilk Test Statisitic	0.610445
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	7.696213	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.720974	95% H-UCL	507.6055
Standard Deviation of log data	1.904796	95% Chebyshev (MVUE) UCL	247.9518
Variance of log data	3.628249	97.5% Chebyshev (MVUE) UCL	322.2503
		99% Chebyshev (MVUE) UCL	468.1953
		95% Non-parametric UCLs	
		CLT UCL	359.9646
		Adj-CLT UCL (Adjusted for skewness)	453.9165
		Mod-t UCL (Adjusted for skewness)	383.489
		Jackknife UCL	368.8344
		Standard Bootstrap UCL	351.8067
		Bootstrap-t UCL	1630.593
RECOMMENDATION		Hall's Bootstrap UCL	1217.827
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	378
		BCA Bootstrap UCL	485.1667
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	661.3889
		97.5% Chebyshev (Mean, Sd) UCL	870.8607
		99% Chebyshev (Mean, Sd) UCL	1282.328

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_111
Xylenes, total			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.548489
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.908
Minimum	5	Data not normal at 5% significance level	
Maximum	640000		
Mean	77586.88	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	140568.5
Standard Deviation	167342.1		
Variance	2.8E+10	Gamma Distribution Test	
Coefficient of Variation	2.156835	A-D Test Statistic	3.044021
Skewness	2.487555	A-D 5% Critical Value	0.918087
		K-S Test Statistic	0.372741
Gamma Statistics		K-S 5% Critical Value	0.212245
k hat	0.127766	Data do not follow gamma distribution	
k star (bias corrected)	0.14126	at 5% significance level	
Theta hat	607257		
Theta star	549249.3	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.366178	Approximate Gamma UCL	286767.7
nu star	5.932914	Adjusted Gamma UCL	319777.9
Approx.Chi Square Value (.05)	1.605189		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	1.439487	Shapiro-Wilk Test Statisitic	0.691703
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	13.36922	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.105248	95% H-UCL	2.94E+11
Standard Deviation of log data	4.788644	95% Chebyshev (MVUE) UCL	3121955
Variance of log data	22.93111	97.5% Chebyshev (MVUE) UCL	4214267
		99% Chebyshev (MVUE) UCL	6359903
		95% Non-parametric UCLs	
		CLT UCL	137652.1
		Adj-CLT UCL (Adjusted for skewness)	158832.7
		Mod-t UCL (Adjusted for skewness)	143872.2
		Jackknife UCL	140568.5
		Standard Bootstrap UCL	135429
		Bootstrap-t UCL	204053.2
RECOMMENDATION		Hall's Bootstrap UCL	153025.2
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	139632
		BCA Bootstrap UCL	161719.9
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	236761
		97.5% Chebyshev (Mean, Sd) UCL	305635.7
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	440926.9
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_112
Zinc			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.585379
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.908
Minimum	23.1	Data not normal at 5% significance level	
Maximum	2510		
Mean	392.0095	95% UCL (Assuming Normal Distribution)	
Median	245	Student's-t UCL	592.7119
Standard Deviation	533.2662		
Variance	284372.8	Gamma Distribution Test	
Coefficient of Variation	1.36034	A-D Test Statistic	0.504149
Skewness	3.432204	A-D 5% Critical Value	0.767821
		K-S Test Statistic	0.145792
Gamma Statistics		K-S 5% Critical Value	0.194554
k hat	1.078769	Data follow gamma distribution	
k star (bias corrected)	0.956405	at 5% significance level	
Theta hat	363.3861		
Theta star	409.8782	95% UCLs (Assuming Gamma Distribution)	
nu hat	45.30828	Approximate Gamma UCL	590.9848
nu star	40.169	Adjusted Gamma UCL	610.37
Approx.Chi Square Value (.05)	26.64473		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	25.7985	Shapiro-Wilk Test Statisitic	0.986288
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.139833		
Maximum of log data	7.828038	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.440853	95% H-UCL	733.1709
Standard Deviation of log data	1.043465	95% Chebyshev (MVUE) UCL	812.6619
Variance of log data	1.088819	97.5% Chebyshev (MVUE) UCL	998.6203
		99% Chebyshev (MVUE) UCL	1363.9
		95% Non-parametric UCLs	
		CLT UCL	583.4182
		Adj-CLT UCL (Adjusted for skewness)	676.5458
		Mod-t UCL (Adjusted for skewness)	607.2379
		Jackknife UCL	592.7119
		Standard Bootstrap UCL	585.4169
		Bootstrap-t UCL	884.0727
RECOMMENDATION		Hall's Bootstrap UCL	1375.575
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	603.219
		BCA Bootstrap UCL	703.0381
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	899.2468
		97.5% Chebyshev (Mean, Sd) UCL	1118.729
		99% Chebyshev (Mean, Sd) UCL	1549.859

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_113
alpha-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.394105
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.9	Data not normal at 5% significance level	
Maximum	90		
Mean	7.880952	95% UCL (Assuming Normal Distribution)	
Median	1.1	Student's-t UCL	15.28714
Standard Deviation	19.67824		
Variance	387.2331	Gamma Distribution Test	
Coefficient of Variation	2.496937	A-D Test Statistic	2.886795
Skewness	4.027332	A-D 5% Critical Value	0.802796
		K-S Test Statistic	0.294031
Gamma Statistics		K-S 5% Critical Value	0.199978
k hat	0.527747	Data do not follow gamma distribution	
k star (bias corrected)	0.484101	at 5% significance level	
Theta hat	14.93319		
Theta star	16.27956	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.16539	Approximate Gamma UCL	14.44241
nu star	20.33224	Adjusted Gamma UCL	15.15711
Approx.Chi Square Value (.05)	11.09492		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	10.57177	Shapiro-Wilk Test Statisitic	0.770913
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	4.49981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.870855	95% H-UCL	13.1423
Standard Deviation of log data	1.295187	95% Chebyshev (MVUE) UCL	12.65002
Variance of log data	1.677509	97.5% Chebyshev (MVUE) UCL	15.88641
		99% Chebyshev (MVUE) UCL	22.24366
		95% Non-parametric UCLs	
		CLT UCL	14.94419
		Adj-CLT UCL (Adjusted for skewness)	18.9766
		Mod-t UCL (Adjusted for skewness)	15.91611
		Jackknife UCL	15.28714
		Standard Bootstrap UCL	14.96911
		Bootstrap-t UCL	47.6976
RECOMMENDATION		Hall's Bootstrap UCL	40.9036
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.70952
		BCA Bootstrap UCL	20.79048
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	26.59869
		97.5% Chebyshev (Mean, Sd) UCL	34.69787
		99% Chebyshev (Mean, Sd) UCL	50.60715

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_114
alpha-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.44658
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.27	Data not normal at 5% significance level	
Maximum	170		
Mean	15.87286	95% UCL (Assuming Normal Distribution)	
Median	1.7	Student's-t UCL	29.9315
Standard Deviation	37.35382		
Variance	1395.308	Gamma Distribution Test	
Coefficient of Variation	2.353314	A-D Test Statistic	1.437386
Skewness	3.880824	A-D 5% Critical Value	0.819665
		K-S Test Statistic	0.228607
Gamma Statistics		K-S 5% Critical Value	0.20215
k hat	0.428958	Data do not follow gamma distribution	
k star (bias corrected)	0.399424	at 5% significance level	
Theta hat	37.0033		
Theta star	39.73935	95% UCLs (Assuming Gamma Distribution)	
nu hat	18.01623	Approximate Gamma UCL	31.28672
nu star	16.77582	Adjusted Gamma UCL	33.03583
Approx.Chi Square Value (.05)	8.510964		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	8.060344	Shapiro-Wilk Test Statisitic	0.926371
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.309333		
Maximum of log data	5.135798	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.247676	95% H-UCL	64.77737
Standard Deviation of log data	1.730339	95% Chebyshev (MVUE) UCL	40.44281
Variance of log data	2.994073	97.5% Chebyshev (MVUE) UCL	52.15626
		99% Chebyshev (MVUE) UCL	75.16506
		95% Non-parametric UCLs	
		CLT UCL	29.28051
		Adj-CLT UCL (Adjusted for skewness)	36.65649
		Mod-t UCL (Adjusted for skewness)	31.08201
		Jackknife UCL	29.9315
		Standard Bootstrap UCL	29.0625
		Bootstrap-t UCL	65.69937
RECOMMENDATION		Hall's Bootstrap UCL	77.61058
Data are lognormal (0.05)		Percentile Bootstrap UCL	30.98667
		BCA Bootstrap UCL	41.50238
Use 95% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	51.40342
		97.5% Chebyshev (Mean, Sd) UCL	66.77753
		99% Chebyshev (Mean, Sd) UCL	96.97698

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_115
beta-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.490393
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.9	Data not normal at 5% significance level	
Maximum	90		
Mean	9.838095	95% UCL (Assuming Normal Distribution)	
Median	2.6	Student's-t UCL	17.43872
Standard Deviation	20.19486		
Variance	407.8325	Gamma Distribution Test	
Coefficient of Variation	2.052721	A-D Test Statistic	1.748519
Skewness	3.51952	A-D 5% Critical Value	0.798188
		K-S Test Statistic	0.219447
Gamma Statistics		K-S 5% Critical Value	0.199273
k hat	0.579016	Data do not follow gamma distribution	
k star (bias corrected)	0.528045	at 5% significance level	
Theta hat	16.99107		
Theta star	18.63116	95% UCLs (Assuming Gamma Distribution)	
nu hat	24.31866	Approximate Gamma UCL	17.49688
nu star	22.17789	Adjusted Gamma UCL	18.31709
Approx.Chi Square Value (.05)	12.47012		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	11.91173	Shapiro-Wilk Test Statisitic	0.878696
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	4.49981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.213496	95% H-UCL	20.98468
Standard Deviation of log data	1.346352	95% Chebyshev (MVUE) UCL	19.44464
Variance of log data	1.812665	97.5% Chebyshev (MVUE) UCL	24.51163
		99% Chebyshev (MVUE) UCL	34.46474
		95% Non-parametric UCLs	
		CLT UCL	17.08677
		Adj-CLT UCL (Adjusted for skewness)	20.70324
		Mod-t UCL (Adjusted for skewness)	18.00282
		Jackknife UCL	17.43872
		Standard Bootstrap UCL	16.79985
		Bootstrap-t UCL	32.78208
RECOMMENDATION		Hall's Bootstrap UCL	42.5649
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	17.68095
		BCA Bootstrap UCL	21.58571
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	29.04724
		97.5% Chebyshev (Mean, Sd) UCL	37.35905
		99% Chebyshev (Mean, Sd) UCL	53.686

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_116
bis(2-Ethylhexyl)phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.74346
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.908
Minimum	175	Data not normal at 5% significance level	
Maximum	13000		
Mean	2571.667	95% UCL (Assuming Normal Distribution)	
Median	700	Student's-t UCL	3833.459
Standard Deviation	3352.581		
Variance	11239801	Gamma Distribution Test	
Coefficient of Variation	1.303661	A-D Test Statistic	1.351055
Skewness	1.731947	A-D 5% Critical Value	0.794963
		K-S Test Statistic	0.221841
Gamma Statistics		K-S 5% Critical Value	0.198779
k hat	0.614895	Data do not follow gamma distribution	
k star (bias corrected)	0.558799	at 5% significance level	
Theta hat	4182.288		
Theta star	4602.135	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.82558	Approximate Gamma UCL	4489.33
nu star	23.46954	Adjusted Gamma UCL	4692.54
Approx.Chi Square Value (.05)	13.44429		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	12.86208	Shapiro-Wilk Test Statisitic	0.848108
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.472705	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.851075	95% H-UCL	10224.61
Standard Deviation of log data	1.551723	95% Chebyshev (MVUE) UCL	7859.287
Variance of log data	2.407843	97.5% Chebyshev (MVUE) UCL	10039.85
		99% Chebyshev (MVUE) UCL	14323.14
		95% Non-parametric UCLs	
		CLT UCL	3775.03
		Adj-CLT UCL (Adjusted for skewness)	4070.474
		Mod-t UCL (Adjusted for skewness)	3879.542
		Jackknife UCL	3833.459
		Standard Bootstrap UCL	3718.549
		Bootstrap-t UCL	4291.982
RECOMMENDATION		Hall's Bootstrap UCL	4466.961
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3785.238
		BCA Bootstrap UCL	4039.762
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5760.607
		97.5% Chebyshev (Mean, Sd) UCL	7140.465
		99% Chebyshev (Mean, Sd) UCL	9850.927

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_117
cis-1,2-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.288844
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3	Data not normal at 5% significance level	
Maximum	240000		
Mean	13902.19	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	33544.73
Standard Deviation	52190.24		
Variance	2.72E+09	Gamma Distribution Test	
Coefficient of Variation	3.754102	A-D Test Statistic	3.760413
Skewness	4.477198	A-D 5% Critical Value	0.914036
		K-S Test Statistic	0.382636
Gamma Statistics		K-S 5% Critical Value	0.211876
k hat	0.138287	Data do not follow gamma distribution	
k star (bias corrected)	0.150278	at 5% significance level	
Theta hat	100531.2		
Theta star	92509.8	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.808068	Approximate Gamma UCL	48730.76
nu star	6.311677	Adjusted Gamma UCL	54087.93
Approx.Chi Square Value (.05)	1.800631		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	1.622287	Shapiro-Wilk Test Statisitic	0.694843
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	12.38839	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.916702	95% H-UCL	8809950
Standard Deviation of log data	3.594233	95% Chebyshev (MVUE) UCL	38716.11
Variance of log data	12.91851	97.5% Chebyshev (MVUE) UCL	52002.27
		99% Chebyshev (MVUE) UCL	78100.35
		95% Non-parametric UCLs	
		CLT UCL	32635.17
		Adj-CLT UCL (Adjusted for skewness)	44524.48
		Mod-t UCL (Adjusted for skewness)	35399.23
		Jackknife UCL	33544.73
		Standard Bootstrap UCL	32331.17
		Bootstrap-t UCL	246118.4
RECOMMENDATION		Hall's Bootstrap UCL	154837.9
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	36164.07
		BCA Bootstrap UCL	49508.48
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	63545.01
		97.5% Chebyshev (Mean, Sd) UCL	85025.5
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	127219.8
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_118
delta-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.382422
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.9	Data not normal at 5% significance level	
Maximum	90		
Mean	7.761905	95% UCL (Assuming Normal Distribution)	
Median	1.1	Student's-t UCL	15.0669
Standard Deviation	19.40938		
Variance	376.724	Gamma Distribution Test	
Coefficient of Variation	2.500595	A-D Test Statistic	2.649969
Skewness	4.187208	A-D 5% Critical Value	0.80107
		K-S Test Statistic	0.301016
Gamma Statistics		K-S 5% Critical Value	0.199714
k hat	0.54695	Data do not follow gamma distribution	
k star (bias corrected)	0.50056	at 5% significance level	
Theta hat	14.19126		
Theta star	15.50644	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.97188	Approximate Gamma UCL	14.05832
nu star	21.02352	Adjusted Gamma UCL	14.73962
Approx.Chi Square Value (.05)	11.60754		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	11.07102	Shapiro-Wilk Test Statisitic	0.783048
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	4.49981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.903793	95% H-UCL	13.31563
Standard Deviation of log data	1.286906	95% Chebyshev (MVUE) UCL	12.89202
Variance of log data	1.656126	97.5% Chebyshev (MVUE) UCL	16.18014
		99% Chebyshev (MVUE) UCL	22.63901
		95% Non-parametric UCLs	
		CLT UCL	14.72864
		Adj-CLT UCL (Adjusted for skewness)	18.86385
		Mod-t UCL (Adjusted for skewness)	15.71191
		Jackknife UCL	15.0669
		Standard Bootstrap UCL	14.57238
		Bootstrap-t UCL	43.98267
RECOMMENDATION		Hall's Bootstrap UCL	40.12584
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.54524
		BCA Bootstrap UCL	20.13333
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	26.22391
		97.5% Chebyshev (Mean, Sd) UCL	34.21243
		99% Chebyshev (Mean, Sd) UCL	49.90434

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_119
gamma-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.463118
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.908
Minimum	0.83	Data not normal at 5% significance level	
Maximum	190		
Mean	18.59905	95% UCL (Assuming Normal Distribution)	
Median	1.5	Student's-t UCL	34.26736
Standard Deviation	41.63069		
Variance	1733.115	Gamma Distribution Test	
Coefficient of Variation	2.238324	A-D Test Statistic	1.767506
Skewness	3.836067	A-D 5% Critical Value	0.817023
		K-S Test Statistic	0.267988
Gamma Statistics		K-S 5% Critical Value	0.201821
k hat	0.442014	Data do not follow gamma distribution	
k star (bias corrected)	0.410615	at 5% significance level	
Theta hat	42.07793		
Theta star	45.29554	95% UCLs (Assuming Gamma Distribution)	
nu hat	18.5646	Approximate Gamma UCL	36.25676
nu star	17.24585	Adjusted Gamma UCL	38.24812
Approx.Chi Square Value (.05)	8.846803		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	8.386199	Shapiro-Wilk Test Statisitic	0.835695
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.18633		
Maximum of log data	5.247024	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.457997	95% H-UCL	74.01588
Standard Deviation of log data	1.706099	95% Chebyshev (MVUE) UCL	47.65701
Variance of log data	2.910773	97.5% Chebyshev (MVUE) UCL	61.38691
		99% Chebyshev (MVUE) UCL	88.35664
		95% Non-parametric UCLs	
		CLT UCL	33.54182
		Adj-CLT UCL (Adjusted for skewness)	41.66753
		Mod-t UCL (Adjusted for skewness)	35.5348
		Jackknife UCL	34.26736
		Standard Bootstrap UCL	33.31973
		Bootstrap-t UCL	68.06696
RECOMMENDATION		Hall's Bootstrap UCL	85.19222
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	35.94429
		BCA Bootstrap UCL	46.82857
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	58.19773
		97.5% Chebyshev (Mean, Sd) UCL	75.33212
		99% Chebyshev (Mean, Sd) UCL	108.9893

Data File	C:\lhilsche\AMCO\EPCs3_UCL\all._3EPCs3.t	Variable:	_120
trans-1,2-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	21	Shapiro-Wilk Test Statisitic	0.290024
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.908
Minimum	3	Data not normal at 5% significance level	
Maximum	1200		
Mean	74.52381	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	172.2723
Standard Deviation	259.7177		
Variance	67453.26	Gamma Distribution Test	
Coefficient of Variation	3.485029	A-D Test Statistic	4.805699
Skewness	4.480069	A-D 5% Critical Value	0.835914
		K-S Test Statistic	0.43254
Gamma Statistics		K-S 5% Critical Value	0.204174
k hat	0.348657	Data do not follow gamma distribution	
k star (bias corrected)	0.330595	at 5% significance level	
Theta hat	213.7455		
Theta star	225.4235	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.64358	Approximate Gamma UCL	159.4015
nu star	13.88497	Adjusted Gamma UCL	169.4805
Approx.Chi Square Value (.05)	6.491541		
Adjusted Level of Significance	0.0383	Lognormal Distribution Test	
Adjusted Chi Square Value	6.105489	Shapiro-Wilk Test Statisitic	0.625537
		Shapiro-Wilk 5% Critical Value	0.908
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.381259	95% H-UCL	92.61414
Standard Deviation of log data	1.467872	95% Chebyshev (MVUE) UCL	77.34402
Variance of log data	2.154649	97.5% Chebyshev (MVUE) UCL	98.3015
		99% Chebyshev (MVUE) UCL	139.4684
		95% Non-parametric UCLs	
		CLT UCL	167.746
		Adj-CLT UCL (Adjusted for skewness)	226.9494
		Mod-t UCL (Adjusted for skewness)	181.5068
		Jackknife UCL	172.2723
		Standard Bootstrap UCL	164.9263
		Bootstrap-t UCL	929.5599
RECOMMENDATION		Hall's Bootstrap UCL	745.2071
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	187.2143
		BCA Bootstrap UCL	293.7619
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	321.5646
		97.5% Chebyshev (Mean, Sd) UCL	428.4593
		99% Chebyshev (Mean, Sd) UCL	638.4333

Former AMCO Chemical Facility – Deep Soil

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_1
1,1,1-Trichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.321779
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	81		
Mean	10.32258	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	15.29534
Standard Deviation	16.31285		
Variance	266.1091	Gamma Distribution Test	
Coefficient of Variation	1.580308	A-D Test Statistic	8.339738
Skewness	3.885331	A-D 5% Critical Value	0.763621
		K-S Test Statistic	0.416954
Gamma Statistics		K-S 5% Critical Value	0.160573
k hat	1.511668	Data do not follow gamma distribution	
k star (bias corrected)	1.386883	at 5% significance level	
Theta hat	6.828601		
Theta star	7.443006	95% UCLs (Assuming Gamma Distribution)	
nu hat	93.72344	Approximate Gamma UCL	13.52896
nu star	85.98676	Adjusted Gamma UCL	13.73614
Approx.Chi Square Value (.05)	65.60781		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	64.61823	Shapiro-Wilk Test Statisitic	0.451572
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	4.394449	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.968461	95% H-UCL	10.9367
Standard Deviation of log data	0.621782	95% Chebyshev (MVUE) UCL	13.10067
Variance of log data	0.386613	97.5% Chebyshev (MVUE) UCL	15.03809
		99% Chebyshev (MVUE) UCL	18.84376
		95% Non-parametric UCLs	
		CLT UCL	15.1418
		Adj-CLT UCL (Adjusted for skewness)	17.32642
		Mod-t UCL (Adjusted for skewness)	15.6361
		Jackknife UCL	15.29534
		Standard Bootstrap UCL	15.02041
		Bootstrap-t UCL	98.92191
RECOMMENDATION		Hall's Bootstrap UCL	47.86285
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.45161
		BCA Bootstrap UCL	17.80645
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	23.09361
		97.5% Chebyshev (Mean, Sd) UCL	28.61964
		99% Chebyshev (Mean, Sd) UCL	39.47447

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_2
1,1-Dichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.382213
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	14000		
Mean	1154.258	95% UCL (Assuming Normal Distribution)	
Median	6.5	Student's-t UCL	2202.659
Standard Deviation	3439.217		
Variance	11828216	Gamma Distribution Test	
Coefficient of Variation	2.979591	A-D Test Statistic	5.587275
Skewness	3.33159	A-D 5% Critical Value	0.898199
		K-S Test Statistic	0.349058
Gamma Statistics		K-S 5% Critical Value	0.1747
k hat	0.199629	Data do not follow gamma distribution	
k star (bias corrected)	0.201816	at 5% significance level	
Theta hat	5782.013		
Theta star	5719.372	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.377	Approximate Gamma UCL	2595.059
nu star	12.51256	Adjusted Gamma UCL	2720.575
Approx.Chi Square Value (.05)	5.565472		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	5.308704	Shapiro-Wilk Test Statisitic	0.705343
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	9.546813	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.363707	95% H-UCL	6001.916
Standard Deviation of log data	2.528675	95% Chebyshev (MVUE) UCL	1872.775
Variance of log data	6.394198	97.5% Chebyshev (MVUE) UCL	2466.952
		99% Chebyshev (MVUE) UCL	3634.097
		95% Non-parametric UCLs	
		CLT UCL	2170.287
		Adj-CLT UCL (Adjusted for skewness)	2565.226
		Mod-t UCL (Adjusted for skewness)	2264.261
		Jackknife UCL	2202.659
		Standard Bootstrap UCL	2158.894
		Bootstrap-t UCL	4792.77
RECOMMENDATION		Hall's Bootstrap UCL	5224.224
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2299.742
		BCA Bootstrap UCL	2734.774
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3846.757
		97.5% Chebyshev (Mean, Sd) UCL	5011.804
		99% Chebyshev (Mean, Sd) UCL	7300.312

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_3
1,1-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.321078
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	240		
Mean	17.90323	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	31.40733
Standard Deviation	44.29944		
Variance	1962.44	Gamma Distribution Test	
Coefficient of Variation	2.474383	A-D Test Statistic	8.028928
Skewness	4.619246	A-D 5% Critical Value	0.787313
		K-S Test Statistic	0.440328
Gamma Statistics		K-S 5% Critical Value	0.163886
k hat	0.759282	Data do not follow gamma distribution	
k star (bias corrected)	0.707308	at 5% significance level	
Theta hat	23.57916		
Theta star	25.31178	95% UCLs (Assuming Gamma Distribution)	
nu hat	47.07546	Approximate Gamma UCL	26.46685
nu star	43.85311	Adjusted Gamma UCL	27.05934
Approx.Chi Square Value (.05)	29.66398		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	29.01446	Shapiro-Wilk Test Statisitic	0.50889
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	5.480639	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.09787	95% H-UCL	17.47485
Standard Deviation of log data	0.885496	95% Chebyshev (MVUE) UCL	21.09464
Variance of log data	0.784102	97.5% Chebyshev (MVUE) UCL	25.09184
		99% Chebyshev (MVUE) UCL	32.94358
		95% Non-parametric UCLs	
		CLT UCL	30.99036
		Adj-CLT UCL (Adjusted for skewness)	38.04359
		Mod-t UCL (Adjusted for skewness)	32.5075
		Jackknife UCL	31.40733
		Standard Bootstrap UCL	30.91563
		Bootstrap-t UCL	76.2185
RECOMMENDATION		Hall's Bootstrap UCL	84.99623
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	31.30645
		BCA Bootstrap UCL	40.43548
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	52.58443
		97.5% Chebyshev (Mean, Sd) UCL	67.59102
		99% Chebyshev (Mean, Sd) UCL	97.06855

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_4
1,2,3,4,6,7,8-HpCDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.859717
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.706	Data are normal at 5% significance level	
Maximum	1100		
Mean	409.1765	95% UCL (Assuming Normal Distribution)	
Median	268	Student's-t UCL	972.2605
Standard Deviation	478.5356		
Variance	228996.3	Gamma Distribution Test	
Coefficient of Variation	1.169509	A-D Test Statistic	0.39004
Skewness	1.549014	A-D 5% Critical Value	0.690353
		K-S Test Statistic	0.324773
Gamma Statistics		K-S 5% Critical Value	0.413436
k hat	0.418666	Data follow gamma distribution	
k star (bias corrected)	0.271333	at 5% significance level	
Theta hat	977.3341		
Theta star	1508.022	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.349328	Approximate Gamma UCL	5043.375
nu star	2.170665	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.176109		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.809603
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.34814		
Maximum of log data	7.003065	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.453874	95% H-UCL	1.18E+28
Standard Deviation of log data	3.273035	95% Chebyshev (MVUE) UCL	6000.867
Variance of log data	10.71276	97.5% Chebyshev (MVUE) UCL	8083.904
		99% Chebyshev (MVUE) UCL	12175.63
		95% Non-parametric UCLs	
		CLT UCL	802.737
		Adj-CLT UCL (Adjusted for skewness)	1000.748
		Mod-t UCL (Adjusted for skewness)	1003.146
		Jackknife UCL	972.2605
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1452.121
		97.5% Chebyshev (Mean, Sd) UCL	1903.403
		99% Chebyshev (Mean, Sd) UCL	2789.861

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_5
1,2,3,4,6,7,8-HpCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.900289
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1895	Data are normal at 5% significance level	
Maximum	178		
Mean	70.09737	95% UCL (Assuming Normal Distribution)	
Median	51.1	Student's-t UCL	159.7465
Standard Deviation	76.18812		
Variance	5804.629	Gamma Distribution Test	
Coefficient of Variation	1.08689	A-D Test Statistic	0.397338
Skewness	1.344229	A-D 5% Critical Value	0.685956
		K-S Test Statistic	0.325817
Gamma Statistics		K-S 5% Critical Value	0.411957
k hat	0.456535	Data follow gamma distribution	
k star (bias corrected)	0.2808	at 5% significance level	
Theta hat	153.5422		
Theta star	249.6342	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.65228	Approximate Gamma UCL	831.8925
nu star	2.246403	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.189288		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.806079
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.663366		
Maximum of log data	5.181784	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.838619	95% H-UCL	1.35E+24
Standard Deviation of log data	3.063326	95% Chebyshev (MVUE) UCL	917.8752
Variance of log data	9.383966	97.5% Chebyshev (MVUE) UCL	1235.387
		99% Chebyshev (MVUE) UCL	1859.078
		95% Non-parametric UCLs	
		CLT UCL	132.7565
		Adj-CLT UCL (Adjusted for skewness)	160.1143
		Mod-t UCL (Adjusted for skewness)	164.0138
		Jackknife UCL	159.7465
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	236.1455
		97.5% Chebyshev (Mean, Sd) UCL	307.9947
		99% Chebyshev (Mean, Sd) UCL	449.1285

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_6
1,2,3,4,7,8,9-HpCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.927307
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2085	Data are normal at 5% significance level	
Maximum	8.51		
Mean	3.553375	95% UCL (Assuming Normal Distribution)	
Median	2.7475	Student's-t UCL	7.933529
Standard Deviation	3.722464		
Variance	13.85673	Gamma Distribution Test	
Coefficient of Variation	1.047585	A-D Test Statistic	0.213539
Skewness	0.935607	A-D 5% Critical Value	0.669064
		K-S Test Statistic	0.203124
Gamma Statistics		K-S 5% Critical Value	0.404139
k hat	0.833729	Data follow gamma distribution	
k star (bias corrected)	0.375099	at 5% significance level	
Theta hat	4.262024		
Theta star	9.473165	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.669836	Approximate Gamma UCL	28.62701
nu star	3.000792	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.372478		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.956875
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.567816		
Maximum of log data	2.141242	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.55987	95% H-UCL	5190828
Standard Deviation of log data	1.625909	95% Chebyshev (MVUE) UCL	16.09602
Variance of log data	2.643581	97.5% Chebyshev (MVUE) UCL	21.2948
		99% Chebyshev (MVUE) UCL	31.50681
		95% Non-parametric UCLs	
		CLT UCL	6.614829
		Adj-CLT UCL (Adjusted for skewness)	7.545175
		Mod-t UCL (Adjusted for skewness)	8.078645
		Jackknife UCL	7.933529
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	11.6663
		97.5% Chebyshev (Mean, Sd) UCL	15.17676
		99% Chebyshev (Mean, Sd) UCL	22.0724

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t			Variable:	_7		
1,2,3,4,7,8-HxCDD							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.713629
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.1915	Data not normal at 5% significance level			
Maximum			16.4				
Mean			5.030375	95% UCL (Assuming Normal Distribution)			
Median			1.765	Student's-t UCL			13.99194
Standard Deviation			7.615967				
Variance			58.00296	Gamma Distribution Test			
Coefficient of Variation			1.513996	A-D Test Statistic			0.392906
Skewness			1.941968	A-D 5% Critical Value			0.676996
				K-S Test Statistic			0.338496
Gamma Statistics				K-S 5% Critical Value			0.408316
k hat			0.592222	Data follow gamma distribution			
k star (bias corrected)			0.314722	at 5% significance level			
Theta hat			8.494075				
Theta star			15.98355	95% UCLs (Assuming Gamma Distribution)			
nu hat			4.737773	Approximate Gamma UCL			51.68354
nu star			2.517777	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.245056				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.946234
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.652868				
Maximum of log data			2.797281	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			0.570161	95% H-UCL			2.09E+08
Standard Deviation of log data			1.81678	95% Chebyshev (MVUE) UCL			20.5046
Variance of log data			3.300691	97.5% Chebyshev (MVUE) UCL			27.24373
				99% Chebyshev (MVUE) UCL			40.48143
				95% Non-parametric UCLs			
				CLT UCL			11.29395
				Adj-CLT UCL (Adjusted for skewness)			15.24477
				Mod-t UCL (Adjusted for skewness)			14.60819
				Jackknife UCL			13.99194
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			21.62899
				97.5% Chebyshev (Mean, Sd) UCL			28.81123
				99% Chebyshev (Mean, Sd) UCL			42.91933
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_8
1,2,3,4,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.935236
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1595	Data are normal at 5% significance level	
Maximum	2.46		
Mean	1.088625	95% UCL (Assuming Normal Distribution)	
Median	0.8675	Student's-t UCL	2.263393
Standard Deviation	0.998373		
Variance	0.996749	Gamma Distribution Test	
Coefficient of Variation	0.917096	A-D Test Statistic	0.189932
Skewness	1.109988	A-D 5% Critical Value	0.663687
		K-S Test Statistic	0.166042
Gamma Statistics		K-S 5% Critical Value	0.40041
k hat	1.344638	Data follow gamma distribution	
k star (bias corrected)	0.502826	at 5% significance level	
Theta hat	0.809604		
Theta star	2.165012	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.75711	Approximate Gamma UCL	5.995863
nu star	4.02261	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.730356		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.982092
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.835711		
Maximum of log data	0.900161	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.330929	95% H-UCL	1444.272
Standard Deviation of log data	1.15885	95% Chebyshev (MVUE) UCL	3.745045
Variance of log data	1.342934	97.5% Chebyshev (MVUE) UCL	4.872804
		99% Chebyshev (MVUE) UCL	7.088069
		95% Non-parametric UCLs	
		CLT UCL	1.909714
		Adj-CLT UCL (Adjusted for skewness)	2.205741
		Mod-t UCL (Adjusted for skewness)	2.309567
		Jackknife UCL	2.263393
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.264529
		97.5% Chebyshev (Mean, Sd) UCL	4.206045
		99% Chebyshev (Mean, Sd) UCL	6.055469

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t			Variable:	_9		
1,2,3,6,7,8-HxCDD							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.7472
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.1855	Data not normal at 5% significance level			
Maximum			73.5				
Mean			22.75387	95% UCL (Assuming Normal Distribution)			
Median			8.665	Student's-t UCL			62.88646
Standard Deviation			34.10658				
Variance			1163.259	Gamma Distribution Test			
Coefficient of Variation			1.498935	A-D Test Statistic			0.253583
Skewness			1.902835	A-D 5% Critical Value			0.685789
				K-S Test Statistic			0.226573
Gamma Statistics				K-S 5% Critical Value			0.411901
k hat			0.457976	Data follow gamma distribution			
k star (bias corrected)			0.281161	at 5% significance level			
Theta hat			49.68359				
Theta star			80.9284	95% UCLs (Assuming Gamma Distribution)			
nu hat			3.663805	Approximate Gamma UCL			269.6367
nu star			2.249285	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.189811				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.939988
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.6847				
Maximum of log data			4.297285	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			1.718608	95% H-UCL			9.03E+15
Standard Deviation of log data			2.495773	95% Chebyshev (MVUE) UCL			148.2611
Variance of log data			6.228881	97.5% Chebyshev (MVUE) UCL			198.8041
				99% Chebyshev (MVUE) UCL			298.0859
				95% Non-parametric UCLs			
				CLT UCL			50.80404
				Adj-CLT UCL (Adjusted for skewness)			68.14047
				Mod-t UCL (Adjusted for skewness)			65.59059
				Jackknife UCL			62.88646
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Adjusted Gamma UCL not available				95% Chebyshev (Mean, Sd) UCL			97.08744
try Approximate Gamma UCL				97.5% Chebyshev (Mean, Sd) UCL			129.2516
				99% Chebyshev (Mean, Sd) UCL			192.432
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_10
1,2,3,6,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.883881
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.2555	Data are normal at 5% significance level	
Maximum	16.8		
Mean	6.341375	95% UCL (Assuming Normal Distribution)	
Median	4.155	Student's-t UCL	15.03562
Standard Deviation	7.388785		
Variance	54.59414	Gamma Distribution Test	
Coefficient of Variation	1.165171	A-D Test Statistic	0.189507
Skewness	1.39902	A-D 5% Critical Value	0.67153
		K-S Test Statistic	0.165614
Gamma Statistics		K-S 5% Critical Value	0.405601
k hat	0.721014	Data follow gamma distribution	
k star (bias corrected)	0.34692	at 5% significance level	
Theta hat	8.79508		
Theta star	18.27906	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.768111	Approximate Gamma UCL	56.96506
nu star	2.775361	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.308954		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.967177
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.364533		
Maximum of log data	2.821379	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.012341	95% H-UCL	1.91E+08
Standard Deviation of log data	1.790513	95% Chebyshev (MVUE) UCL	30.90466
Variance of log data	3.205937	97.5% Chebyshev (MVUE) UCL	41.04019
		99% Chebyshev (MVUE) UCL	60.94948
		95% Non-parametric UCLs	
		CLT UCL	12.41811
		Adj-CLT UCL (Adjusted for skewness)	15.17943
		Mod-t UCL (Adjusted for skewness)	15.46633
		Jackknife UCL	15.03562
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	22.44486
		97.5% Chebyshev (Mean, Sd) UCL	29.41285
		99% Chebyshev (Mean, Sd) UCL	43.10011

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t			Variable:	_11		
1,2,3,7,8,9-HxCDD							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.699058
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.159	Data not normal at 5% significance level			
Maximum			41.4				
Mean			11.94475	95% UCL (Assuming Normal Distribution)			
Median			3.11	Student's-t UCL			35.11435
Standard Deviation			19.69063				
Variance			387.7207	Gamma Distribution Test			
Coefficient of Variation			1.648475	A-D Test Statistic			0.329856
Skewness			1.966971	A-D 5% Critical Value			0.687149
				K-S Test Statistic			0.305708
Gamma Statistics				K-S 5% Critical Value			0.412358
k hat			0.446263	Data follow gamma distribution			
k star (bias corrected)			0.278232	at 5% significance level			
Theta hat			26.76616				
Theta star			42.93083	95% UCLs (Assuming Gamma Distribution)			
nu hat			3.570105	Approximate Gamma UCL			143.2479
nu star			2.225859	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.185604				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.967124
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.838851				
Maximum of log data			3.723281	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			1.03133	95% H-UCL			1.3E+13
Standard Deviation of log data			2.277235	95% Chebyshev (MVUE) UCL			57.02209
Variance of log data			5.1858	97.5% Chebyshev (MVUE) UCL			76.29332
				99% Chebyshev (MVUE) UCL			114.1479
				95% Non-parametric UCLs			
				CLT UCL			28.13885
				Adj-CLT UCL (Adjusted for skewness)			38.48498
				Mod-t UCL (Adjusted for skewness)			36.72813
				Jackknife UCL			35.11435
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Adjusted Gamma UCL not available				95% Chebyshev (Mean, Sd) UCL			54.85947
try Approximate Gamma UCL				97.5% Chebyshev (Mean, Sd) UCL			73.42871
				99% Chebyshev (Mean, Sd) UCL			109.9044
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t			Variable:	_12		
1,2,3,7,8,9-HxCDF							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.71327
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.248	Data not normal at 5% significance level			
Maximum			8.75				
Mean			2.6795	95% UCL (Assuming Normal Distribution)			
Median			0.86	Student's-t UCL			7.462896
Standard Deviation			4.065158				
Variance			16.52551	Gamma Distribution Test			
Coefficient of Variation			1.517133	A-D Test Statistic			0.425927
Skewness			1.94736	A-D 5% Critical Value			0.673545
				K-S Test Statistic			0.317324
Gamma Statistics				K-S 5% Critical Value			0.406602
k hat			0.673529	Data follow gamma distribution			
k star (bias corrected)			0.335049	at 5% significance level			
Theta hat			3.978298				
Theta star			7.997338	95% UCLs (Assuming Gamma Distribution)			
nu hat			5.388234	Approximate Gamma UCL			25.26651
nu star			2.680392	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.284254				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.94706
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.394327				
Maximum of log data			2.169054	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			0.083473	95% H-UCL			569084
Standard Deviation of log data			1.527867	95% Chebyshev (MVUE) UCL			8.874865
Variance of log data			2.334376	97.5% Chebyshev (MVUE) UCL			11.7102
				99% Chebyshev (MVUE) UCL			17.27968
				95% Non-parametric UCLs			
				CLT UCL			6.022795
				Adj-CLT UCL (Adjusted for skewness)			8.137472
				Mod-t UCL (Adjusted for skewness)			7.792743
				Jackknife UCL			7.462896
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			11.53931
				97.5% Chebyshev (Mean, Sd) UCL			15.37295
				99% Chebyshev (Mean, Sd) UCL			22.9034
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t			Variable:	_13		
1,2,3,7,8-PeCDD							
Raw Statistics				Normal Distribution Test			
Number of Valid Samples			4	Shapiro-Wilk Test Statisitic			0.667757
Number of Unique Samples			4	Shapiro-Wilk 5% Critical Value			0.748
Minimum			0.3125	Data not normal at 5% significance level			
Maximum			15.3				
Mean			4.333125	95% UCL (Assuming Normal Distribution)			
Median			0.86	Student's-t UCL			12.94305
Standard Deviation			7.317121				
Variance			53.54026	Gamma Distribution Test			
Coefficient of Variation			1.688648	A-D Test Statistic			0.584373
Skewness			1.990374	A-D 5% Critical Value			0.679179
				K-S Test Statistic			0.394865
Gamma Statistics				K-S 5% Critical Value			0.4094
k hat			0.540784	Data follow gamma distribution			
k star (bias corrected)			0.301863	at 5% significance level			
Theta hat			8.012667				
Theta star			14.35462	95% UCLs (Assuming Gamma Distribution)			
nu hat			4.326275	Approximate Gamma UCL			47.04652
nu star			2.414902	Adjusted Gamma UCL			N/A
Approx.Chi Square Value (.05)			0.22242				
Adjusted Level of Significance			N/A	Lognormal Distribution Test			
Adjusted Chi Square Value			N/A	Shapiro-Wilk Test Statisitic			0.877891
				Shapiro-Wilk 5% Critical Value			0.748
Log-transformed Statistics				Data are lognormal at 5% significance level			
Minimum of log data			-1.163151				
Maximum of log data			2.727853	95% UCLs (Assuming Lognormal Distribution)			
Mean of log data			0.305799	95% H-UCL			13023859
Standard Deviation of log data			1.689044	95% Chebyshev (MVUE) UCL			13.47895
Variance of log data			2.85287	97.5% Chebyshev (MVUE) UCL			17.85985
				99% Chebyshev (MVUE) UCL			26.46529
				95% Non-parametric UCLs			
				CLT UCL			10.35092
				Adj-CLT UCL (Adjusted for skewness)			14.24133
				Mod-t UCL (Adjusted for skewness)			13.54987
				Jackknife UCL			12.94305
				Standard Bootstrap UCL			N/R
				Bootstrap-t UCL			N/R
RECOMMENDATION				Hall's Bootstrap UCL			N/R
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL			N/R
				BCA Bootstrap UCL			N/R
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL			20.28042
				97.5% Chebyshev (Mean, Sd) UCL			27.18083
				99% Chebyshev (Mean, Sd) UCL			40.73534
Recommended UCL exceeds the maximum observation							

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_14
1,2,4-Trichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.287074
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.929
Minimum	2	Data not normal at 5% significance level	
Maximum	2100		
Mean	141.5968	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	296.9929
Standard Deviation	509.7678		
Variance	259863.2	Gamma Distribution Test	
Coefficient of Variation	3.600137	A-D Test Statistic	8.899836
Skewness	3.728568	A-D 5% Critical Value	0.868231
		K-S Test Statistic	0.473938
Gamma Statistics		K-S 5% Critical Value	0.172282
k hat	0.268173	Data do not follow gamma distribution	
k star (bias corrected)	0.263727	at 5% significance level	
Theta hat	528.0044		
Theta star	536.9075	95% UCLs (Assuming Gamma Distribution)	
nu hat	16.62675	Approximate Gamma UCL	282.0343
nu star	16.35105	Adjusted Gamma UCL	293.4968
Approx.Chi Square Value (.05)	8.209129		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	7.888519	Shapiro-Wilk Test Statisitic	0.543556
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	7.649693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.334264	95% H-UCL	84.41681
Standard Deviation of log data	1.553785	95% Chebyshev (MVUE) UCL	81.54268
Variance of log data	2.414247	97.5% Chebyshev (MVUE) UCL	103.0137
		99% Chebyshev (MVUE) UCL	145.1893
		95% Non-parametric UCLs	
		CLT UCL	292.1946
		Adj-CLT UCL (Adjusted for skewness)	357.7085
		Mod-t UCL (Adjusted for skewness)	307.2117
		Jackknife UCL	296.9929
		Standard Bootstrap UCL	287.1045
		Bootstrap-t UCL	6103.345
RECOMMENDATION		Hall's Bootstrap UCL	5981.128
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	279.7742
		BCA Bootstrap UCL	348.9032
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	540.6845
		97.5% Chebyshev (Mean, Sd) UCL	713.3701
		99% Chebyshev (Mean, Sd) UCL	1052.577

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_15
1,2-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.547463
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	110000		
Mean	10895.74	95% UCL (Assuming Normal Distribution)	
Median	8	Student's-t UCL	18078.81
Standard Deviation	23563.64		
Variance	5.55E+08	Gamma Distribution Test	
Coefficient of Variation	2.162646	A-D Test Statistic	4.12225
Skewness	3.008175	A-D 5% Critical Value	0.917057
		K-S Test Statistic	0.348958
Gamma Statistics		K-S 5% Critical Value	0.176057
k hat	0.162983	Data do not follow gamma distribution	
k star (bias corrected)	0.168716	at 5% significance level	
Theta hat	66851.99		
Theta star	64580.41	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.10495	Approximate Gamma UCL	26940.05
nu star	10.46039	Adjusted Gamma UCL	28409.67
Approx.Chi Square Value (.05)	4.230641		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	4.011792	Shapiro-Wilk Test Statisitic	0.706001
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	11.60824	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.637634	95% H-UCL	23796662
Standard Deviation of log data	3.877628	95% Chebyshev (MVUE) UCL	240672.8
Variance of log data	15.036	97.5% Chebyshev (MVUE) UCL	323379.3
		99% Chebyshev (MVUE) UCL	485840.2
		95% Non-parametric UCLs	
		CLT UCL	17857.02
		Adj-CLT UCL (Adjusted for skewness)	20300.24
		Mod-t UCL (Adjusted for skewness)	18459.9
		Jackknife UCL	18078.81
		Standard Bootstrap UCL	17806.31
		Bootstrap-t UCL	24107.74
RECOMMENDATION		Hall's Bootstrap UCL	39603.63
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	18025.29
		BCA Bootstrap UCL	20844.32
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	29343.27
		97.5% Chebyshev (Mean, Sd) UCL	37325.54
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	53005.14
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_16
1,2-Dichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.205613
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	220		
Mean	13.22581	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	24.93275
Standard Deviation	38.40396		
Variance	1474.864	Gamma Distribution Test	
Coefficient of Variation	2.903714	A-D Test Statistic	9.517883
Skewness	5.554814	A-D 5% Critical Value	0.779883
		K-S Test Statistic	0.447357
Gamma Statistics		K-S 5% Critical Value	0.162971
k hat	0.911001	Data do not follow gamma distribution	
k star (bias corrected)	0.844345	at 5% significance level	
Theta hat	14.51789		
Theta star	15.66399	95% UCLs (Assuming Gamma Distribution)	
nu hat	56.48205	Approximate Gamma UCL	18.85153
nu star	52.34938	Adjusted Gamma UCL	19.23281
Approx.Chi Square Value (.05)	36.72714		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	35.99904	Shapiro-Wilk Test Statisitic	0.372647
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	5.393628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.941412	95% H-UCL	11.19229
Standard Deviation of log data	0.666331	95% Chebyshev (MVUE) UCL	13.4666
Variance of log data	0.443996	97.5% Chebyshev (MVUE) UCL	15.56095
		99% Chebyshev (MVUE) UCL	19.67489
		95% Non-parametric UCLs	
		CLT UCL	24.57127
		Adj-CLT UCL (Adjusted for skewness)	31.92427
		Mod-t UCL (Adjusted for skewness)	26.07967
		Jackknife UCL	24.93275
		Standard Bootstrap UCL	24.40321
		Bootstrap-t UCL	378.5169
RECOMMENDATION		Hall's Bootstrap UCL	169.7337
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	26.95161
		BCA Bootstrap UCL	34.25806
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	43.29155
		97.5% Chebyshev (Mean, Sd) UCL	56.30102
		99% Chebyshev (Mean, Sd) UCL	81.85561

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_17
1,3-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.247825
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	3800		
Mean	162.371	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	370.2654
Standard Deviation	681.9856		
Variance	465104.3	Gamma Distribution Test	
Coefficient of Variation	4.200169	A-D Test Statistic	6.521121
Skewness	5.401582	A-D 5% Critical Value	0.859579
		K-S Test Statistic	0.385237
Gamma Statistics		K-S 5% Critical Value	0.171584
k hat	0.287984	Data do not follow gamma distribution	
k star (bias corrected)	0.28162	at 5% significance level	
Theta hat	563.8203		
Theta star	576.5614	95% UCLs (Assuming Gamma Distribution)	
nu hat	17.85498	Approximate Gamma UCL	314.9816
nu star	17.46041	Adjusted Gamma UCL	327.2599
Approx.Chi Square Value (.05)	9.000729		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	8.663034	Shapiro-Wilk Test Statisitic	0.668513
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	8.242756	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.679407	95% H-UCL	148.4707
Standard Deviation of log data	1.638215	95% Chebyshev (MVUE) UCL	135.4267
Variance of log data	2.683747	97.5% Chebyshev (MVUE) UCL	171.9979
		99% Chebyshev (MVUE) UCL	243.8348
		95% Non-parametric UCLs	
		CLT UCL	363.8462
		Adj-CLT UCL (Adjusted for skewness)	490.8202
		Mod-t UCL (Adjusted for skewness)	390.0708
		Jackknife UCL	370.2654
		Standard Bootstrap UCL	361.1718
		Bootstrap-t UCL	2652.969
RECOMMENDATION		Hall's Bootstrap UCL	1562.607
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	401.3387
		BCA Bootstrap UCL	545.4839
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	696.2847
		97.5% Chebyshev (Mean, Sd) UCL	927.3097
		99% Chebyshev (Mean, Sd) UCL	1381.113

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_18
1,4-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.32449
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.929
Minimum	4	Data not normal at 5% significance level	
Maximum	44000		
Mean	2384.226	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	4972.474
Standard Deviation	8490.598		
Variance	72090259	Gamma Distribution Test	
Coefficient of Variation	3.561155	A-D Test Statistic	5.591422
Skewness	4.444253	A-D 5% Critical Value	0.910663
		K-S Test Statistic	0.348817
Gamma Statistics		K-S 5% Critical Value	0.175597
k hat	0.175408	Data do not follow gamma distribution	
k star (bias corrected)	0.179938	at 5% significance level	
Theta hat	13592.46		
Theta star	13250.23	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.8753	Approximate Gamma UCL	5688.741
nu star	11.15618	Adjusted Gamma UCL	5985.822
Approx.Chi Square Value (.05)	4.675702		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	4.443643	Shapiro-Wilk Test Statisitic	0.723004
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.386294		
Maximum of log data	10.69194	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.495614	95% H-UCL	16431.23
Standard Deviation of log data	2.733643	95% Chebyshev (MVUE) UCL	3521.271
Variance of log data	7.472806	97.5% Chebyshev (MVUE) UCL	4661.128
		99% Chebyshev (MVUE) UCL	6900.158
		95% Non-parametric UCLs	
		CLT UCL	4892.556
		Adj-CLT UCL (Adjusted for skewness)	6193.192
		Mod-t UCL (Adjusted for skewness)	5175.347
		Jackknife UCL	4972.474
		Standard Bootstrap UCL	4772.402
		Bootstrap-t UCL	19553.39
RECOMMENDATION		Hall's Bootstrap UCL	17446.35
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5168.242
		BCA Bootstrap UCL	7275.371
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9031.357
		97.5% Chebyshev (Mean, Sd) UCL	11907.58
		99% Chebyshev (Mean, Sd) UCL	17557.35

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_19
1,4-Dioxane (p-dioxane)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.53176
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	125	Data not normal at 5% significance level	
Maximum	1500		
Mean	340	95% UCL (Assuming Normal Distribution)	
Median	232.5	Student's-t UCL	580.5735
Standard Deviation	415.01		
Variance	172233.3	Gamma Distribution Test	
Coefficient of Variation	1.220618	A-D Test Statistic	1.202123
Skewness	2.955155	A-D 5% Critical Value	0.738555
		K-S Test Statistic	0.338842
Gamma Statistics		K-S 5% Critical Value	0.270878
k hat	1.592511	Data do not follow gamma distribution	
k star (bias corrected)	1.181424	at 5% significance level	
Theta hat	213.4993		
Theta star	287.7883	95% UCLs (Assuming Gamma Distribution)	
nu hat	31.85021	Approximate Gamma UCL	592.2458
nu star	23.62848	Adjusted Gamma UCL	655.3773
Approx.Chi Square Value (.05)	13.56478		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	12.25811	Shapiro-Wilk Test Statisitic	0.793376
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.828314		
Maximum of log data	7.31322	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.483232	95% H-UCL	612.6761
Standard Deviation of log data	0.749294	95% Chebyshev (MVUE) UCL	637.1551
Variance of log data	0.561442	97.5% Chebyshev (MVUE) UCL	779.546
		99% Chebyshev (MVUE) UCL	1059.245
		95% Non-parametric UCLs	
		CLT UCL	555.8668
		Adj-CLT UCL (Adjusted for skewness)	686.9114
		Mod-t UCL (Adjusted for skewness)	601.0138
		Jackknife UCL	580.5735
		Standard Bootstrap UCL	546.3989
		Bootstrap-t UCL	1221.937
RECOMMENDATION		Hall's Bootstrap UCL	1446.674
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	591.5
		BCA Bootstrap UCL	692.5
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	912.0519
		97.5% Chebyshev (Mean, Sd) UCL	1159.579
		99% Chebyshev (Mean, Sd) UCL	1645.799

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_20
2,3,4,6,7,8-HxCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.870196
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.141	Data are normal at 5% significance level	
Maximum	16.9		
Mean	6.15025	95% UCL (Assuming Normal Distribution)	
Median	3.78	Student's-t UCL	15.07734
Standard Deviation	7.586668		
Variance	57.55752	Gamma Distribution Test	
Coefficient of Variation	1.233554	A-D Test Statistic	0.192993
Skewness	1.41849	A-D 5% Critical Value	0.676865
		K-S Test Statistic	0.163555
Gamma Statistics		K-S 5% Critical Value	0.408251
k hat	0.595305	Data follow gamma distribution	
k star (bias corrected)	0.315493	at 5% significance level	
Theta hat	10.33127		
Theta star	19.49411	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.762436	Approximate Gamma UCL	62.98143
nu star	2.523942	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.246468		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.962883
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.958995		
Maximum of log data	2.827314	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.777371	95% H-UCL	6.05E+10
Standard Deviation of log data	2.067368	95% Chebyshev (MVUE) UCL	34.22544
Variance of log data	4.274012	97.5% Chebyshev (MVUE) UCL	45.66856
		99% Chebyshev (MVUE) UCL	68.14637
		95% Non-parametric UCLs	
		CLT UCL	12.38973
		Adj-CLT UCL (Adjusted for skewness)	15.26446
		Mod-t UCL (Adjusted for skewness)	15.52574
		Jackknife UCL	15.07734
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	22.68501
		97.5% Chebyshev (Mean, Sd) UCL	29.83961
		99% Chebyshev (Mean, Sd) UCL	43.89344

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_21
2,3,4,7,8-PeCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.777852
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.1745	Data are normal at 5% significance level	
Maximum	42.4		
Mean	13.94863	95% UCL (Assuming Normal Distribution)	
Median	6.61	Student's-t UCL	36.57404
Standard Deviation	19.22815		
Variance	369.7218	Gamma Distribution Test	
Coefficient of Variation	1.378498	A-D Test Statistic	0.266951
Skewness	1.835928	A-D 5% Critical Value	0.679792
		K-S Test Statistic	0.216992
Gamma Statistics		K-S 5% Critical Value	0.409705
k hat	0.526341	Data follow gamma distribution	
k star (bias corrected)	0.298252	at 5% significance level	
Theta hat	26.50112		
Theta star	46.76793	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.210728	Approximate Gamma UCL	153.8093
nu star	2.386015	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.216383		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.921862
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.745831		
Maximum of log data	3.747148	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.438108	95% H-UCL	3.74E+13
Standard Deviation of log data	2.302476	95% Chebyshev (MVUE) UCL	88.33509
Variance of log data	5.301396	97.5% Chebyshev (MVUE) UCL	118.2223
		99% Chebyshev (MVUE) UCL	176.93
		95% Non-parametric UCLs	
		CLT UCL	29.76237
		Adj-CLT UCL (Adjusted for skewness)	39.19241
		Mod-t UCL (Adjusted for skewness)	38.04493
		Jackknife UCL	36.57404
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	55.85541
		97.5% Chebyshev (Mean, Sd) UCL	73.98851
		99% Chebyshev (Mean, Sd) UCL	109.6075

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_22
2,3,7,8-TCDF			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	4	Shapiro-Wilk Test Statisitic	0.769885
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.748
Minimum	0.158	Data are normal at 5% significance level	
Maximum	5.36		
Mean	1.774875	95% UCL (Assuming Normal Distribution)	
Median	0.79075	Student's-t UCL	4.625608
Standard Deviation	2.422688		
Variance	5.869417	Gamma Distribution Test	
Coefficient of Variation	1.364991	A-D Test Statistic	0.295027
Skewness	1.844616	A-D 5% Critical Value	0.670036
		K-S Test Statistic	0.244322
Gamma Statistics		K-S 5% Critical Value	0.404809
k hat	0.767855	Data follow gamma distribution	
k star (bias corrected)	0.35863	at 5% significance level	
Theta hat	2.311471		
Theta star	4.949036	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.14284	Approximate Gamma UCL	15.22127
nu star	2.869043	Adjusted Gamma UCL	N/A
Approx.Chi Square Value (.05)	0.334545		
Adjusted Level of Significance	N/A	Lognormal Distribution Test	
Adjusted Chi Square Value	N/A	Shapiro-Wilk Test Statisitic	0.991998
		Shapiro-Wilk 5% Critical Value	0.748
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.84516		
Maximum of log data	1.678964	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.203418	95% H-UCL	214298
Standard Deviation of log data	1.487074	95% Chebyshev (MVUE) UCL	6.339781
Variance of log data	2.21139	97.5% Chebyshev (MVUE) UCL	8.355081
		99% Chebyshev (MVUE) UCL	12.31375
		95% Non-parametric UCLs	
		CLT UCL	3.767359
		Adj-CLT UCL (Adjusted for skewness)	4.961137
		Mod-t UCL (Adjusted for skewness)	4.811813
		Jackknife UCL	4.625608
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.055001
		97.5% Chebyshev (Mean, Sd) UCL	9.339716
		99% Chebyshev (Mean, Sd) UCL	13.8276

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_23
2-Methylnapthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.650495
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.93
Minimum	130	Data not normal at 5% significance level	
Maximum	550000		
Mean	101729.7	95% UCL (Assuming Normal Distribution)	
Median	485	Student's-t UCL	152848.7
Standard Deviation	170551.3		
Variance	2.91E+10	Gamma Distribution Test	
Coefficient of Variation	1.676515	A-D Test Statistic	3.18162
Skewness	1.621179	A-D 5% Critical Value	0.891466
		K-S Test Statistic	0.325643
Gamma Statistics		K-S 5% Critical Value	0.171628
k hat	0.215898	Data do not follow gamma distribution	
k star (bias corrected)	0.216491	at 5% significance level	
Theta hat	471193.7		
Theta star	469903.2	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.81746	Approximate Gamma UCL	217807.3
nu star	13.85541	Adjusted Gamma UCL	227282.2
Approx.Chi Square Value (.05)	6.471345		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	6.201569	Shapiro-Wilk Test Statisitic	0.759792
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	13.21767	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.162128	95% H-UCL	35650269
Standard Deviation of log data	3.358778	95% Chebyshev (MVUE) UCL	1935625
Variance of log data	11.28139	97.5% Chebyshev (MVUE) UCL	2587705
		99% Chebyshev (MVUE) UCL	3868590
		95% Non-parametric UCLs	
		CLT UCL	151321.2
		Adj-CLT UCL (Adjusted for skewness)	160553.6
		Mod-t UCL (Adjusted for skewness)	154288.8
		Jackknife UCL	152848.7
		Standard Bootstrap UCL	151251.7
		Bootstrap-t UCL	169603.6
RECOMMENDATION		Hall's Bootstrap UCL	154826.4
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	151218.4
		BCA Bootstrap UCL	167861.1
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	233148.3
		97.5% Chebyshev (Mean, Sd) UCL	290013.3
		99% Chebyshev (Mean, Sd) UCL	401713.4

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_24
2-Methylphenol			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.719553
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2570.938	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3532.937
Standard Deviation	3209.572		
Variance	10301356	Gamma Distribution Test	
Coefficient of Variation	1.248405	A-D Test Statistic	3.280955
Skewness	1.035068	A-D 5% Critical Value	0.803902
		K-S Test Statistic	0.246426
Gamma Statistics		K-S 5% Critical Value	0.163571
k hat	0.571599	Data do not follow gamma distribution	
k star (bias corrected)	0.538845	at 5% significance level	
Theta hat	4497.802		
Theta star	4771.204	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.58231	Approximate Gamma UCL	4020.743
nu star	34.48605	Adjusted Gamma UCL	4120.364
Approx.Chi Square Value (.05)	22.05102		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.51788	Shapiro-Wilk Test Statisitic	0.778723
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.763244	95% H-UCL	7651.937
Standard Deviation of log data	1.59131	95% Chebyshev (MVUE) UCL	7308.164
Variance of log data	2.532269	97.5% Chebyshev (MVUE) UCL	9245.893
		99% Chebyshev (MVUE) UCL	13052.19
		95% Non-parametric UCLs	
		CLT UCL	3504.191
		Adj-CLT UCL (Adjusted for skewness)	3615.12
		Mod-t UCL (Adjusted for skewness)	3550.239
		Jackknife UCL	3532.937
		Standard Bootstrap UCL	3492.868
		Bootstrap-t UCL	3726.03
RECOMMENDATION		Hall's Bootstrap UCL	3581.634
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3541.406
		BCA Bootstrap UCL	3649.063
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5044.079
		97.5% Chebyshev (Mean, Sd) UCL	6114.21
		99% Chebyshev (Mean, Sd) UCL	8216.274

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_25
4,4'-DDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.659809
Number of Unique Samples	29	Shapiro-Wilk 5% Critical Value	0.929
Minimum	0.55	Data not normal at 5% significance level	
Maximum	34000		
Mean	4483.912	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	6811.777
Standard Deviation	7636.426		
Variance	58314995	Gamma Distribution Test	
Coefficient of Variation	1.703072	A-D Test Statistic	1.133076
Skewness	2.419764	A-D 5% Critical Value	0.886456
		K-S Test Statistic	0.195789
Gamma Statistics		K-S 5% Critical Value	0.173753
k hat	0.226447	Data do not follow gamma distribution	
k star (bias corrected)	0.226039	at 5% significance level	
Theta hat	19801.12		
Theta star	19836.94	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.03974	Approximate Gamma UCL	9549.957
nu star	14.01439	Adjusted Gamma UCL	9978.696
Approx.Chi Square Value (.05)	6.580059		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	6.297344	Shapiro-Wilk Test Statisitic	0.891995
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.597837		
Maximum of log data	10.43412	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.221429	95% H-UCL	12259270
Standard Deviation of log data	3.674064	95% Chebyshev (MVUE) UCL	241046.1
Variance of log data	13.49875	97.5% Chebyshev (MVUE) UCL	323364
		99% Chebyshev (MVUE) UCL	485061.8
		95% Non-parametric UCLs	
		CLT UCL	6739.899
		Adj-CLT UCL (Adjusted for skewness)	7376.814
		Mod-t UCL (Adjusted for skewness)	6911.123
		Jackknife UCL	6811.777
		Standard Bootstrap UCL	6685.117
		Bootstrap-t UCL	8090.831
RECOMMENDATION		Hall's Bootstrap UCL	8330.789
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6718.392
		BCA Bootstrap UCL	7343.934
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	10462.33
		97.5% Chebyshev (Mean, Sd) UCL	13049.19
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	18130.59
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_26
4,4'-DDE			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.690281
Number of Unique Samples	28	Shapiro-Wilk 5% Critical Value	0.929
Minimum	1.6	Data not normal at 5% significance level	
Maximum	10000		
Mean	1456.039	95% UCL (Assuming Normal Distribution)	
Median	86	Student's-t UCL	2169.244
Standard Deviation	2339.628		
Variance	5473861	Gamma Distribution Test	
Coefficient of Variation	1.606845	A-D Test Statistic	1.206601
Skewness	2.188413	A-D 5% Critical Value	0.863806
		K-S Test Statistic	0.20103
Gamma Statistics		K-S 5% Critical Value	0.171925
k hat	0.278305	Data do not follow gamma distribution	
k star (bias corrected)	0.272878	at 5% significance level	
Theta hat	5231.811		
Theta star	5335.868	95% UCLs (Assuming Gamma Distribution)	
nu hat	17.25491	Approximate Gamma UCL	2860.196
nu star	16.91841	Adjusted Gamma UCL	2973.943
Approx.Chi Square Value (.05)	8.612646		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	8.283231	Shapiro-Wilk Test Statisitic	0.882228
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	9.21034	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.775247	95% H-UCL	228864.1
Standard Deviation of log data	3.023435	95% Chebyshev (MVUE) UCL	26411.67
Variance of log data	9.141161	97.5% Chebyshev (MVUE) UCL	35152.61
		99% Chebyshev (MVUE) UCL	52322.5
		95% Non-parametric UCLs	
		CLT UCL	2147.222
		Adj-CLT UCL (Adjusted for skewness)	2323.702
		Mod-t UCL (Adjusted for skewness)	2196.771
		Jackknife UCL	2169.244
		Standard Bootstrap UCL	2153.767
		Bootstrap-t UCL	2523.671
RECOMMENDATION		Hall's Bootstrap UCL	2575.109
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2149.569
		BCA Bootstrap UCL	2271.173
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3287.69
		97.5% Chebyshev (Mean, Sd) UCL	4080.247
		99% Chebyshev (Mean, Sd) UCL	5637.072

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_27
4,4'-DDT			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.506516
Number of Unique Samples	27	Shapiro-Wilk 5% Critical Value	0.929
Minimum	1.5	Data not normal at 5% significance level	
Maximum	560		
Mean	51.39839	95% UCL (Assuming Normal Distribution)	
Median	12	Student's-t UCL	84.7918
Standard Deviation	109.5452		
Variance	12000.14	Gamma Distribution Test	
Coefficient of Variation	2.131296	A-D Test Statistic	2.00108
Skewness	3.697269	A-D 5% Critical Value	0.824619
		K-S Test Statistic	0.194688
Gamma Statistics		K-S 5% Critical Value	0.168234
k hat	0.433348	Data do not follow gamma distribution	
k star (bias corrected)	0.412917	at 5% significance level	
Theta hat	118.6076		
Theta star	124.4764	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.8676	Approximate Gamma UCL	87.3121
nu star	25.60084	Adjusted Gamma UCL	89.99791
Approx.Chi Square Value (.05)	15.07056		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	14.6208	Shapiro-Wilk Test Statisitic	0.892085
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.405465		
Maximum of log data	6.327937	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.440478	95% H-UCL	158.7772
Standard Deviation of log data	1.74917	95% Chebyshev (MVUE) UCL	132.8205
Variance of log data	3.059597	97.5% Chebyshev (MVUE) UCL	169.7675
		99% Chebyshev (MVUE) UCL	242.3425
		95% Non-parametric UCLs	
		CLT UCL	83.7607
		Adj-CLT UCL (Adjusted for skewness)	97.72094
		Mod-t UCL (Adjusted for skewness)	86.96932
		Jackknife UCL	84.7918
		Standard Bootstrap UCL	83.10107
		Bootstrap-t UCL	120.7309
RECOMMENDATION		Hall's Bootstrap UCL	195.442
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	87.78548
		BCA Bootstrap UCL	100.8306
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	137.1592
		97.5% Chebyshev (Mean, Sd) UCL	174.268
		99% Chebyshev (Mean, Sd) UCL	247.1611

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_28
4-Chloro-3-methylphenol			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.73095
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2608.75	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3570.135
Standard Deviation	3207.524		
Variance	10288210	Gamma Distribution Test	
Coefficient of Variation	1.229525	A-D Test Statistic	3.175375
Skewness	1.016088	A-D 5% Critical Value	0.803558
		K-S Test Statistic	0.249848
Gamma Statistics		K-S 5% Critical Value	0.163529
k hat	0.575395	Data do not follow gamma distribution	
k star (bias corrected)	0.542285	at 5% significance level	
Theta hat	4533.841		
Theta star	4810.66	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.82529	Approximate Gamma UCL	4073.349
nu star	34.70625	Adjusted Gamma UCL	4173.896
Approx.Chi Square Value (.05)	22.2274		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.69195	Shapiro-Wilk Test Statisitic	0.779668
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.786099	95% H-UCL	7990.752
Standard Deviation of log data	1.599252	95% Chebyshev (MVUE) UCL	7592.298
Variance of log data	2.557606	97.5% Chebyshev (MVUE) UCL	9610.214
		99% Chebyshev (MVUE) UCL	13574.02
		95% Non-parametric UCLs	
		CLT UCL	3541.407
		Adj-CLT UCL (Adjusted for skewness)	3650.233
		Mod-t UCL (Adjusted for skewness)	3587.11
		Jackknife UCL	3570.135
		Standard Bootstrap UCL	3513.703
		Bootstrap-t UCL	3743.014
RECOMMENDATION		Hall's Bootstrap UCL	3635.723
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3560.156
		BCA Bootstrap UCL	3685
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5080.313
		97.5% Chebyshev (Mean, Sd) UCL	6149.761
		99% Chebyshev (Mean, Sd) UCL	8250.483

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_29
4-Methylphenol			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.726905
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2355.625	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3254.029
Standard Deviation	2997.396		
Variance	8984385	Gamma Distribution Test	
Coefficient of Variation	1.272442	A-D Test Statistic	2.84358
Skewness	1.284025	A-D 5% Critical Value	0.801595
		K-S Test Statistic	0.24633
Gamma Statistics		K-S 5% Critical Value	0.163288
k hat	0.597072	Data do not follow gamma distribution	
k star (bias corrected)	0.56193	at 5% significance level	
Theta hat	3945.295		
Theta star	4192.028	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.2126	Approximate Gamma UCL	3645.75
nu star	35.9635	Adjusted Gamma UCL	3733.882
Approx.Chi Square Value (.05)	23.23707		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	22.68859	Shapiro-Wilk Test Statisitic	0.797543
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.72897	95% H-UCL	6504.833
Standard Deviation of log data	1.540681	95% Chebyshev (MVUE) UCL	6411.998
Variance of log data	2.373699	97.5% Chebyshev (MVUE) UCL	8085.329
		99% Chebyshev (MVUE) UCL	11372.26
		95% Non-parametric UCLs	
		CLT UCL	3227.183
		Adj-CLT UCL (Adjusted for skewness)	3355.697
		Mod-t UCL (Adjusted for skewness)	3274.075
		Jackknife UCL	3254.029
		Standard Bootstrap UCL	3197.098
		Bootstrap-t UCL	3452.927
RECOMMENDATION		Hall's Bootstrap UCL	3391.826
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3220.313
		BCA Bootstrap UCL	3343.906
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4665.274
		97.5% Chebyshev (Mean, Sd) UCL	5664.661
		99% Chebyshev (Mean, Sd) UCL	7627.763

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_30
Acenaphthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.746652
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2536.875	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3522.293
Standard Deviation	3287.707		
Variance	10809014	Gamma Distribution Test	
Coefficient of Variation	1.295967	A-D Test Statistic	2.550137
Skewness	1.291607	A-D 5% Critical Value	0.803403
		K-S Test Statistic	0.247176
Gamma Statistics		K-S 5% Critical Value	0.16351
k hat	0.577106	Data do not follow gamma distribution	
k star (bias corrected)	0.543835	at 5% significance level	
Theta hat	4395.859		
Theta star	4664.785	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.93476	Approximate Gamma UCL	3958.286
nu star	34.80546	Adjusted Gamma UCL	4055.829
Approx.Chi Square Value (.05)	22.3069		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.77042	Shapiro-Wilk Test Statisitic	0.806867
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.761841	95% H-UCL	7349.8
Standard Deviation of log data	1.576117	95% Chebyshev (MVUE) UCL	7088.334
Variance of log data	2.484146	97.5% Chebyshev (MVUE) UCL	8959.025
		99% Chebyshev (MVUE) UCL	12633.63
		95% Non-parametric UCLs	
		CLT UCL	3492.847
		Adj-CLT UCL (Adjusted for skewness)	3634.64
		Mod-t UCL (Adjusted for skewness)	3544.41
		Jackknife UCL	3522.293
		Standard Bootstrap UCL	3477.211
		Bootstrap-t UCL	3727.971
RECOMMENDATION		Hall's Bootstrap UCL	3573.263
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3467.031
		BCA Bootstrap UCL	3627.188
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5070.223
		97.5% Chebyshev (Mean, Sd) UCL	6166.405
		99% Chebyshev (Mean, Sd) UCL	8319.641

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_31
Acetone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.72022
Number of Unique Samples	26	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	860		
Mean	137.9194	95% UCL (Assuming Normal Distribution)	
Median	65	Student's-t UCL	193.8233
Standard Deviation	183.3895		
Variance	33631.7	Gamma Distribution Test	
Coefficient of Variation	1.329686	A-D Test Statistic	0.420337
Skewness	2.449189	A-D 5% Critical Value	0.793666
		K-S Test Statistic	0.121517
Gamma Statistics		K-S 5% Critical Value	0.164701
k hat	0.682975	Data follow gamma distribution	
k star (bias corrected)	0.638386	at 5% significance level	
Theta hat	201.9392		
Theta star	216.0439	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.34443	Approximate Gamma UCL	208.6331
nu star	39.57991	Adjusted Gamma UCL	213.5893
Approx.Chi Square Value (.05)	26.16477		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	25.55763	Shapiro-Wilk Test Statisitic	0.929009
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.756932	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.038738	95% H-UCL	432.4843
Standard Deviation of log data	1.525606	95% Chebyshev (MVUE) UCL	425.1505
Variance of log data	2.327475	97.5% Chebyshev (MVUE) UCL	536.094
		99% Chebyshev (MVUE) UCL	754.021
		95% Non-parametric UCLs	
		CLT UCL	192.0971
		Adj-CLT UCL (Adjusted for skewness)	207.5787
		Mod-t UCL (Adjusted for skewness)	196.2381
		Jackknife UCL	193.8233
		Standard Bootstrap UCL	191.3841
		Bootstrap-t UCL	219.7577
RECOMMENDATION		Hall's Bootstrap UCL	247.7327
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	195.0323
		BCA Bootstrap UCL	206.1935
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	281.4916
		97.5% Chebyshev (Mean, Sd) UCL	343.6154
		99% Chebyshev (Mean, Sd) UCL	465.6456

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_32
Acetophenone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.709814
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	14000		
Mean	2649.375	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3684.881
Standard Deviation	3454.819		
Variance	11935772	Gamma Distribution Test	
Coefficient of Variation	1.304013	A-D Test Statistic	3.191915
Skewness	1.409011	A-D 5% Critical Value	0.804858
		K-S Test Statistic	0.245426
Gamma Statistics		K-S 5% Critical Value	0.163688
k hat	0.561044	Data do not follow gamma distribution	
k star (bias corrected)	0.529279	at 5% significance level	
Theta hat	4722.224		
Theta star	5005.626	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.90681	Approximate Gamma UCL	4162.274
nu star	33.87388	Adjusted Gamma UCL	4266.495
Approx.Chi Square Value (.05)	21.56144		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.03474	Shapiro-Wilk Test Statisitic	0.784743
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.546813	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.769705	95% H-UCL	7916.832
Standard Deviation of log data	1.601997	95% Chebyshev (MVUE) UCL	7508.486
Variance of log data	2.566394	97.5% Chebyshev (MVUE) UCL	9505.777
		99% Chebyshev (MVUE) UCL	13429.07
		95% Non-parametric UCLs	
		CLT UCL	3653.939
		Adj-CLT UCL (Adjusted for skewness)	3816.483
		Mod-t UCL (Adjusted for skewness)	3710.235
		Jackknife UCL	3684.881
		Standard Bootstrap UCL	3620.932
		Bootstrap-t UCL	3907.114
RECOMMENDATION		Hall's Bootstrap UCL	3850.301
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3652.188
		BCA Bootstrap UCL	3867.188
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5311.492
		97.5% Chebyshev (Mean, Sd) UCL	6463.392
		99% Chebyshev (Mean, Sd) UCL	8726.076

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_33
Aldrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.327244
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.929
Minimum	0.83	Data not normal at 5% significance level	
Maximum	2400		
Mean	128.9494	95% UCL (Assuming Normal Distribution)	
Median	1.4	Student's-t UCL	264.5869
Standard Deviation	444.951		
Variance	197981.4	Gamma Distribution Test	
Coefficient of Variation	3.450587	A-D Test Statistic	3.91455
Skewness	4.804704	A-D 5% Critical Value	0.880763
		K-S Test Statistic	0.265628
Gamma Statistics		K-S 5% Critical Value	0.173294
k hat	0.239482	Data do not follow gamma distribution	
k star (bias corrected)	0.237811	at 5% significance level	
Theta hat	538.4521		
Theta star	542.2339	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.84786	Approximate Gamma UCL	268.4325
nu star	14.7443	Adjusted Gamma UCL	280.0925
Approx.Chi Square Value (.05)	7.082854		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	6.788001	Shapiro-Wilk Test Statisitic	0.823095
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.18633		
Maximum of log data	7.783224	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.87289	95% H-UCL	568.6498
Standard Deviation of log data	2.30825	95% Chebyshev (MVUE) UCL	251.5189
Variance of log data	5.328019	97.5% Chebyshev (MVUE) UCL	329.2014
		99% Chebyshev (MVUE) UCL	481.7935
		95% Non-parametric UCLs	
		CLT UCL	260.3987
		Adj-CLT UCL (Adjusted for skewness)	334.0869
		Mod-t UCL (Adjusted for skewness)	276.0807
		Jackknife UCL	264.5869
		Standard Bootstrap UCL	255.8514
		Bootstrap-t UCL	786.0668
RECOMMENDATION		Hall's Bootstrap UCL	747.511
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	280.8874
		BCA Bootstrap UCL	379.73
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	477.2932
		97.5% Chebyshev (Mean, Sd) UCL	628.0218
		99% Chebyshev (Mean, Sd) UCL	924.0991

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_34
Aluminum			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.939623
Number of Unique Samples	31	Shapiro-Wilk 5% Critical Value	0.93
Minimum	5400	Data are normal at 5% significance level	
Maximum	20700		
Mean	11175	95% UCL (Assuming Normal Distribution)	
Median	10900	Student's-t UCL	12450.54
Standard Deviation	4255.66		
Variance	18110645	Gamma Distribution Test	
Coefficient of Variation	0.38082	A-D Test Statistic	0.363827
Skewness	0.53186	A-D 5% Critical Value	0.747261
		K-S Test Statistic	0.101912
Gamma Statistics		K-S 5% Critical Value	0.155635
k hat	7.205604	Data follow gamma distribution	
k star (bias corrected)	6.550912	at 5% significance level	
Theta hat	1550.876		
Theta star	1705.869	95% UCLs (Assuming Gamma Distribution)	
nu hat	461.1587	Approximate Gamma UCL	12568.22
nu star	419.2584	Adjusted Gamma UCL	12647.6
Approx.Chi Square Value (.05)	372.7823		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	370.4427	Shapiro-Wilk Test Statisitic	0.955804
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.594154		
Maximum of log data	9.937889	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.250442	95% H-UCL	12741.62
Standard Deviation of log data	0.385767	95% Chebyshev (MVUE) UCL	14601.46
Variance of log data	0.148816	97.5% Chebyshev (MVUE) UCL	16079.57
		99% Chebyshev (MVUE) UCL	18983.05
		95% Non-parametric UCLs	
		CLT UCL	12412.43
		Adj-CLT UCL (Adjusted for skewness)	12488
		Mod-t UCL (Adjusted for skewness)	12462.33
		Jackknife UCL	12450.54
		Standard Bootstrap UCL	12364.48
		Bootstrap-t UCL	12628.51
RECOMMENDATION		Hall's Bootstrap UCL	12494.62
Data are normal (0.05)		Percentile Bootstrap UCL	12426.56
		BCA Bootstrap UCL	12403.13
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	14454.21
		97.5% Chebyshev (Mean, Sd) UCL	15873.12
		99% Chebyshev (Mean, Sd) UCL	18660.31

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_35
Anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.724719
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.93
Minimum	77	Data not normal at 5% significance level	
Maximum	11500		
Mean	2568.969	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3531.727
Standard Deviation	3212.106		
Variance	10317625	Gamma Distribution Test	
Coefficient of Variation	1.250348	A-D Test Statistic	2.931992
Skewness	1.032203	A-D 5% Critical Value	0.805346
		K-S Test Statistic	0.239253
Gamma Statistics		K-S 5% Critical Value	0.163747
k hat	0.555651	Data do not follow gamma distribution	
k star (bias corrected)	0.524392	at 5% significance level	
Theta hat	4623.353		
Theta star	4898.95	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.56164	Approximate Gamma UCL	4045.54
nu star	33.56107	Adjusted Gamma UCL	4147.393
Approx.Chi Square Value (.05)	21.3117		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	20.78832	Shapiro-Wilk Test Statisitic	0.824863
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.343805		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.726451	95% H-UCL	8368.261
Standard Deviation of log data	1.639689	95% Chebyshev (MVUE) UCL	7736.301
Variance of log data	2.688581	97.5% Chebyshev (MVUE) UCL	9817.143
		99% Chebyshev (MVUE) UCL	13904.55
		95% Non-parametric UCLs	
		CLT UCL	3502.959
		Adj-CLT UCL (Adjusted for skewness)	3613.668
		Mod-t UCL (Adjusted for skewness)	3548.996
		Jackknife UCL	3531.727
		Standard Bootstrap UCL	3486.012
		Bootstrap-t UCL	3712.753
RECOMMENDATION		Hall's Bootstrap UCL	3579.135
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3507.5
		BCA Bootstrap UCL	3609.531
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5044.063
		97.5% Chebyshev (Mean, Sd) UCL	6115.038
		99% Chebyshev (Mean, Sd) UCL	8218.761

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_36
Antimony			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.47384
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.93
Minimum	0.27	Data not normal at 5% significance level	
Maximum	49		
Mean	5.445938	95% UCL (Assuming Normal Distribution)	
Median	4.45	Student's-t UCL	8.032345
Standard Deviation	8.629176		
Variance	74.46268	Gamma Distribution Test	
Coefficient of Variation	1.584516	A-D Test Statistic	1.325744
Skewness	4.459291	A-D 5% Critical Value	0.779759
		K-S Test Statistic	0.234496
Gamma Statistics		K-S 5% Critical Value	0.1606
k hat	0.91396	Data do not follow gamma distribution	
k star (bias corrected)	0.84911	at 5% significance level	
Theta hat	5.958616		
Theta star	6.413703	95% UCLs (Assuming Gamma Distribution)	
nu hat	58.49345	Approximate Gamma UCL	7.706616
nu star	54.34302	Adjusted Gamma UCL	7.853462
Approx.Chi Square Value (.05)	38.4019		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	37.68385	Shapiro-Wilk Test Statisitic	0.91572
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.309333		
Maximum of log data	3.89182	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.056443	95% H-UCL	10.22064
Standard Deviation of log data	1.186642	95% Chebyshev (MVUE) UCL	11.76449
Variance of log data	1.408118	97.5% Chebyshev (MVUE) UCL	14.42624
		99% Chebyshev (MVUE) UCL	19.65473
		95% Non-parametric UCLs	
		CLT UCL	7.955059
		Adj-CLT UCL (Adjusted for skewness)	9.239948
		Mod-t UCL (Adjusted for skewness)	8.232761
		Jackknife UCL	8.032345
		Standard Bootstrap UCL	7.815598
		Bootstrap-t UCL	12.62173
RECOMMENDATION		Hall's Bootstrap UCL	19.52918
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8.354062
		BCA Bootstrap UCL	9.96875
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	12.09516
		97.5% Chebyshev (Mean, Sd) UCL	14.97229
		99% Chebyshev (Mean, Sd) UCL	20.62385

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_37
Aroclor-1260			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.494975
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.929
Minimum	17.5	Data not normal at 5% significance level	
Maximum	1950		
Mean	228.0968	95% UCL (Assuming Normal Distribution)	
Median	21.5	Student's-t UCL	376.4033
Standard Deviation	486.511		
Variance	236693	Gamma Distribution Test	
Coefficient of Variation	2.132915	A-D Test Statistic	4.148976
Skewness	2.879936	A-D 5% Critical Value	0.818358
		K-S Test Statistic	0.320335
Gamma Statistics		K-S 5% Critical Value	0.167618
k hat	0.461449	Data do not follow gamma distribution	
k star (bias corrected)	0.438298	at 5% significance level	
Theta hat	494.3053		
Theta star	520.4146	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.60985	Approximate Gamma UCL	380.6236
nu star	27.17449	Adjusted Gamma UCL	391.9177
Approx.Chi Square Value (.05)	16.28489		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	15.8156	Shapiro-Wilk Test Statisitic	0.754714
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	7.575585	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.03589	95% H-UCL	408.4479
Standard Deviation of log data	1.503596	95% Chebyshev (MVUE) UCL	406.8386
Variance of log data	2.2608	97.5% Chebyshev (MVUE) UCL	512.2376
		99% Chebyshev (MVUE) UCL	719.2736
		95% Non-parametric UCLs	
		CLT UCL	371.824
		Adj-CLT UCL (Adjusted for skewness)	420.1181
		Mod-t UCL (Adjusted for skewness)	383.9362
		Jackknife UCL	376.4033
		Standard Bootstrap UCL	367.0374
		Bootstrap-t UCL	534.5858
RECOMMENDATION		Hall's Bootstrap UCL	463.3998
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	382.4516
		BCA Bootstrap UCL	429.8065
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	608.9772
		97.5% Chebyshev (Mean, Sd) UCL	773.7844
		99% Chebyshev (Mean, Sd) UCL	1097.516

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_38
Arsenic			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.806166
Number of Unique Samples	27	Shapiro-Wilk 5% Critical Value	0.93
Minimum	1.3	Data not normal at 5% significance level	
Maximum	21		
Mean	6.465625	95% UCL (Assuming Normal Distribution)	
Median	4.8	Student's-t UCL	7.984999
Standard Deviation	5.069174		
Variance	25.69652	Gamma Distribution Test	
Coefficient of Variation	0.784019	A-D Test Statistic	0.871029
Skewness	1.456991	A-D 5% Critical Value	0.758644
		K-S Test Statistic	0.152835
Gamma Statistics		K-S 5% Critical Value	0.157494
k hat	2.054049	Data follow approximate gamma distibution	
k star (bias corrected)	1.882315	at 5% significance level	
Theta hat	3.147746		
Theta star	3.434932	95% UCLs (Assuming Gamma Distribution)	
nu hat	131.4592	Approximate Gamma UCL	8.103578
nu star	120.4682	Adjusted Gamma UCL	8.20288
Approx.Chi Square Value (.05)	96.11831		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	94.95472	Shapiro-Wilk Test Statisitic	0.95601
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.262364		
Maximum of log data	3.044522	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.603752	95% H-UCL	8.636297
Standard Deviation of log data	0.735531	95% Chebyshev (MVUE) UCL	10.43553
Variance of log data	0.541006	97.5% Chebyshev (MVUE) UCL	12.16096
		99% Chebyshev (MVUE) UCL	15.55023
		95% Non-parametric UCLs	
		CLT UCL	7.939598
		Adj-CLT UCL (Adjusted for skewness)	8.186216
		Mod-t UCL (Adjusted for skewness)	8.023466
		Jackknife UCL	7.984999
		Standard Bootstrap UCL	7.883356
		Bootstrap-t UCL	8.325424
RECOMMENDATION		Hall's Bootstrap UCL	8.191274
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	8.046875
		BCA Bootstrap UCL	8.18125
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	10.37169
		97.5% Chebyshev (Mean, Sd) UCL	12.06184
		99% Chebyshev (Mean, Sd) UCL	15.38182

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_39
Barium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.776213
Number of Unique Samples	31	Shapiro-Wilk 5% Critical Value	0.93
Minimum	46.8	Data not normal at 5% significance level	
Maximum	1460		
Mean	355.3281	95% UCL (Assuming Normal Distribution)	
Median	164.5	Student's-t UCL	466.8949
Standard Deviation	372.2267		
Variance	138552.7	Gamma Distribution Test	
Coefficient of Variation	1.047558	A-D Test Statistic	1.255225
Skewness	1.470894	A-D 5% Critical Value	0.772173
		K-S Test Statistic	0.187769
Gamma Statistics		K-S 5% Critical Value	0.159538
k hat	1.152622	Data do not follow gamma distribution	
k star (bias corrected)	1.065397	at 5% significance level	
Theta hat	308.278		
Theta star	333.517	95% UCLs (Assuming Gamma Distribution)	
nu hat	73.76783	Approximate Gamma UCL	482.8637
nu star	68.18543	Adjusted Gamma UCL	490.96
Approx.Chi Square Value (.05)	50.17606		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	49.34862	Shapiro-Wilk Test Statisitic	0.934263
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.845883		
Maximum of log data	7.286192	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.380198	95% H-UCL	555.0998
Standard Deviation of log data	1.002929	95% Chebyshev (MVUE) UCL	663.7274
Variance of log data	1.005866	97.5% Chebyshev (MVUE) UCL	799.0919
		99% Chebyshev (MVUE) UCL	1064.989
		95% Non-parametric UCLs	
		CLT UCL	463.5612
		Adj-CLT UCL (Adjusted for skewness)	481.843
		Mod-t UCL (Adjusted for skewness)	469.7465
		Jackknife UCL	466.8949
		Standard Bootstrap UCL	461.8284
		Bootstrap-t UCL	489.5407
RECOMMENDATION		Hall's Bootstrap UCL	483.55
Data are lognormal (0.05)		Percentile Bootstrap UCL	462.725
		BCA Bootstrap UCL	479.4156
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	642.1481
		97.5% Chebyshev (Mean, Sd) UCL	766.2553
		99% Chebyshev (Mean, Sd) UCL	1010.04

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_40
Benzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	31	Shapiro-Wilk Test Statisitic	0.41769
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.929
Minimum	5	Data not normal at 5% significance level	
Maximum	3500		
Mean	244.2419	95% UCL (Assuming Normal Distribution)	
Median	6.5	Student's-t UCL	445.4863
Standard Deviation	660.1702		
Variance	435824.7	Gamma Distribution Test	
Coefficient of Variation	2.702936	A-D Test Statistic	4.545612
Skewness	4.32556	A-D 5% Critical Value	0.856578
		K-S Test Statistic	0.357302
Gamma Statistics		K-S 5% Critical Value	0.171342
k hat	0.294852	Data do not follow gamma distribution	
k star (bias corrected)	0.287823	at 5% significance level	
Theta hat	828.3538		
Theta star	848.5823	95% UCLs (Assuming Gamma Distribution)	
nu hat	18.28084	Approximate Gamma UCL	469.7878
nu star	17.84506	Adjusted Gamma UCL	487.8501
Approx.Chi Square Value (.05)	9.277616		
Adjusted Level of Significance	0.0413	Lognormal Distribution Test	
Adjusted Chi Square Value	8.934119	Shapiro-Wilk Test Statisitic	0.725908
		Shapiro-Wilk 5% Critical Value	0.929
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	8.160518	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.152865	95% H-UCL	854.5737
Standard Deviation of log data	2.062359	95% Chebyshev (MVUE) UCL	521.925
Variance of log data	4.253326	97.5% Chebyshev (MVUE) UCL	677.0587
		99% Chebyshev (MVUE) UCL	981.7887
		95% Non-parametric UCLs	
		CLT UCL	439.2723
		Adj-CLT UCL (Adjusted for skewness)	537.7
		Mod-t UCL (Adjusted for skewness)	460.839
		Jackknife UCL	445.4863
		Standard Bootstrap UCL	437.936
		Bootstrap-t UCL	765.6845
RECOMMENDATION		Hall's Bootstrap UCL	1098.211
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	460.4194
		BCA Bootstrap UCL	605.0161
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	761.0769
		97.5% Chebyshev (Mean, Sd) UCL	984.7118
		99% Chebyshev (Mean, Sd) UCL	1423.999

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_41
Benzo(a)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.717346
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.93
Minimum	150	Data not normal at 5% significance level	
Maximum	11500		
Mean	2564.688	95% UCL (Assuming Normal Distribution)	
Median	510	Student's-t UCL	3527.471
Standard Deviation	3212.188		
Variance	10318153	Gamma Distribution Test	
Coefficient of Variation	1.252468	A-D Test Statistic	3.216511
Skewness	1.037968	A-D 5% Critical Value	0.803695
		K-S Test Statistic	0.258706
Gamma Statistics		K-S 5% Critical Value	0.163545
k hat	0.573883	Data do not follow gamma distribution	
k star (bias corrected)	0.540915	at 5% significance level	
Theta hat	4469.005		
Theta star	4741.386	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.72853	Approximate Gamma UCL	4007.096
nu star	34.61857	Adjusted Gamma UCL	4106.155
Approx.Chi Square Value (.05)	22.15715		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.62261	Shapiro-Wilk Test Statisitic	0.794315
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.010635		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.765791	95% H-UCL	7480.668
Standard Deviation of log data	1.581486	95% Chebyshev (MVUE) UCL	7189.935
Variance of log data	2.501099	97.5% Chebyshev (MVUE) UCL	9090.589
		99% Chebyshev (MVUE) UCL	12824.06
		95% Non-parametric UCLs	
		CLT UCL	3498.701
		Adj-CLT UCL (Adjusted for skewness)	3610.032
		Mod-t UCL (Adjusted for skewness)	3544.836
		Jackknife UCL	3527.471
		Standard Bootstrap UCL	3493.682
		Bootstrap-t UCL	3615.658
RECOMMENDATION		Hall's Bootstrap UCL	3576.59
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3507.5
		BCA Bootstrap UCL	3563.125
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5039.845
		97.5% Chebyshev (Mean, Sd) UCL	6110.847
		99% Chebyshev (Mean, Sd) UCL	8214.624

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_42
Benzo(a)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.723448
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.93
Minimum	130	Data not normal at 5% significance level	
Maximum	11500		
Mean	2579.063	95% UCL (Assuming Normal Distribution)	
Median	550	Student's-t UCL	3539.367
Standard Deviation	3203.917		
Variance	10265085	Gamma Distribution Test	
Coefficient of Variation	1.24228	A-D Test Statistic	3.008736
Skewness	1.036256	A-D 5% Critical Value	0.803251
		K-S Test Statistic	0.230517
Gamma Statistics		K-S 5% Critical Value	0.163491
k hat	0.57879	Data do not follow gamma distribution	
k star (bias corrected)	0.545362	at 5% significance level	
Theta hat	4455.952		
Theta star	4729.082	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.04259	Approximate Gamma UCL	4021.286
nu star	34.90318	Adjusted Gamma UCL	4120.219
Approx.Chi Square Value (.05)	22.38525		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.84774	Shapiro-Wilk Test Statisitic	0.808055
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.781936	95% H-UCL	7653.067
Standard Deviation of log data	1.584082	95% Chebyshev (MVUE) UCL	7343.413
Variance of log data	2.509317	97.5% Chebyshev (MVUE) UCL	9286.19
		99% Chebyshev (MVUE) UCL	13102.4
		95% Non-parametric UCLs	
		CLT UCL	3510.671
		Adj-CLT UCL (Adjusted for skewness)	3621.532
		Mod-t UCL (Adjusted for skewness)	3556.659
		Jackknife UCL	3539.367
		Standard Bootstrap UCL	3506.278
		Bootstrap-t UCL	3666.181
RECOMMENDATION		Hall's Bootstrap UCL	3593.836
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3565
		BCA Bootstrap UCL	3576.719
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5047.846
		97.5% Chebyshev (Mean, Sd) UCL	6116.091
		99% Chebyshev (Mean, Sd) UCL	8214.451

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_43
Benzo(b)fluroanthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.723305
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.93
Minimum	110	Data not normal at 5% significance level	
Maximum	11500		
Mean	2575.938	95% UCL (Assuming Normal Distribution)	
Median	510	Student's-t UCL	3536.901
Standard Deviation	3206.117		
Variance	10279185	Gamma Distribution Test	
Coefficient of Variation	1.244641	A-D Test Statistic	3.001241
Skewness	1.035739	A-D 5% Critical Value	0.803649
		K-S Test Statistic	0.228494
Gamma Statistics		K-S 5% Critical Value	0.16354
k hat	0.57439	Data do not follow gamma distribution	
k star (bias corrected)	0.541374	at 5% significance level	
Theta hat	4484.651		
Theta star	4758.148	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.76094	Approximate Gamma UCL	4023.815
nu star	34.64794	Adjusted Gamma UCL	4123.238
Approx.Chi Square Value (.05)	22.18067		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.64583	Shapiro-Wilk Test Statisitic	0.813296
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.70048		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.771267	95% H-UCL	7749.97
Standard Deviation of log data	1.59314	95% Chebyshev (MVUE) UCL	7392.999
Variance of log data	2.538095	97.5% Chebyshev (MVUE) UCL	9354.313
		99% Chebyshev (MVUE) UCL	13206.93
		95% Non-parametric UCLs	
		CLT UCL	3508.186
		Adj-CLT UCL (Adjusted for skewness)	3619.068
		Mod-t UCL (Adjusted for skewness)	3554.196
		Jackknife UCL	3536.901
		Standard Bootstrap UCL	3503.92
		Bootstrap-t UCL	3669.388
RECOMMENDATION		Hall's Bootstrap UCL	3568.471
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3507.656
		BCA Bootstrap UCL	3608.438
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5046.416
		97.5% Chebyshev (Mean, Sd) UCL	6115.395
		99% Chebyshev (Mean, Sd) UCL	8215.195

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_44
Benzo(g,h,i)perylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.721333
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2578.75	95% UCL (Assuming Normal Distribution)	
Median	515	Student's-t UCL	3539.063
Standard Deviation	3203.946		
Variance	10265268	Gamma Distribution Test	
Coefficient of Variation	1.242441	A-D Test Statistic	3.145211
Skewness	1.03666	A-D 5% Critical Value	0.80294
		K-S Test Statistic	0.231882
Gamma Statistics		K-S 5% Critical Value	0.163453
k hat	0.582223	Data do not follow gamma distribution	
k star (bias corrected)	0.548473	at 5% significance level	
Theta hat	4429.146		
Theta star	4701.692	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.26226	Approximate Gamma UCL	4015.09
nu star	35.10226	Adjusted Gamma UCL	4113.541
Approx.Chi Square Value (.05)	22.54494		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	22.00536	Shapiro-Wilk Test Statisitic	0.790373
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.789081	95% H-UCL	7486.823
Standard Deviation of log data	1.572671	95% Chebyshev (MVUE) UCL	7236.232
Variance of log data	2.473293	97.5% Chebyshev (MVUE) UCL	9143.912
		99% Chebyshev (MVUE) UCL	12891.18
		95% Non-parametric UCLs	
		CLT UCL	3510.367
		Adj-CLT UCL (Adjusted for skewness)	3621.272
		Mod-t UCL (Adjusted for skewness)	3556.362
		Jackknife UCL	3539.063
		Standard Bootstrap UCL	3469.288
		Bootstrap-t UCL	3717.739
RECOMMENDATION		Hall's Bootstrap UCL	3590.073
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3506.563
		BCA Bootstrap UCL	3665.313
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5047.556
		97.5% Chebyshev (Mean, Sd) UCL	6115.81
		99% Chebyshev (Mean, Sd) UCL	8214.189

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_45
Benzo(k)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.722822
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.93
Minimum	130	Data not normal at 5% significance level	
Maximum	11500		
Mean	2576.875	95% UCL (Assuming Normal Distribution)	
Median	515	Student's-t UCL	3537.625
Standard Deviation	3205.406		
Variance	10274627	Gamma Distribution Test	
Coefficient of Variation	1.243912	A-D Test Statistic	3.039824
Skewness	1.036016	A-D 5% Critical Value	0.803414
		K-S Test Statistic	0.229621
Gamma Statistics		K-S 5% Critical Value	0.163511
k hat	0.576983	Data do not follow gamma distribution	
k star (bias corrected)	0.543724	at 5% significance level	
Theta hat	4466.119		
Theta star	4739.305	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.92692	Approximate Gamma UCL	4020.904
nu star	34.79835	Adjusted Gamma UCL	4120.002
Approx.Chi Square Value (.05)	22.30121		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.7648	Shapiro-Wilk Test Statisitic	0.806262
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.777222	95% H-UCL	7655.528
Standard Deviation of log data	1.586048	95% Chebyshev (MVUE) UCL	7336.501
Variance of log data	2.515548	97.5% Chebyshev (MVUE) UCL	9278.619
		99% Chebyshev (MVUE) UCL	13093.53
		95% Non-parametric UCLs	
		CLT UCL	3508.917
		Adj-CLT UCL (Adjusted for skewness)	3619.803
		Mod-t UCL (Adjusted for skewness)	3554.921
		Jackknife UCL	3537.625
		Standard Bootstrap UCL	3474.149
		Bootstrap-t UCL	3709.778
RECOMMENDATION		Hall's Bootstrap UCL	3551.699
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3511.094
		BCA Bootstrap UCL	3600.781
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5046.806
		97.5% Chebyshev (Mean, Sd) UCL	6115.547
		99% Chebyshev (Mean, Sd) UCL	8214.882

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_46
Benzyl butyl phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.736006
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2777.5	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3771.249
Standard Deviation	3315.5		
Variance	10992540	Gamma Distribution Test	
Coefficient of Variation	1.193699	A-D Test Statistic	3.404485
Skewness	0.863176	A-D 5% Critical Value	0.804457
		K-S Test Statistic	0.253013
Gamma Statistics		K-S 5% Critical Value	0.163639
k hat	0.565468	Data do not follow gamma distribution	
k star (bias corrected)	0.533288	at 5% significance level	
Theta hat	4911.865		
Theta star	5208.252	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.18992	Approximate Gamma UCL	4355.195
nu star	34.13045	Adjusted Gamma UCL	4463.763
Approx.Chi Square Value (.05)	21.7665		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.23709	Shapiro-Wilk Test Statisitic	0.766181
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.826937	95% H-UCL	9187.235
Standard Deviation of log data	1.637	95% Chebyshev (MVUE) UCL	8509.332
Variance of log data	2.67977	97.5% Chebyshev (MVUE) UCL	10796.32
		99% Chebyshev (MVUE) UCL	15288.67
		95% Non-parametric UCLs	
		CLT UCL	3741.554
		Adj-CLT UCL (Adjusted for skewness)	3837.114
		Mod-t UCL (Adjusted for skewness)	3786.154
		Jackknife UCL	3771.249
		Standard Bootstrap UCL	3718.054
		Bootstrap-t UCL	3861.119
RECOMMENDATION		Hall's Bootstrap UCL	3789.8
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3663.594
		BCA Bootstrap UCL	3821.719
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5332.264
		97.5% Chebyshev (Mean, Sd) UCL	6437.713
		99% Chebyshev (Mean, Sd) UCL	8609.153

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_47
Beryllium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.807616
Number of Unique Samples	26	Shapiro-Wilk 5% Critical Value	0.93
Minimum	0.17	Data not normal at 5% significance level	
Maximum	1.7		
Mean	0.498438	95% UCL (Assuming Normal Distribution)	
Median	0.395	Student's-t UCL	0.60274
Standard Deviation	0.347991		
Variance	0.121097	Gamma Distribution Test	
Coefficient of Variation	0.698163	A-D Test Statistic	0.844497
Skewness	1.772497	A-D 5% Critical Value	0.754052
		K-S Test Statistic	0.122841
Gamma Statistics		K-S 5% Critical Value	0.156735
k hat	2.814789	Data follow approximate gamma distibution	
k star (bias corrected)	2.571736	at 5% significance level	
Theta hat	0.177078		
Theta star	0.193814	95% UCLs (Assuming Gamma Distribution)	
nu hat	180.1465	Approximate Gamma UCL	0.603571
nu star	164.5911	Adjusted Gamma UCL	0.60982
Approx.Chi Square Value (.05)	135.9217		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	134.5288	Shapiro-Wilk Test Statisitic	0.948704
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.771957		
Maximum of log data	0.530628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.884302	95% H-UCL	0.613481
Standard Deviation of log data	0.599465	95% Chebyshev (MVUE) UCL	0.732222
Variance of log data	0.359358	97.5% Chebyshev (MVUE) UCL	0.836563
		99% Chebyshev (MVUE) UCL	1.041522
		95% Non-parametric UCLs	
		CLT UCL	0.599623
		Adj-CLT UCL (Adjusted for skewness)	0.620219
		Mod-t UCL (Adjusted for skewness)	0.605953
		Jackknife UCL	0.60274
		Standard Bootstrap UCL	0.60017
		Bootstrap-t UCL	0.625514
RECOMMENDATION		Hall's Bootstrap UCL	0.639826
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	0.6075
		BCA Bootstrap UCL	0.62
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.766582
		97.5% Chebyshev (Mean, Sd) UCL	0.882609
		99% Chebyshev (Mean, Sd) UCL	1.11052

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_48
Biphenyl (diphenyl)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.732474
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2230.625	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3116.4
Standard Deviation	2955.263		
Variance	8733579	Gamma Distribution Test	
Coefficient of Variation	1.324859	A-D Test Statistic	2.438202
Skewness	1.49681	A-D 5% Critical Value	0.800716
		K-S Test Statistic	0.243282
Gamma Statistics		K-S 5% Critical Value	0.163181
k hat	0.606783	Data do not follow gamma distribution	
k star (bias corrected)	0.57073	at 5% significance level	
Theta hat	3676.152		
Theta star	3908.371	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.83409	Approximate Gamma UCL	3439.201
nu star	36.52673	Adjusted Gamma UCL	3521.587
Approx.Chi Square Value (.05)	23.6908		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	23.13656	Shapiro-Wilk Test Statisitic	0.818668
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.693439	95% H-UCL	5751.663
Standard Deviation of log data	1.505135	95% Chebyshev (MVUE) UCL	5788.139
Variance of log data	2.265431	97.5% Chebyshev (MVUE) UCL	7281.054
		99% Chebyshev (MVUE) UCL	10213.59
		95% Non-parametric UCLs	
		CLT UCL	3089.932
		Adj-CLT UCL (Adjusted for skewness)	3237.636
		Mod-t UCL (Adjusted for skewness)	3139.439
		Jackknife UCL	3116.4
		Standard Bootstrap UCL	3068.422
		Bootstrap-t UCL	3320.183
RECOMMENDATION		Hall's Bootstrap UCL	3320.234
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3097.344
		BCA Bootstrap UCL	3259.688
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4507.808
		97.5% Chebyshev (Mean, Sd) UCL	5493.147
		99% Chebyshev (Mean, Sd) UCL	7428.654

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_49
Cadmium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.497743
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.93
Minimum	0.15	Data not normal at 5% significance level	
Maximum	6.4		
Mean	0.870313	95% UCL (Assuming Normal Distribution)	
Median	0.51	Student's-t UCL	1.208425
Standard Deviation	1.128063		
Variance	1.272526	Gamma Distribution Test	
Coefficient of Variation	1.296158	A-D Test Statistic	2.382462
Skewness	4.162695	A-D 5% Critical Value	0.763688
		K-S Test Statistic	0.221405
Gamma Statistics		K-S 5% Critical Value	0.158205
k hat	1.569226	Data do not follow gamma distribution	
k star (bias corrected)	1.442944	at 5% significance level	
Theta hat	0.554613		
Theta star	0.603151	95% UCLs (Assuming Gamma Distribution)	
nu hat	100.4304	Approximate Gamma UCL	1.12908
nu star	92.34842	Adjusted Gamma UCL	1.14508
Approx.Chi Square Value (.05)	71.18361		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	70.18899	Shapiro-Wilk Test Statisitic	0.900494
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.89712		
Maximum of log data	1.856298	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.490194	95% H-UCL	1.086257
Standard Deviation of log data	0.751964	95% Chebyshev (MVUE) UCL	1.313513
Variance of log data	0.56545	97.5% Chebyshev (MVUE) UCL	1.53411
		99% Chebyshev (MVUE) UCL	1.967431
		95% Non-parametric UCLs	
		CLT UCL	1.198321
		Adj-CLT UCL (Adjusted for skewness)	1.355119
		Mod-t UCL (Adjusted for skewness)	1.232882
		Jackknife UCL	1.208425
		Standard Bootstrap UCL	1.185341
		Bootstrap-t UCL	1.691787
RECOMMENDATION		Hall's Bootstrap UCL	2.36003
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.224375
		BCA Bootstrap UCL	1.4175
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1.739543
		97.5% Chebyshev (Mean, Sd) UCL	2.11566
		99% Chebyshev (Mean, Sd) UCL	2.854469

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._1EPCs4.t	Variable:	_50
Calcium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.84911
Number of Unique Samples	32	Shapiro-Wilk 5% Critical Value	0.93
Minimum	1750	Data not normal at 5% significance level	
Maximum	53100		
Mean	17772.81	95% UCL (Assuming Normal Distribution)	
Median	12100	Student's-t UCL	22538.05
Standard Deviation	15898.52		
Variance	2.53E+08	Gamma Distribution Test	
Coefficient of Variation	0.894541	A-D Test Statistic	0.511904
Skewness	0.967906	A-D 5% Critical Value	0.770133
		K-S Test Statistic	0.120316
Gamma Statistics		K-S 5% Critical Value	0.159214
k hat	1.244353	Data follow gamma distribution	
k star (bias corrected)	1.148528	at 5% significance level	
Theta hat	14282.77		
Theta star	15474.42	95% UCLs (Assuming Gamma Distribution)	
nu hat	79.63859	Approximate Gamma UCL	23857.51
nu star	73.50581	Adjusted Gamma UCL	24241.11
Approx.Chi Square Value (.05)	54.75864		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	53.89213	Shapiro-Wilk Test Statisitic	0.94619
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	7.467371		
Maximum of log data	10.87993	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.332573	95% H-UCL	30242.89
Standard Deviation of log data	1.030204	95% Chebyshev (MVUE) UCL	36019.87
Variance of log data	1.06132	97.5% Chebyshev (MVUE) UCL	43492.63
		99% Chebyshev (MVUE) UCL	58171.42
		95% Non-parametric UCLs	
		CLT UCL	22395.65
		Adj-CLT UCL (Adjusted for skewness)	22909.48
		Mod-t UCL (Adjusted for skewness)	22618.19
		Jackknife UCL	22538.05
		Standard Bootstrap UCL	22382.26
		Bootstrap-t UCL	23143.23
RECOMMENDATION		Hall's Bootstrap UCL	22825.03
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	22375
		BCA Bootstrap UCL	22858.75
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	30023.44
		97.5% Chebyshev (Mean, Sd) UCL	35324.3
		99% Chebyshev (Mean, Sd) UCL	45736.81

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._2EPCs4.t	Variable:	_51
Caprolactam			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.722163
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.93
Minimum	95	Data not normal at 5% significance level	
Maximum	11500		
Mean	2568.281	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3530.927
Standard Deviation	3211.731		
Variance	10315215	Gamma Distribution Test	
Coefficient of Variation	1.250537	A-D Test Statistic	3.090862
Skewness	1.033961	A-D 5% Critical Value	0.804727
		K-S Test Statistic	0.242287
Gamma Statistics		K-S 5% Critical Value	0.163672
k hat	0.562485	Data do not follow gamma distribution	
k star (bias corrected)	0.530586	at 5% significance level	
Theta hat	4565.953		
Theta star	4840.465	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.99906	Approximate Gamma UCL	4032.339
nu star	33.95748	Adjusted Gamma UCL	4133.16
Approx.Chi Square Value (.05)	21.62823		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.10065	Shapiro-Wilk Test Statisitic	0.808323
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.553877		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.741897	95% H-UCL	8009.318
Standard Deviation of log data	1.617155	95% Chebyshev (MVUE) UCL	7519.787
Variance of log data	2.615191	97.5% Chebyshev (MVUE) UCL	9529.144
		99% Chebyshev (MVUE) UCL	13476.13
		95% Non-parametric UCLs	
		CLT UCL	3502.162
		Adj-CLT UCL (Adjusted for skewness)	3613.047
		Mod-t UCL (Adjusted for skewness)	3548.223
		Jackknife UCL	3530.927
		Standard Bootstrap UCL	3510.089
		Bootstrap-t UCL	3626.279
RECOMMENDATION		Hall's Bootstrap UCL	3524.643
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3443.75
		BCA Bootstrap UCL	3608.281
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5043.086
		97.5% Chebyshev (Mean, Sd) UCL	6113.936
		99% Chebyshev (Mean, Sd) UCL	8217.414

Data File	C:\lhilsche\AMCO\EPCs4_UCL\all._2EPCs4.t	Variable:	_52
Carbazole			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	32	Shapiro-Wilk Test Statisitic	0.720818
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.93
Minimum	175	Data not normal at 5% significance level	
Maximum	11500		
Mean	2574.375	95% UCL (Assuming Normal Distribution)	
Median	480	Student's-t UCL	3535.868
Standard Deviation	3207.883		
Variance	10290514	Gamma Distribution Test	
Coefficient of Variation	1.246082	A-D Test Statistic	3.257653
Skewness	1.034077	A-D 5% Critical Value	0.803821
		K-S Test Statistic	0.246979
Gamma Statistics		K-S 5% Critical Value	0.163561
k hat	0.572493	Data do not follow gamma distribution	
k star (bias corrected)	0.539656	at 5% significance level	
Theta hat	4496.776		
Theta star	4770.404	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.63958	Approximate Gamma UCL	4024.593
nu star	34.53795	Adjusted Gamma UCL	4124.221
Approx.Chi Square Value (.05)	22.09258		
Adjusted Level of Significance	0.0416	Lognormal Distribution Test	
Adjusted Chi Square Value	21.55889	Shapiro-Wilk Test Statisitic	0.779353
		Shapiro-Wilk 5% Critical Value	0.93
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	9.350102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.766536	95% H-UCL	7684.998
Standard Deviation of log data	1.591706	95% Chebyshev (MVUE) UCL	7337.853
Variance of log data	2.53353	97.5% Chebyshev (MVUE) UCL	9283.688
		99% Chebyshev (MVUE) UCL	13105.9
		95% Non-parametric UCLs	
		CLT UCL	3507.137
		Adj-CLT UCL (Adjusted for skewness)	3617.902
		Mod-t UCL (Adjusted for skewness)	3553.145
		Jackknife UCL	3535.868
		Standard Bootstrap UCL	3468.976
		Bootstrap-t UCL	3721.9
RECOMMENDATION		Hall's Bootstrap UCL	3594.302
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3534.219
		BCA Bootstrap UCL	3677.969
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5046.215
		97.5% Chebyshev (Mean, Sd) UCL	6115.782
		99% Chebyshev (Mean, Sd) UCL	8216.74

Parking Lot – Deep Soil

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_2
2-Methylnaphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.578558
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	170	Data not normal at 5% significance level	
Maximum	2100		
Mean	547.5	95% UCL (Assuming Normal Distribution)	
Median	210	Student's-t UCL	1176.918
Standard Deviation	765.1193		
Variance	585407.5	Gamma Distribution Test	
Coefficient of Variation	1.397478	A-D Test Statistic	1.063331
Skewness	2.386954	A-D 5% Critical Value	0.713538
		K-S Test Statistic	0.350446
Gamma Statistics		K-S 5% Critical Value	0.340124
k hat	1.106808	Data do not follow gamma distribution	
k star (bias corrected)	0.664515	at 5% significance level	
Theta hat	494.6656		
Theta star	823.9088	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.2817	Approximate Gamma UCL	1605.452
nu star	7.974184	Adjusted Gamma UCL	2506.239
Approx.Chi Square Value (.05)	2.7194		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	1.741999	Shapiro-Wilk Test Statisitic	0.728442
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.135798		
Maximum of log data	7.649693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.789843	95% H-UCL	3081.742
Standard Deviation of log data	0.959313	95% Chebyshev (MVUE) UCL	1262.82
Variance of log data	0.920281	97.5% Chebyshev (MVUE) UCL	1605.537
		99% Chebyshev (MVUE) UCL	2278.739
		95% Non-parametric UCLs	
		CLT UCL	1061.284
		Adj-CLT UCL (Adjusted for skewness)	1386.523
		Mod-t UCL (Adjusted for skewness)	1227.648
		Jackknife UCL	1176.918
		Standard Bootstrap UCL	1014.33
		Bootstrap-t UCL	13885.21
RECOMMENDATION		Hall's Bootstrap UCL	5314.382
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1144.167
		BCA Bootstrap UCL	1211.667
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	1909.04
		97.5% Chebyshev (Mean, Sd) UCL	2498.179
		99% Chebyshev (Mean, Sd) UCL	3655.429

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_3
4,4'-DDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.583975
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	1.95	Data not normal at 5% significance level	
Maximum	65		
Mean	14.125	95% UCL (Assuming Normal Distribution)	
Median	2.975	Student's-t UCL	34.78055
Standard Deviation	25.10886		
Variance	630.4547	Gamma Distribution Test	
Coefficient of Variation	1.777618	A-D Test Statistic	0.874147
Skewness	2.372438	A-D 5% Critical Value	0.728799
		K-S Test Statistic	0.325876
Gamma Statistics		K-S 5% Critical Value	0.346161
k hat	0.618631	Data follow approximate gamma distibution	
k star (bias corrected)	0.420427	at 5% significance level	
Theta hat	22.83266		
Theta star	33.59681	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.423576	Approxi	60.76854
nu star	5.045121	Adjusted Gamma UCL	112.6667
Approx.Chi Square Value (.05)	1.172685		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.632506	Shapiro-Wilk Test Statisitic	0.795685
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.667829		
Maximum of log data	4.174387	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.653641	95% H-UCL	458.7856
Standard Deviation of log data	1.38097	95% Chebyshev (MVUE) UCL	35.93744
Variance of log data	1.907079	97.5% Chebyshev (MVUE) UCL	46.83729
		99% Chebyshev (MVUE) UCL	68.24793
		95% Non-parametric UCLs	
		CLT UCL	30.98582
		Adj-CLT UCL (Adjusted for skewness)	41.59424
		Mod-t UCL (Adjusted for skewness)	36.43525
		Jackknife UCL	34.78055
		Standard Bootstrap UCL	29.63147
		Bootstrap-t UCL	358.8353
RECOMMENDATION		Hall's Bootstrap UCL	222.7159
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	33.575
		BCA Bootstrap UCL	36.125
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	58.80654
		97.5% Chebyshev (Mean, Sd) UCL	78.14028
		99% Chebyshev (Mean, Sd) UCL	116.1177

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_4
4,4'-DDE			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.554522
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	1.95	Data not normal at 5% significance level	
Maximum	26		
Mean	6.458333	95% UCL (Assuming Normal Distribution)	
Median	2.675	Student's-t UCL	14.35111
Standard Deviation	9.594447		
Variance	92.05342	Gamma Distribution Test	
Coefficient of Variation	1.485592	A-D Test Statistic	1.150207
Skewness	2.425589	A-D 5% Critical Value	0.71487
		K-S Test Statistic	0.417708
Gamma Statistics		K-S 5% Critical Value	0.340743
k hat	1.01575	Data do not follow gamma distribution	
k star (bias corrected)	0.618986	at 5% significance level	
Theta hat	6.358195		
Theta star	10.43373	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.18899	Approximate Gamma UCL	19.9242
nu star	7.427831	Adjusted Gamma UCL	31.82804
Approx.Chi Square Value (.05)	2.407695		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	1.507206	Shapiro-Wilk Test Statisitic	0.704037
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.667829		
Maximum of log data	3.258097	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.298142	95% H-UCL	39.56881
Standard Deviation of log data	0.990277	95% Chebyshev (MVUE) UCL	14.74814
Variance of log data	0.980649	97.5% Chebyshev (MVUE) UCL	18.79538
		99% Chebyshev (MVUE) UCL	26.74541
		95% Non-parametric UCLs	
		CLT UCL	12.90109
		Adj-CLT UCL (Adjusted for skewness)	17.04553
		Mod-t UCL (Adjusted for skewness)	14.99756
		Jackknife UCL	14.35111
		Standard Bootstrap UCL	12.43724
		Bootstrap-t UCL	94.67412
RECOMMENDATION		Hall's Bootstrap UCL	76.43424
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	14.075
		BCA Bootstrap UCL	14.61667
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	23.53178
		97.5% Chebyshev (Mean, Sd) UCL	30.91947
		99% Chebyshev (Mean, Sd) UCL	45.43116

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_5
4,4'-DDT			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.618172
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	1.95	Data not normal at 5% significance level	
Maximum	9.5		
Mean	3.541667	95% UCL (Assuming Normal Distribution)	
Median	2.425	Student's-t UCL	5.965792
Standard Deviation	2.946764		
Variance	8.683417	Gamma Distribution Test	
Coefficient of Variation	0.832027	A-D Test Statistic	0.959372
Skewness	2.348574	A-D 5% Critical Value	0.701914
		K-S Test Statistic	0.359999
Gamma Statistics		K-S 5% Critical Value	0.334809
k hat	2.797321	Data do not follow gamma distribution	
k star (bias corrected)	1.509772	at 5% significance level	
Theta hat	1.266092		
Theta star	2.345829	95% UCLs (Assuming Gamma Distribution)	
nu hat	33.56785	Approximate Gamma UCL	6.772579
nu star	18.11726	Adjusted Gamma UCL	8.75453
Approx.Chi Square Value (.05)	9.474277		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	7.329382	Shapiro-Wilk Test Statisitic	0.737172
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.667829		
Maximum of log data	2.251292	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.075334	95% H-UCL	7.805776
Standard Deviation of log data	0.599968	95% Chebyshev (MVUE) UCL	7.009468
Variance of log data	0.359961	97.5% Chebyshev (MVUE) UCL	8.573545
		99% Chebyshev (MVUE) UCL	11.64587
		95% Non-parametric UCLs	
		CLT UCL	5.520444
		Adj-CLT UCL (Adjusted for skewness)	6.752921
		Mod-t UCL (Adjusted for skewness)	6.158034
		Jackknife UCL	5.965792
		Standard Bootstrap UCL	5.33387
		Bootstrap-t UCL	16.45384
RECOMMENDATION		Hall's Bootstrap UCL	15.00249
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.775
		BCA Bootstrap UCL	6.075
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	8.785471
		97.5% Chebyshev (Mean, Sd) UCL	11.05447
		99% Chebyshev (Mean, Sd) UCL	15.51148

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_6
Acenaphthylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.743123
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	1200		
Mean	460.8333	95% UCL (Assuming Normal Distribution)	
Median	242.5	Student's-t UCL	797.246
Standard Deviation	408.9427		
Variance	167234.2	Gamma Distribution Test	
Coefficient of Variation	0.887398	A-D Test Statistic	0.73268
Skewness	1.566491	A-D 5% Critical Value	0.704425
		K-S Test Statistic	0.35268
Gamma Statistics		K-S 5% Critical Value	0.335927
k hat	1.970021	Data do not follow gamma distribution	
k star (bias corrected)	1.096122	at 5% significance level	
Theta hat	233.923		
Theta star	420.4217	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.64025	Approximate Gamma UCL	1011.108
nu star	13.15346	Adjusted Gamma UCL	1386.809
Approx.Chi Square Value (.05)	5.994961		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	4.370863	Shapiro-Wilk Test Statisitic	0.800438
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.858258	95% H-I	1563.786
Standard Deviation of log data	0.767693	95% Chebyshev (MVUE) UCL	1046.485
Variance of log data	0.589352	97.5% Chebyshev (MVUE) UCL	1307.189
		99% Chebyshev (MVUE) UCL	1819.292
		95% Non-parametric UCLs	
		CLT UCL	735.4419
		Adj-CLT UCL (Adjusted for skewness)	849.5245
		Mod-t UCL (Adjusted for skewness)	815.0406
		Jackknife UCL	797.246
		Standard Bootstrap UCL	708.7991
		Bootstrap-t UCL	3846.932
RECOMMENDATION		Hall's Bootstrap UCL	3231.221
Data are lognormal (0.05)		Percentile Bootstrap UCL	708.3333
		BCA Bootstrap UCL	790.8333
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	1188.552
		97.5% Chebyshev (Mean, Sd) UCL	1503.437
		99% Chebyshev (Mean, Sd) UCL	2121.967
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_7
Acetone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.857782
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	6	Data are normal at 5% significance level	
Maximum	50		
Mean	20.33333	95% UCL (Assuming Normal Distribution)	
Median	17	Student	33.99675
Standard Deviation	16.60923		
Variance	275.8667	Gamma Distribution Test	
Coefficient of Variation	0.816848	A-D Test Statistic	0.313254
Skewness	1.316198	A-D 5% Critical Value	0.704605
		K-S Test Statistic	0.200637
Gamma Statistics		K-S 5% Critical Value	0.336009
k hat	1.94482	Data follow gamma distribution	
k star (bias corrected)	1.083521	at 5% significance level	
Theta hat	10.45512		
Theta star	18.76598	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.33784	Approximate Gamma UCL	44.86214
nu star	13.00226	Adjusted Gamma UCL	61.6816
Approx.Chi Square Value (.05)	5.893147		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	4.286192	Shapiro-Wilk Test Statisitic	0.935788
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.791759		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.73366	95% H-UCL	84.5612
Standard Deviation of log data	0.825337	95% Chebyshev (MVUE) UCL	49.67105
Variance of log data	0.681182	97.5% Chebyshev (MVUE) UCL	62.41293
		99% Chebyshev (MVUE) UCL	87.4419
		95% Non-parametric UCLs	
		CLT UCL	31.48658
		Adj-CLT UCL (Adjusted for skewness)	35.37972
		Mod-t UCL (Adjusted for skewness)	34.60401
		Jackknife UCL	33.99675
		Standard Bootstrap UCL	30.54584
		Bootstrap-t UCL	44.10563
RECOMMENDATION		Hall's Bootstrap UCL	40.28477
Data are normal (0.05)		Percentile Bootstrap UCL	30.66667
		BCA Bootstrap UCL	33.66667
Use Stu		95% Chebyshev (Mean, Sd) UCL	49.88968
		97.5% Chebyshev (Mean, Sd) UCL	62.67874
		99% Chebyshev (Mean, Sd) UCL	87.80036

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_8
Aluminum			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.875649
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	7130	Data are normal at 5% significance level	
Maximum	14900		
Mean	10310	95% UCL (Assuming Normal Distribution)	
Median	9290	Student	12998.99
Standard Deviation	3268.737		
Variance	10684640	Gamma Distribution Test	
Coefficient of Variation	0.317045	A-D Test Statistic	0.435098
Skewness	0.580709	A-D 5% Critical Value	0.69803
		K-S Test Statistic	0.279082
Gamma Statistics		K-S 5% Critical Value	0.332299
k hat	12.41733	Data follow gamma distribution	
k star (bias corrected)	6.319778	at 5% significance level	
Theta hat	830.2909		
Theta star	1631.386	95% UCLs (Assuming Gamma Distribution)	
nu hat	149.008	Approximate Gamma UCL	13771.53
nu star	75.83734	Adjusted Gamma UCL	15372.47
Approx.Chi Square Value (.05)	56.77533		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	50.86255	Shapiro-Wilk Test Statisitic	0.88863
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.872067		
Maximum of log data	9.609116	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.200063	95% H-UCL	14262.22
Standard Deviation of log data	0.310536	95% Chebyshev (MVUE) UCL	15992.45
Variance of log data	0.096432	97.5% Chebyshev (MVUE) UCL	18455.06
		99% Chebyshev (MVUE) UCL	23292.38
		95% Non-parametric UCLs	
		CLT UCL	12504.99
		Adj-CLT UCL (Adjusted for skewness)	12843.02
		Mod-t UCL (Adjusted for skewness)	13051.72
		Jackknife UCL	12998.99
		Standard Bootstrap UCL	12299.22
		Bootstrap-t UCL	13940.63
RECOMMENDATION		Hall's Bootstrap UCL	13312.96
Data are normal (0.05)		Percentile Bootstrap UCL	12330
		BCA Bootstrap UCL	12555
Use Stu		95% Chebyshev (Mean, Sd) UCL	16126.76
		97.5% Chebyshev (Mean, Sd) UCL	18643.68
		99% Chebyshev (Mean, Sd) UCL	23587.67

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_9
Anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.703273
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	940		
Mean	442.5	95% UCL (Assuming Normal Distribution)	
Median	232.5	Student's-t UCL	735.1188
Standard Deviation	355.707		
Variance	126527.5	Gamma Distribution Test	
Coefficient of Variation	0.803858	A-D Test Statistic	0.951933
Skewness	0.979804	A-D 5% Critical Value	0.703808
		K-S Test Statistic	0.383326
Gamma Statistics		K-S 5% Critical Value	0.335651
k hat	2.139706	Data do not follow gamma distribution	
k star (bias corrected)	1.180964	at 5% significance level	
Theta hat	206.8041		
Theta star	374.6938	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.67647	Approximate Gamma UCL	937.6614
nu star	14.17157	Adjusted Gamma UCL	1266.724
Approx.Chi Square Value (.05)	6.68783		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	4.950502	Shapiro-Wilk Test Statisitic	0.732818
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	6.84588	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.840925	95% H-UCL	1441.304
Standard Deviation of log data	0.748914	95% Chebyshev (MVUE) UCL	1003.119
Variance of log data	0.560873	97.5% Chebyshev (MVUE) UCL	1250.449
		99% Chebyshev (MVUE) UCL	1736.282
		95% Non-parametric UCLs	
		CLT UCL	681.3604
		Adj-CLT UCL (Adjusted for skewness)	743.4274
		Mod-t UCL (Adjusted for skewness)	744.8
		Jackknife UCL	735.1188
		Standard Bootstrap UCL	663.9454
		Bootstrap-t UCL	4545.974
RECOMMENDATION		Hall's Bootstrap UCL	5326.726
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	672.5
		BCA Bootstrap UCL	678.3333
Use 95%		95% Ch	1075.485
		97.5% Chebyshev (Mean, Sd) UCL	1349.379
		99% Chebyshev (Mean, Sd) UCL	1887.389
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_10
Antimony			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.507967
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.788
Minimum	3.4	Data not normal at 5% significance level	
Maximum	216		
Mean	39.76667	95% UCL (Assuming Normal Distribution)	
Median	4.8	Student's-t UCL	110.7974
Standard Deviation	86.34484		
Variance	7455.431	Gamma Distribution Test	
Coefficient of Variation	2.171287	A-D Test Statistic	1.421975
Skewness	2.448408	A-D 5% Critical Value	0.748341
		K-S Test Statistic	0.485062
Gamma Statistics		K-S 5% Critical Value	0.35192
k hat	0.418971	Data do not follow gamma distribution	
k star (bias corrected)	0.320597	at 5% significance level	
Theta hat	94.91512		
Theta star	124.0396	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.02765	Approximate Gamma UCL	231.1072
nu star	3.847158	Adjusted Gamma UCL	481.7112
Approx.Chi Square Value (.05)	0.661981		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.317594	Shapiro-Wilk Test Statisitic	0.627128
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.223775		
Maximum of log data	5.375278	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.124073	95% H-UCL	3564.603
Standard Deviation of log data	1.613909	95% Chebyshev (MVUE) UCL	79.78049
Variance of log data	2.604701	97.5% Chebyshev (MVUE) UCL	104.8839
		99% Chebyshev (MVUE) UCL	154.1947
		95% Non-parametric UCLs	
		CLT UCL	97.74797
		Adj-CLT UCL (Adjusted for skewness)	135.3966
		Mod-t UCL (Adjusted for skewness)	116.6698
		Jackknife UCL	110.7974
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99%		95% Chebyshev (Mean, Sd) UCL	193.4184
		97.5% Chebyshev (Mean, Sd) UCL	259.9037
		99% Ch	390.501
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_11
Arsenic			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.790346
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	2.3	Data are normal at 5% significance level	
Maximum	20		
Mean	7.333333	95% UCL (Assuming Normal Distribution)	
Median	4.8	Student	12.84482
Standard Deviation	6.699751		
Variance	44.88667	Gamma Distribution Test	
Coefficient of Variation	0.913602	A-D Test Statistic	0.401197
Skewness	1.75784	A-D 5% Critical Value	0.705381
		K-S Test Statistic	0.266246
Gamma Statistics		K-S 5% Critical Value	0.33636
k hat	1.836518	Data follow gamma distribution	
k star (bias corrected)	1.02937	at 5% significance level	
Theta hat	3.993064		
Theta star	7.124098	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.03822	Approximate Gamma UCL	16.59352
nu star	12.35244	Adjusted Gamma UCL	23.06849
Approx.Chi Square Value (.05)	5.459031		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	3.926767	Shapiro-Wilk Test Statisitic	0.924819
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.832909		
Maximum of log data	2.995732	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.696119	95% H-UCL	28.74441
Standard Deviation of log data	0.814107	95% Chebyshev (MVUE) UCL	17.33797
Variance of log data	0.66277	97.5% Chebyshev (MVUE) UCL	21.7615
		99% Chebyshev (MVUE) UCL	30.45067
		95% Non-parametric UCLs	
		CLT UCL	11.83227
		Adj-CLT UCL (Adjusted for skewness)	13.92961
		Mod-t UCL (Adjusted for skewness)	13.17196
		Jackknife UCL	12.84482
		Standard Bootstrap UCL	11.4238
		Bootstrap-t UCL	19.70415
RECOMMENDATION		Hall's Bootstrap UCL	29.83535
Data are normal (0.05)		Percentile Bootstrap UCL	11.43333
		BCA Bootstrap UCL	12.65
Use Stu		95% Chebyshev (Mean, Sd) UCL	19.25563
		97.5% Chebyshev (Mean, Sd) UCL	24.41441
		99% Chebyshev (Mean, Sd) UCL	34.54785

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_12
Barium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.575824
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	80.2	Data not normal at 5% significance level	
Maximum	3800		
Mean	816.0333	95% UCL (Assuming Normal Distribution)	
Median	235	Student's-t UCL	2023.25
Standard Deviation	1467.491		
Variance	2153529	Gamma Distribution Test	
Coefficient of Variation	1.798322	A-D Test Statistic	0.771632
Skewness	2.407748	A-D 5% Critical Value	0.728645
		K-S Test Statistic	0.343158
Gamma Statistics		K-S 5% Critical Value	0.346108
k hat	0.621212	Data follow approximate gamma distibution	
k star (bias corrected)	0.421717	at 5% significance level	
Theta hat	1313.616		
Theta star	1935.026	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.454539	Approximate Gamma UCL	3500.028
nu star	5.060603	Adjusted Gamma UCL	6480.608
Approx.Chi Square Value (.05)	1.179882		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.637227	Shapiro-Wilk Test Statisitic	0.876207
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.384523		
Maximum of log data	8.242756	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.714881	95% H-UCL	26448.23
Standard Deviation of log data	1.379869	95% Chebyshev (MVUE) UCL	2082.841
Variance of log data	1.90404	97.5% Chebyshev (MVUE) UCL	2714.439
		99% Chebyshev (MVUE) UCL	3955.091
		95% Non-parametric UCLs	
		CLT UCL	1801.466
		Adj-CLT UCL (Adjusted for skewness)	2430.705
		Mod-t UCL (Adjusted for skewness)	2121.398
		Jackknife UCL	2023.25
		Standard Bootstrap UCL	1673.806
		Bootstrap-t UCL	10491.63
RECOMMENDATION		Hall's Bootstrap UCL	9240.676
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	1991.7
		BCA Bootstrap UCL	2067.167
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	3427.452
		97.5% Chebyshev (Mean, Sd) UCL	4557.415
		99% Chebyshev (Mean, Sd) UCL	6777.009

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_13
Benzo(a)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.721034
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	4300		
Mean	1202.5	95% UCL (Assuming Normal Distribution)	
Median	612.5	Student's-t UCL	2509.987
Standard Deviation	1589.38		
Variance	2526128	Gamma Distribution Test	
Coefficient of Variation	1.321729	A-D Test Statistic	0.53118
Skewness	1.997441	A-D 5% Critical Value	0.718592
		K-S Test Statistic	0.294264
Gamma Statistics		K-S 5% Critical Value	0.342391
k hat	0.8518	Data follow gamma distribution	
k star (bias corrected)	0.537011	at 5% significance level	
Theta hat	1411.716		
Theta star	2239.245	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.2216	Approximate Gamma UCL	4143.132
nu star	6.444135	Adjusted Gamma UCL	6958.916
Approx.Chi Square Value (.05)	1.870342		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	1.113546	Shapiro-Wilk Test Statisitic	0.855131
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	8.36637	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.401057	95% H-UCL	29248.92
Standard Deviation of log data	1.28264	95% Chebyshev (MVUE) UCL	3615.231
Variance of log data	1.645165	97.5% Chebyshev (MVUE) UCL	4690.388
		99% Chebyshev (MVUE) UCL	6802.327
		95% Non-parametric UCLs	
		CLT UCL	2269.782
		Adj-CLT UCL (Adjusted for skewness)	2835.15
		Mod-t UCL (Adjusted for skewness)	2598.173
		Jackknife UCL	2509.987
		Standard Bootstrap UCL	2178.9
		Bootstrap-t UCL	4103.293
RECOMMENDATION		Hall's Bootstrap UCL	6074.77
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	2300
		BCA Bootstrap UCL	2615.833
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	4030.822
		97.5% Chebyshev (Mean, Sd) UCL	5254.639
		99% Chebyshev (Mean, Sd) UCL	7658.59

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_14
Benzo(a)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.688116
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	8900		
Mean	2185.833	95% UCL (Assuming Normal Distribution)	
Median	612.5	Student's-t UCL	4997.998
Standard Deviation	3418.464		
Variance	11685894	Gamma Distribution Test	
Coefficient of Variation	1.563918	A-D Test Statistic	0.545965
Skewness	2.085909	A-D 5% Critical Value	0.730561
		K-S Test Statistic	0.289719
Gamma Statistics		K-S 5% Critical Value	0.346773
k hat	0.588986	Data follow gamma distribution	
k star (bias corrected)	0.405604	at 5% significance level	
Theta hat	3711.182		
Theta star	5389.082	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.067829	Approximate Gamma UCL	9751.904
nu star	4.867248	Adjusted Gamma UCL	18363.76
Approx.Chi Square Value (.05)	1.090966		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.579347	Shapiro-Wilk Test Statisitic	0.856638
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	9.093807	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.637821	95% H-UCL	297288.2
Standard Deviation of log data	1.601532	95% Chebyshev (MVUE) UCL	7154.549
Variance of log data	2.564905	97.5% Chebyshev (MVUE) UCL	9402.022
		99% Chebyshev (MVUE) UCL	13816.75
		95% Non-parametric UCLs	
		CLT UCL	4481.361
		Adj-CLT UCL (Adjusted for skewness)	5751.22
		Mod-t UCL (Adjusted for skewness)	5196.071
		Jackknife UCL	4997.998
		Standard Bootstrap UCL	4287.431
		Bootstrap-t UCL	16436.65
RECOMMENDATION		Hall's Bootstrap UCL	19942.26
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	4686.667
		BCA Bootstrap UCL	5483.333
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	8269.034
		97.5% Chebyshev (Mean, Sd) UCL	10901.24
		99% Chebyshev (Mean, Sd) UCL	16071.7
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_15
Benzo(b)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.662028
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	5600		
Mean	1379.167	95% UCL (Assuming Normal Distribution)	
Median	292.5	Student's-t UCL	3147.122
Standard Deviation	2149.124		
Variance	4618734	Gamma Distribution Test	
Coefficient of Variation	1.558277	A-D Test Statistic	0.753776
Skewness	2.094811	A-D 5% Critical Value	0.725827
		K-S Test Statistic	0.344862
Gamma Statistics		K-S 5% Critical Value	0.34513
k hat	0.668625	Data follow approximate gamma distibution	
k star (bias corrected)	0.445424	at 5% significance level	
Theta hat	2062.691		
Theta star	3096.304	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.0235	Approximate Gamma UCL	5608.298
nu star	5.345083	Adjusted Gamma UCL	10145.61
Approx.Chi Square Value (.05)	1.314438		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.726596	Shapiro-Wilk Test Statisitic	0.80562
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	8.630522	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.319518	95% H-UCL	54631.72
Standard Deviation of log data	1.399072	95% Chebyshev (MVUE) UCL	3916.144
Variance of log data	1.957402	97.5% Chebyshev (MVUE) UCL	5107.857
		99% Chebyshev (MVUE) UCL	7448.748
		95% Non-parametric UCLs	
		CLT UCL	2822.322
		Adj-CLT UCL (Adjusted for skewness)	3624.066
		Mod-t UCL (Adjusted for skewness)	3272.178
		Jackknife UCL	3147.122
		Standard Bootstrap UCL	2681.577
		Bootstrap-t UCL	38282.14
RECOMMENDATION		Hall's Bootstrap UCL	24562.78
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	2925
		BCA Bootstrap UCL	3175.833
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5203.561
		97.5% Chebyshev (Mean, Sd) UCL	6858.379
		99% Chebyshev (Mean, Sd) UCL	10108.95
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_16
Benzo(g,h,i)perylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.633282
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	9000		
Mean	2028.333	95% UCL (Assuming Normal Distribution)	
Median	240	Student's-t UCL	4920.399
Standard Deviation	3515.591		
Variance	12359377	Gamma Distribution Test	
Coefficient of Variation	1.733241	A-D Test Statistic	0.898539
Skewness	2.175625	A-D 5% Critical Value	0.734866
		K-S Test Statistic	0.398002
Gamma Statistics		K-S 5% Critical Value	0.348268
k hat	0.516558	Data do not follow gamma distribution	
k star (bias corrected)	0.36939	at 5% significance level	
Theta hat	3926.635		
Theta star	5491.036	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.198691	Approximate Gamma UCL	9996.895
nu star	4.432679	Adjusted Gamma UCL	19614.49
Approx.Chi Square Value (.05)	0.899374		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.458383	Shapiro-Wilk Test Statisitic	0.751106
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	9.10498	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.391501	95% H-UCL	296096.5
Standard Deviation of log data	1.634602	95% Chebyshev (MVUE) UCL	5860.792
Variance of log data	2.671922	97.5% Chebyshev (MVUE) UCL	7709.957
		99% Chebyshev (MVUE) UCL	11342.28
		95% Non-parametric UCLs	
		CLT UCL	4389.083
		Adj-CLT UCL (Adjusted for skewness)	5751.191
		Mod-t UCL (Adjusted for skewness)	5132.86
		Jackknife UCL	4920.399
		Standard Bootstrap UCL	4156.1
		Bootstrap-t UCL	259413.6
RECOMMENDATION		Hall's Bootstrap UCL	90630.61
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4602.5
		BCA Bootstrap UCL	5309.167
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	8284.373
		97.5% Chebyshev (Mean, Sd) UCL	10991.37
		99% Chebyshev (Mean, Sd) UCL	16308.73
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_17
Benzo(k)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.721405
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	195	Data not normal at 5% significance level	
Maximum	3500		
Mean	1006.667	95% UCL (Assuming Normal Distribution)	
Median	325	Student's-t UCL	2093.488
Standard Deviation	1321.138		
Variance	1745407	Gamma Distribution Test	
Coefficient of Variation	1.312389	A-D Test Statistic	0.644091
Skewness	1.805334	A-D 5% Critical Value	0.717933
		K-S Test Statistic	0.296266
Gamma Statistics		K-S 5% Critical Value	0.342101
k hat	0.879749	Data follow gamma distribution	
k star (bias corrected)	0.550986	at 5% significance level	
Theta hat	1144.266		
Theta star	1827.029	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.55699	Approximate Gamma UCL	3396.644
nu star	6.611828	Adjusted Gamma UCL	5651.281
Approx.Chi Square Value (.05)	1.959554		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	1.17777	Shapiro-Wilk Test Statisitic	0.831846
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.273		
Maximum of log data	8.160518	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.247988	95% H-UCL	17458.71
Standard Deviation of log data	1.218533	95% Chebyshev (MVUE) UCL	2840.034
Variance of log data	1.484822	97.5% Chebyshev (MVUE) UCL	3672.489
		99% Chebyshev (MVUE) UCL	5307.688
		95% Non-parametric UCLs	
		CLT UCL	1893.823
		Adj-CLT UCL (Adjusted for skewness)	2318.574
		Mod-t UCL (Adjusted for skewness)	2159.741
		Jackknife UCL	2093.488
		Standard Bootstrap UCL	1830.441
		Bootstrap-t UCL	9571.433
RECOMMENDATION		Hall's Bootstrap UCL	8031.889
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	1890.833
		BCA Bootstrap UCL	2103.333
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	3357.65
		97.5% Chebyshev (Mean, Sd) UCL	4374.922
		99% Chebyshev (Mean, Sd) UCL	6373.156

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_18
Beryllium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.68994
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	0.22	Data not normal at 5% significance level	
Maximum	0.92		
Mean	0.398333	95% UCL (Assuming Normal Distribution)	
Median	0.31	Student's-t UCL	0.612941
Standard Deviation	0.260877		
Variance	0.068057	Gamma Distribution Test	
Coefficient of Variation	0.654921	A-D Test Statistic	0.711837
Skewness	2.230981	A-D 5% Critical Value	0.6998
		K-S Test Statistic	0.325711
Gamma Statistics		K-S 5% Critical Value	0.33347
k hat	4.093288	Data follow approximate gamma distibution	
k star (bias corrected)	2.157755	at 5% significance level	
Theta hat	0.097314		
Theta star	0.184605	95% UCLs (Assuming Gamma Distribution)	
nu hat	49.11945	Approximate Gamma UCL	0.674333
nu star	25.89306	Adjusted Gamma UCL	0.828207
Approx.Chi Square Value (.05)	15.29522		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	12.4535	Shapiro-Wilk Test Statisitic	0.829616
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.514128		
Maximum of log data	-0.083382	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.047562	95% H-UCL	0.737962
Standard Deviation of log data	0.505931	95% Chebyshev (MVUE) UCL	0.739975
Variance of log data	0.255966	97.5% Chebyshev (MVUE) UCL	0.891557
		99% Chebyshev (MVUE) UCL	1.189312
		95% Non-parametric UCLs	
		CLT UCL	0.573514
		Adj-CLT UCL (Adjusted for skewness)	0.677162
		Mod-t UCL (Adjusted for skewness)	0.629108
		Jackknife UCL	0.612941
		Standard Bootstrap UCL	0.56235
		Bootstrap-t UCL	1.177057
RECOMMENDATION		Hall's Bootstrap UCL	1.375388
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	0.595
		BCA Bootstrap UCL	0.62
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.862567
		97.5% Chebyshev (Mean, Sd) UCL	1.063441
		99% Chebyshev (Mean, Sd) UCL	1.45802

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_19
Biphenyl (diphenyl)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.726818
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.788
Minimum	160	Data not normal at 5% significance level	
Maximum	385		
Mean	225	95% UCL (Assuming Normal Distribution)	
Median	195	Student's-t UCL	291.6795
Standard Deviation	81.05554		
Variance	6570	Gamma Distribution Test	
Coefficient of Variation	0.360247	A-D Test Statistic	0.75048
Skewness	2.098172	A-D 5% Critical Value	0.698114
		K-S Test Statistic	0.314847
Gamma Statistics		K-S 5% Critical Value	0.332349
k hat	11.74447	Data follow approximate gamma distibution	
k star (bias corrected)	5.983347	at 5% significance level	
Theta hat	19.15795		
Theta star	37.60437	95% UCLs (Assuming Gamma Distribution)	
nu hat	140.9337	Approximate Gamma UCL	303.1731
nu star	71.80016	Adjusted Gamma UCL	339.5776
Approx.Chi Square Value (.05)	53.28651		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	47.57391	Shapiro-Wilk Test Statisitic	0.809099
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.075174		
Maximum of log data	5.953243	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.372923	95% H-UCL	307.4794
Standard Deviation of log data	0.304339	95% Chebyshev (MVUE) UCL	345.1713
Variance of log data	0.092622	97.5% Chebyshev (MVUE) UCL	397.6352
		99% Chebyshev (MVUE) UCL	500.6904
		95% Non-parametric UCLs	
		CLT UCL	279.4295
		Adj-CLT UCL (Adjusted for skewness)	309.7163
		Mod-t UCL (Adjusted for skewness)	296.4037
		Jackknife UCL	291.6795
		Standard Bootstrap UCL	275.5835
		Bootstrap-t UCL	438.5155
RECOMMENDATION		Hall's Bootstrap UCL	587.8296
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	283.3333
		BCA Bootstrap UCL	290
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	369.2394
		97.5% Chebyshev (Mean, Sd) UCL	431.6519
		99% Chebyshev (Mean, Sd) UCL	554.2491

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_20
Cadmium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.719826
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	0.2	Data not normal at 5% significance level	
Maximum	11.1		
Mean	2.91	95% UCL (Assuming Normal Distribution)	
Median	0.75	Student's-t UCL	6.457882
Standard Deviation	4.3128		
Variance	18.60024	Gamma Distribution Test	
Coefficient of Variation	1.482062	A-D Test Statistic	0.476197
Skewness	1.847242	A-D 5% Critical Value	0.729291
		K-S Test Statistic	0.311003
Gamma Statistics		K-S 5% Critical Value	0.346332
k hat	0.610355	Data follow gamma distribution	
k star (bias corrected)	0.416289	at 5% significance level	
Theta hat	4.767718		
Theta star	6.990344	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.324258	Approximate Gamma UCL	12.64411
nu star	4.995462	Adjusted Gamma UCL	23.54283
Approx.Chi Square Value (.05)	1.149689		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.617462	Shapiro-Wilk Test Statisitic	0.915709
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	2.406945	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.058376	95% H-UCL	365.4094
Standard Deviation of log data	1.584619	95% Chebyshev (MVUE) UCL	9.700111
Variance of log data	2.511016	97.5% Chebyshev (MVUE) UCL	12.74015
		99% Chebyshev (MVUE) UCL	18.71173
		95% Non-parametric UCLs	
		CLT UCL	5.806083
		Adj-CLT UCL (Adjusted for skewness)	7.224853
		Mod-t UCL (Adjusted for skewness)	6.679181
		Jackknife UCL	6.457882
		Standard Bootstrap UCL	5.537377
		Bootstrap-t UCL	40.31135
RECOMMENDATION		Hall's Bootstrap UCL	29.07872
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	5.833334
		BCA Bootstrap UCL	7.151667
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	10.58468
		97.5% Chebyshev (Mean, Sd) UCL	13.90553
		99% Chebyshev (Mean, Sd) UCL	20.42868
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs6_\all._1EPCs6.txt	Variable:	_21
Calcium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.887327
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.788
Minimum	2360	Data are normal at 5% significance level	
Maximum	16500		
Mean	8306.667	95% UCL (Assuming Normal Distribution)	
Median	7045	Student's-t UCL	13188.63
Standard Deviation	5934.508		
Variance	35218387	Gamma Distribution Test	
Coefficient of Variation	0.714427	A-D Test Statistic	0.392611
Skewness	0.419947	A-D 5% Critical Value	0.703869
		K-S Test Statistic	0.250209
Gamma Statistics		K-S 5% Critical Value	0.335679
k hat	2.118336	Data follow gamma distribution	
k star (bias corrected)	1.170279	at 5% significance level	
Theta hat	3921.316		
Theta star	7098.02	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.42004	Approximate Gamma UCL	17675.04
nu star	14.04335	Adjusted Gamma UCL	23920.94
Approx.Chi Square Value (.05)	6.599897		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	4.876625	Shapiro-Wilk Test Statisitic	0.904239
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	7.766417		
Maximum of log data	9.711116	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.770586	95% H-UCL	33693.31
Standard Deviation of log data	0.811963	95% Chebyshev (MVUE) UCL	20424.82
Variance of log data	0.659284	97.5% Chebyshev (MVUE) UCL	25630.44
		99% Chebyshev (MVUE) UCL	35855.88
		95% Non-parametric UCLs	
		CLT UCL	12291.74
		Adj-CLT UCL (Adjusted for skewness)	12735.56
		Mod-t UCL (Adjusted for skewness)	13257.86
		Jackknife UCL	13188.63
		Standard Bootstrap UCL	11950.2
		Bootstrap-t UCL	13165.56
RECOMMENDATION		Hall's Bootstrap UCL	11209.35
Data are normal (0.05)		Percentile Bootstrap UCL	12233.33
		BCA Bootstrap UCL	12365
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	18867.2
		97.5% Chebyshev (Mean, Sd) UCL	23436.75
		99% Chebyshev (Mean, Sd) UCL	32412.75

Large Vacant Lot – Shallow Soil

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_1
1,2-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.47746
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	15		
Mean	6.785714	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student	8.246636
Standard Deviation	3.08666		
Variance	9.527473	Gamma Distribution Test	
Coefficient of Variation	0.454876	A-D Test Statistic	3.642283
Skewness	2.355917	A-D 5% Critical Value	0.735976
		K-S Test Statistic	0.443874
Gamma Statistics		K-S 5% Critical Value	0.228932
k hat	7.910841	Data do not follow gamma distribution	
k star (bias corrected)	6.26328	at 5% significance level	
Theta hat	0.857774		
Theta star	1.083412	95% UCLs (Assuming Gamma Distribution)	
nu hat	221.5036	Approximate Gamma UCL	8.165438
nu star	175.3718	Adjusted Gamma UCL	8.3712
Approx.Chi Square Value (.05)	145.7391		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	142.1568	Shapiro-Wilk Test Statisitic	0.492344
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.70805	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.850286	95% H-UCL	8.053666
Standard Deviation of log data	0.335716	95% Chebyshev (MVUE) UCL	9.358377
Variance of log data	0.112705	97.5% Chebyshev (MVUE) UCL	10.50772
		99% Chebyshev (MVUE) UCL	12.76538
		95% Non-parametric UCLs	
		CLT UCL	8.142628
		Adj-CLT UCL (Adjusted for skewness)	8.697638
		Mod-t U	8.333207
		Jackknife UCL	8.246636
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	10.38156
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	11.93749
		99% Chebyshev (Mean, Sd) UCL	14.99381

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_2
1,4-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.417449
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	2	Data not normal at 5% significance level	
Maximum	6		
Mean	5.321429	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student	5.781878
Standard Deviation	0.972846		
Variance	0.946429	Gamma Distribution Test	
Coefficient of Variation	0.182817	A-D Test Statistic	4.034387
Skewness	-3.50445	A-D 5% Critical Value	0.734054
		K-S Test Statistic	0.5159
Gamma Statistics		K-S 5% Critical Value	0.228317
k hat	18.80746	Data do not follow gamma distribution	
k star (bias corrected)	14.82491	at 5% significance level	
Theta hat	0.282942		
Theta star	0.358952	95% UCLs (Assuming Gamma Distribution)	
nu hat	526.609	Approximate Gamma UCL	5.988505
nu star	415.0975	Adjusted Gamma UCL	6.08389
Approx.Chi Square Value (.05)	368.8586		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	363.0756	Shapiro-Wilk Test Statisitic	0.371253
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	1.791759	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.644921	95% H-UCL	6.212019
Standard Deviation of log data	0.275732	95% Chebyshev (MVUE) UCL	7.105795
Variance of log data	0.076028	97.5% Chebyshev (MVUE) UCL	7.858479
		99% Chebyshev (MVUE) UCL	9.336981
		95% Non-parametric UCLs	
		CLT UCL	5.749097
		Adj-CLT UCL (Adjusted for skewness)	5.488892
		Mod-t U	5.741291
		Jackknife UCL	5.781878
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.454759
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.945153
		99% Chebyshev (Mean, Sd) UCL	7.908435

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_3
2-Methylnaphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.510188
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	77	Data not normal at 5% significance level	
Maximum	4600		
Mean	654.9286	95% UCL (Assuming Normal Distribution)	
Median	187.5	Student's-t UCL	1226.644
Standard Deviation	1207.93		
Variance	1459094	Gamma Distribution Test	
Coefficient of Variation	1.844369	A-D Test Statistic	1.8963
Skewness	3.09118	A-D 5% Critical Value	0.774023
		K-S Test Statistic	0.386088
Gamma Statistics		K-S 5% Critical Value	0.238197
k hat	0.712437	Data do not follow gamma distribution	
k star (bias corrected)	0.607391	at 5% significance level	
Theta hat	919.2794		
Theta star	1078.265	95% UCLs (Assuming Gamma Distribution)	
nu hat	19.94823	Approximate Gamma UCL	1283.829
nu star	17.00695	Adjusted Gamma UCL	1410.444
Approx.Chi Square Value (.05)	8.675869		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	7.897043	Shapiro-Wilk Test Statisitic	0.808751
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.343805		
Maximum of log data	8.433812	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.638324	95% H-UCL	1473.239
Standard Deviation of log data	1.157892	95% Chebyshev (MVUE) UCL	1271.847
Variance of log data	1.340715	97.5% Chebyshev (MVUE) UCL	1600.88
		99% Chebyshev (MVUE) UCL	2247.202
		95% Non-parametric UCLs	
		CLT UCL	1185.941
		Adj-CLT UCL (Adjusted for skewness)	1470.924
		Mod-t UCL (Adjusted for skewness)	1271.095
		Jackknife UCL	1226.644
		Standard Bootstrap UCL	1137.608
		Bootstrap-t UCL	2438.795
RECOMMENDATION		Hall's Bootstrap UCL	2702.947
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1222.071
		BCA Bootstrap UCL	1621.571
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2062.124
		97.5% Chebyshev (Mean, Sd) UCL	2671.019
		99% Ch	3867.074

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_4
4,4'-DDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.67584
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.9	Data not normal at 5% significance level	
Maximum	11000		
Mean	2189.257	95% UCL (Assuming Normal Distribution)	
Median	155.5	Student's-t UCL	3860.495
Standard Deviation	3531.019		
Variance	12468097	Gamma Distribution Test	
Coefficient of Variation	1.612885	A-D Test Statistic	0.880164
Skewness	1.545807	A-D 5% Critical Value	0.860903
		K-S Test Statistic	0.222257
Gamma Statistics		K-S 5% Critical Value	0.251393
k hat	0.230359	Data follow approximate gamma distibution	
k star (bias corrected)	0.228616	at 5% significance level	
Theta hat	9503.66		
Theta star	9576.146	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.450062	Approximate Gamma UCL	7584.575
nu star	6.401239	Adjuste	9086.928
Approx.Chi Square Value (.05)	1.847692		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	1.542211	Shapiro-Wilk Test Statisitic	0.848623
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.641854		
Maximum of log data	9.305651	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.567159	95% H-UCL	88804019
Standard Deviation of log data	3.499993	95% Chebyshev (MVUE) UCL	40915.7
Variance of log data	12.24995	97.5% Chebyshev (MVUE) UCL	55004.11
		99% Chebyshev (MVUE) UCL	82678.05
		95% Non-parametric UCLs	
		CLT UCL	3741.513
		Adj-CLT UCL (Adjusted for skewness)	4158.102
		Mod-t UCL (Adjusted for skewness)	3925.474
		Jackknife UCL	3860.495
		Standard Bootstrap UCL	3700.286
		Bootstrap-t UCL	4346.378
RECOMMENDATION		Hall's Bootstrap UCL	3760.729
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	3753.136
		BCA Bootstrap UCL	4074.05
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	6302.77
		97.5% Chebyshev (Mean, Sd) UCL	8082.69
		99% Chebyshev (Mean, Sd) UCL	11579

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx			Variable:		_5		
4,4'-DDE								
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			14	Shapiro-Wilk Test Statisitic				0.574197
Number of Unique Samples			14	Shapiro-Wilk 5% Critical Value				0.874
Minimum			1.3	Data not normal at 5% significance level				
Maximum			8600					
Mean			1327.814	95% UCL (Assuming Normal Distribution)				
Median			144.5	Student's-t UCL				2576.607
Standard Deviation			2638.47					
Variance			6961525	Gamma Distribution Test				
Coefficient of Variation			1.987078	A-D Test Statistic				0.629201
Skewness			2.319522	A-D 5% Critical Value				0.854647
				K-S Test Statistic				0.211681
Gamma Statistics				K-S 5% Critical Value				0.250615
k hat			0.245448	Data follow gamma distribution				
k star (bias corrected)			0.240471	at 5% significance level				
Theta hat			5409.761					
Theta star			5521.724	95% UCLs (Assuming Gamma Distribution)				
nu hat			6.87254	Approximate Gamma UCL				4415.543
nu star			6.733186	Adjuste				5256.78
Approx.Chi Square Value (.05)			2.024762					
Adjusted Level of Significance			0.03122	Lognormal Distribution Test				
Adjusted Chi Square Value			1.700741	Shapiro-Wilk Test Statisitic				0.897465
				Shapiro-Wilk 5% Critical Value				0.874
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			0.262364					
Maximum of log data			9.059517	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			4.288857	95% H-UCL				7454143
Standard Deviation of log data			3.203511	95% Chebyshev (MVUE) UCL				16177.24
Variance of log data			10.26248	97.5% Chebyshev (MVUE) UCL				21699.22
				99% Chebyshev (MVUE) UCL				32546.09
				95% Non-parametric UCLs				
				CLT UCL				2487.701
				Adj-CLT UCL (Adjusted for skewness)				2954.793
				Mod-t UCL (Adjusted for skewness)				2649.464
				Jackknife UCL				2576.607
				Standard Bootstrap UCL				2446.162
				Bootstrap-t UCL				7319.625
RECOMMENDATION				Hall's Bootstrap UCL				8275.149
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL				2550.207
				BCA Bootstrap UCL				2970.457
Use Adjusted Gamma UCL				95% Chebyshev (Mean, Sd) UCL				4401.539
				97.5% Chebyshev (Mean, Sd) UCL				5731.542
				99% Chebyshev (Mean, Sd) UCL				8344.076

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_6
4,4'-DDT			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.407062
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.8	Data not normal at 5% significance level	
Maximum	140000		
Mean	13038.22	95% UCL (Assuming Normal Distribution)	
Median	50.5	Student's-t UCL	30680.59
Standard Deviation	37275.1		
Variance	1.39E+09	Gamma Distribution Test	
Coefficient of Variation	2.85891	A-D Test Statistic	1.31519
Skewness	3.512383	A-D 5% Critical Value	0.884851
		K-S Test Statistic	0.30583
Gamma Statistics		K-S 5% Critical Value	0.254253
k hat	0.166317	Data do not follow gamma distribution	
k star (bias corrected)	0.178296	at 5% significance level	
Theta hat	78393.94		
Theta star	73126.65	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.656867	Approximate Gamma UCL	56687.91
nu star	4.992301	Adjusted Gamma UCL	70315.18
Approx.Chi Square Value (.05)	1.148229		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	0.925699	Shapiro-Wilk Test Statisitic	0.904969
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.587787		
Maximum of log data	11.8494	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.924287	95% H-UCL	4.31E+08
Standard Deviation of log data	3.654503	95% Chebyshev (MVUE) UCL	82596.95
Variance of log data	13.35539	97.5% Chebyshev (MVUE) UCL	111138.6
		99% Chebyshev (MVUE) UCL	167203.1
		95% Non-parametric UCLs	
		CLT UCL	29424.56
		Adj-CLT UCL (Adjusted for skewness)	39417.04
		Mod-t UCL (Adjusted for skewness)	32239.22
		Jackknife UCL	30680.59
		Standard Bootstrap UCL	28932.83
		Bootstrap-t UCL	176449.4
RECOMMENDATION		Hall's B	121359.5
Data are lognormal (0.05)		Percentile Bootstrap UCL	31735.64
		BCA Bootstrap UCL	44462.57
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	56462.4
		97.5% Chebyshev (Mean, Sd) UCL	75252.07
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	112160.8
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_7
Acetone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.765861
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	150		
Mean	37.75	95% UCL (Assuming Normal Distribution)	
Median	16.5	Student's-t UCL	59.11154
Standard Deviation	45.13303		
Variance	2036.99	Gamma Distribution Test	
Coefficient of Variation	1.195577	A-D Test Statistic	0.889414
Skewness	1.576844	A-D 5% Critical Value	0.766712
		K-S Test Statistic	0.244947
Gamma Statistics		K-S 5% Critical Value	0.236688
k hat	0.841657	Data do not follow gamma distribution	
k star (bias corrected)	0.708921	at 5% significance level	
Theta hat	44.852		
Theta star	53.24994	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.56639	Approximate Gamma UCL	69.7765
nu star	19.84979	Adjusted Gamma UCL	76.00021
Approx.Chi Square Value (.05)	10.73899		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	9.85957	Shapiro-Wilk Test Statisitic	0.844463
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.010635	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.930481	95% H-UCL	128.5488
Standard Deviation of log data	1.25786	95% Chebyshev (MVUE) UCL	99.39648
Variance of log data	1.582211	97.5% Chebyshev (MVUE) UCL	126.0426
		99% Chebyshev (MVUE) UCL	178.3838
		95% Non-parametric UCLs	
		CLT UCL	57.59073
		Adj-CLT UCL (Adjusted for skewness)	63.02243
		Mod-t UCL (Adjusted for skewness)	59.95878
		Jackknife UCL	59.11154
		Standard Bootstrap UCL	57.22832
		Bootstrap-t UCL	73.89148
RECOMMENDATION		Hall's Bootstrap UCL	74.7302
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	58.07143
		BCA Bootstrap UCL	63.28571
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	90.32839
		97.5% Chebyshev (Mean, Sd) UCL	113.0791
		99% Ch	157.7685
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_8
Acetophenone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.600557
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	175	Data not normal at 5% significance level	
Maximum	420		
Mean	223.2143	95% UCL (Assuming Normal Distribution)	
Median	190	Student	260.3966
Standard Deviation	78.55931		
Variance	6171.566	Gamma Distribution Test	
Coefficient of Variation	0.351946	A-D Test Statistic	2.623786
Skewness	1.983459	A-D 5% Critical Value	0.734443
		K-S Test Statistic	0.422995
Gamma Statistics		K-S 5% Critical Value	0.228597
k hat	11.60922	Data do not follow gamma distribution	
k star (bias corrected)	9.169151	at 5% significance level	
Theta hat	19.22732		
Theta star	24.34405	95% UCLs (Assuming Gamma Distribution)	
nu hat	325.0582	Approximate Gamma UCL	259.746
nu star	256.7362	Adjusted Gamma UCL	265.0807
Approx.Chi Square Value (.05)	220.6278		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	216.1877	Shapiro-Wilk Test Statisitic	0.633012
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	6.040255	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.364445	95% H-UCL	258.4606
Standard Deviation of log data	0.285822	95% Chebyshev (MVUE) UCL	296.5258
Variance of log data	0.081694	97.5% Chebyshev (MVUE) UCL	328.8114
		99% Chebyshev (MVUE) UCL	392.2303
		95% Non-parametric UCLs	
		CLT UCL	257.7494
		Adj-CLT UCL (Adjusted for skewness)	269.6419
		Mod-t U	262.2515
		Jackknife UCL	260.3966
		Standard Bootstrap UCL	256.1089
		Bootstrap-t UCL	317.3943
RECOMMENDATION		Hall's Bootstrap UCL	269.3062
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	260
		BCA Bootstrap UCL	267.8571
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	314.7331
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	354.3334
		99% Chebyshev (Mean, Sd) UCL	432.1205

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_9
Aluminum			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.809032
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5400	Data not normal at 5% significance level	
Maximum	14000		
Mean	8034.286	95% UCL (Assuming Normal Distribution)	
Median	7055	Student's-t UCL	9179.989
Standard Deviation	2420.66		
Variance	5859596	Gamma Distribution Test	
Coefficient of Variation	0.301291	A-D Test Statistic	0.941795
Skewness	1.561533	A-D 5% Critical Value	0.7343
		K-S Test Statistic	0.223119
Gamma Statistics		K-S 5% Critical Value	0.228494
k hat	14.26499	Data follow approximate gamma distibution	
k star (bias corrected)	11.25583	at 5% significance level	
Theta hat	563.2169		
Theta star	713.7889	95% UCLs (Assuming Gamma Distribution)	
nu hat	399.4198	Approxi	9206.783
nu star	315.1632	Adjusted Gamma UCL	9376.359
Approx.Chi Square Value (.05)	275.0267		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	270.0527	Shapiro-Wilk Test Statisitic	0.879498
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.594154		
Maximum of log data	9.546813	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.956013	95% H-UCL	9215.969
Standard Deviation of log data	0.265275	95% Chebyshev (MVUE) UCL	10508.13
Variance of log data	0.070371	97.5% Chebyshev (MVUE) UCL	11588.49
		99% Chebyshev (MVUE) UCL	13710.64
		95% Non-parametric UCLs	
		CLT UCL	9098.422
		Adj-CLT UCL (Adjusted for skewness)	9386.916
		Mod-t UCL (Adjusted for skewness)	9224.988
		Jackknife UCL	9179.989
		Standard Bootstrap UCL	9063.365
		Bootstrap-t UCL	9819.099
RECOMMENDATION		Hall's Bootstrap UCL	9801.042
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	9103.571
		BCA Bootstrap UCL	9410
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	10854.27
		97.5% Chebyshev (Mean, Sd) UCL	12074.48
		99% Chebyshev (Mean, Sd) UCL	14471.34

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_10
Antimony			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.616746
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.26	Data not normal at 5% significance level	
Maximum	10.9		
Mean	2.061429	95% UCL (Assuming Normal Distribution)	
Median	1.15	Student's-t UCL	3.371848
Standard Deviation	2.768676		
Variance	7.665567	Gamma Distribution Test	
Coefficient of Variation	1.343086	A-D Test Statistic	0.673045
Skewness	2.871275	A-D 5% Critical Value	0.757962
		K-S Test Statistic	0.23574
Gamma Statistics		K-S 5% Critical Value	0.234615
k hat	1.107312	Data follow approximate gamma distibution	
k star (bias corrected)	0.91765	at 5% significance level	
Theta hat	1.861651		
Theta star	2.246422	95% UCLs (Assuming Gamma Distribution)	
nu hat	31.00473	Approxi	3.497936
nu star	25.6942	Adjusted Gamma UCL	3.762967
Approx.Chi Square Value (.05)	15.14229		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	14.07579	Shapiro-Wilk Test Statisitic	0.966744
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.347074		
Maximum of log data	2.388763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.20814	95% H-UCL	4.262455
Standard Deviation of log data	0.984183	95% Chebyshev (MVUE) UCL	4.275735
Variance of log data	0.968616	97.5% Chebyshev (MVUE) UCL	5.300926
		99% Chebyshev (MVUE) UCL	7.314715
		95% Non-parametric UCLs	
		CLT UCL	3.278554
		Adj-CLT UCL (Adjusted for skewness)	3.885289
		Mod-t UCL (Adjusted for skewness)	3.466486
		Jackknife UCL	3.371848
		Standard Bootstrap UCL	3.245621
		Bootstrap-t UCL	5.757469
RECOMMENDATION		Hall's Bootstrap UCL	8.071483
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	3.402857
		BCA Bootstrap UCL	4.194286
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5.286838
		97.5% Chebyshev (Mean, Sd) UCL	6.682476
		99% Chebyshev (Mean, Sd) UCL	9.423935

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_11
Aroclor-1260			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.358561
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.874
Minimum	17.5	Data not normal at 5% significance level	
Maximum	9500		
Mean	812.4286	95% UCL (Assuming Normal Distribution)	
Median	19.75	Student's-t UCL	2002.01
Standard Deviation	2513.368		
Variance	6317018	Gamma Distribution Test	
Coefficient of Variation	3.093648	A-D Test Statistic	2.368922
Skewness	3.677673	A-D 5% Critical Value	0.839075
		K-S Test Statistic	0.329763
Gamma Statistics		K-S 5% Critical Value	0.248677
k hat	0.283007	Data do not follow gamma distribution	
k star (bias corrected)	0.269982	at 5% significance level	
Theta hat	2870.698		
Theta star	3009.196	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.924206	Approximate Gamma UCL	2474.423
nu star	7.559495	Adjusted Gamma UCL	2906.095
Approx.Chi Square Value (.05)	2.482013		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.113334	Shapiro-Wilk Test Statisitic	0.742063
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	9.159047	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.240193	95% H-UCL	5811.106
Standard Deviation of log data	1.95944	95% Chebyshev (MVUE) UCL	1249.553
Variance of log data	3.839406	97.5% Chebyshev (MVUE) UCL	1639.256
		99% Chebyshev (MVUE) UCL	2404.751
		95% Non-parametric UCLs	
		CLT UCL	1917.319
		Adj-CLT UCL (Adjusted for skewness)	2622.794
		Mod-t UCL (Adjusted for skewness)	2112.05
		Jackknife UCL	2002.01
		Standard Bootstrap UCL	1888.079
		Bootstrap-t UCL	18569.27
RECOMMENDATION		Hall's Bootstrap UCL	11209.35
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2124.107
		BCA Bootstrap UCL	2912.179
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3740.413
		97.5% Chebyshev (Mean, Sd) UCL	5007.355
		99% Ch	7496.016

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_12
Arsenic			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.853663
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	2.5	Data not normal at 5% significance level	
Maximum	53.7		
Mean	16.37857	95% UCL (Assuming Normal Distribution)	
Median	13.55	Student's-t UCL	23.62803
Standard Deviation	15.31677		
Variance	234.6034	Gamma Distribution Test	
Coefficient of Variation	0.935171	A-D Test Statistic	0.410199
Skewness	1.28194	A-D 5% Critical Value	0.755554
		K-S Test Statistic	0.175259
Gamma Statistics		K-S 5% Critical Value	0.233994
k hat	1.236618	Data follow gamma distribution	
k star (bias corrected)	1.019248	at 5% significance level	
Theta hat	13.24465		
Theta star	16.06928	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.62531	Approxi	26.94686
nu star	28.53893	Adjusted Gamma UCL	28.86025
Approx.Chi Square Value (.05)	17.34625		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	16.19622	Shapiro-Wilk Test Statisitic	0.923973
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	3.983413	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.339997	95% H-UCL	41.14919
Standard Deviation of log data	1.043939	95% Chebyshev (MVUE) UCL	39.42543
Variance of log data	1.089808	97.5% Chebyshev (MVUE) UCL	49.1515
		99% Chebyshev (MVUE) UCL	68.25646
		95% Non-parametric UCLs	
		CLT UCL	23.11191
		Adj-CLT UCL (Adjusted for skewness)	24.61051
		Mod-t UCL (Adjusted for skewness)	23.86178
		Jackknife UCL	23.62803
		Standard Bootstrap UCL	23.08889
		Bootstrap-t UCL	26.31999
RECOMMENDATION		Hall's Bootstrap UCL	26.94991
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	23.1
		BCA Bootstrap UCL	24.27143
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	34.22207
		97.5% Chebyshev (Mean, Sd) UCL	41.94296
		99% Chebyshev (Mean, Sd) UCL	57.10916

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_13
Barium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.526931
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	102	Data not normal at 5% significance level	
Maximum	1990		
Mean	353.9286	95% UCL (Assuming Normal Distribution)	
Median	167	Student's-t UCL	590.8083
Standard Deviation	500.4834		
Variance	250483.6	Gamma Distribution Test	
Coefficient of Variation	1.41408	A-D Test Statistic	1.635711
Skewness	3.115357	A-D 5% Critical Value	0.755209
		K-S Test Statistic	0.310987
Gamma Statistics		K-S 5% Critical Value	0.233905
k hat	1.255136	Data do not follow gamma distribution	
k star (bias corrected)	1.033797	at 5% significance level	
Theta hat	281.9844		
Theta star	342.3579	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.14379	Approximate Gamma UCL	579.9705
nu star	28.94631	Adjusted Gamma UCL	620.795
Approx.Chi Square Value (.05)	17.66457		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	16.50292	Shapiro-Wilk Test Statisitic	0.812222
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.624973		
Maximum of log data	7.59589	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.420529	95% H-UCL	565.8615
Standard Deviation of log data	0.825145	95% Chebyshev (MVUE) UCL	623.5276
Variance of log data	0.680865	97.5% Chebyshev (MVUE) UCL	760.0308
		99% Chebyshev (MVUE) UCL	1028.165
		95% Non-parametric UCLs	
		CLT UCL	573.9439
		Adj-CLT UCL (Adjusted for skewness)	692.9447
		Mod-t UCL (Adjusted for skewness)	609.37
		Jackknife UCL	590.8083
		Standard Bootstrap UCL	553.9239
		Bootstrap-t UCL	1406.419
RECOMMENDATION		Hall's Bootstrap UCL	1429.297
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	593.0714
		BCA Bootstrap UCL	704
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	936.9741
		97.5% Chebyshev (Mean, Sd) UCL	1189.258
		99% Chebyshev (Mean, Sd) UCL	1684.822

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_14
Benzo(a)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.674537
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	80	Data not normal at 5% significance level	
Maximum	1200		
Mean	319.2857	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	457.1316
Standard Deviation	291.2431		
Variance	84822.53	Gamma Distribution Test	
Coefficient of Variation	0.912171	A-D Test Statistic	1.154487
Skewness	2.4397	A-D 5% Critical Value	0.745577
		K-S Test Statistic	0.317522
Gamma Statistics		K-S 5% Critical Value	0.231522
k hat	2.103456	Data do not follow gamma distribution	
k star (bias corrected)	1.700335	at 5% significance level	
Theta hat	151.791		
Theta star	187.7782	95% UCLs (Assuming Gamma Distribution)	
nu hat	58.89678	Approximate Gamma UCL	463.8578
nu star	47.60937	Adjusted Gamma UCL	488.1035
Approx.Chi Square Value (.05)	32.7708		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	31.14297	Shapiro-Wilk Test Statisitic	0.888492
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.382027		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.509936	95% H-l	487.5721
Standard Deviation of log data	0.68741	95% Chebyshev (MVUE) UCL	564.5143
Variance of log data	0.472533	97.5% Chebyshev (MVUE) UCL	676.024
		99% Chebyshev (MVUE) UCL	895.0631
		95% Non-parametric UCLs	
		CLT UCL	447.3178
		Adj-CLT UCL (Adjusted for skewness)	501.5484
		Mod-t UCL (Adjusted for skewness)	465.5905
		Jackknife UCL	457.1316
		Standard Bootstrap UCL	445.8079
		Bootstrap-t UCL	614.2073
RECOMMENDATION		Hall's Bootstrap UCL	883.9443
Data are lognormal (0.05)		Percentile Bootstrap UCL	449.2857
		BCA Bootstrap UCL	485.7143
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	658.5736
		97.5% Chebyshev (Mean, Sd) UCL	805.3838
		99% Chebyshev (Mean, Sd) UCL	1093.764

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_15
Benzo(a)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.722396
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	81	Data not normal at 5% significance level	
Maximum	1400		
Mean	382.2143	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	554.0146
Standard Deviation	362.9826		
Variance	131756.3	Gamma Distribution Test	
Coefficient of Variation	0.949683	A-D Test Statistic	1.20348
Skewness	1.98201	A-D 5% Critical Value	0.748678
		K-S Test Statistic	0.351519
Gamma Statistics		K-S 5% Critical Value	0.232275
k hat	1.70889	Data do not follow gamma distribution	
k star (bias corrected)	1.390318	at 5% significance level	
Theta hat	223.6623		
Theta star	274.9113	95% UCLs (Assuming Gamma Distribution)	
nu hat	47.84892	Approximate Gamma UCL	580.4174
nu star	38.92891	Adjusted Gamma UCL	614.5789
Approx.Chi Square Value (.05)	25.63532		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	24.21038	Shapiro-Wilk Test Statisitic	0.874971
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.394449		
Maximum of log data	7.244228	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.625713	95% H-I	650.9822
Standard Deviation of log data	0.789682	95% Chebyshev (MVUE) UCL	728.532
Variance of log data	0.623598	97.5% Chebyshev (MVUE) UCL	884.246
		99% Chebyshev (MVUE) UCL	1190.116
		95% Non-parametric UCLs	
		CLT UCL	541.7835
		Adj-CLT UCL (Adjusted for skewness)	596.6925
		Mod-t UCL (Adjusted for skewness)	562.5793
		Jackknife UCL	554.0146
		Standard Bootstrap UCL	537.574
		Bootstrap-t UCL	682.562
RECOMMENDATION		Hall's Bootstrap UCL	1065.85
Data are lognormal (0.05)		Percentile Bootstrap UCL	545.1429
		BCA Bootstrap UCL	569.6429
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	805.0762
		97.5% Chebyshev (Mean, Sd) UCL	988.0488
		99% Chebyshev (Mean, Sd) UCL	1347.463

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_16
Benzo(b)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.719385
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	130	Data not normal at 5% significance level	
Maximum	860		
Mean	341.0714	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	462.3604
Standard Deviation	256.2614		
Variance	65669.92	Gamma Distribution Test	
Coefficient of Variation	0.751342	A-D Test Statistic	1.64938
Skewness	1.334605	A-D 5% Critical Value	0.744307
		K-S Test Statistic	0.374207
Gamma Statistics		K-S 5% Critical Value	0.231097
k hat	2.476012	Data do not follow gamma distribution	
k star (bias corrected)	1.993057	at 5% significance level	
Theta hat	137.7503		
Theta star	171.1298	95% UCLs (Assuming Gamma Distribution)	
nu hat	69.32833	Approximate Gamma UCL	480.2332
nu star	55.80559	Adjusted Gamma UCL	503.1233
Approx.Chi Square Value (.05)	39.63427		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	37.83107	Shapiro-Wilk Test Statisitic	0.787754
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	6.756932	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.616768	95% H-UCL	507.5259
Standard Deviation of log data	0.644314	95% Chebyshev (MVUE) UCL	593.3017
Variance of log data	0.415141	97.5% Chebyshev (MVUE) UCL	706.0835
		99% Chebyshev (MVUE) UCL	927.6215
		95% Non-parametric UCLs	
		CLT UCL	453.7254
		Adj-CLT UCL (Adjusted for skewness)	479.8283
		Mod-t UCL (Adjusted for skewness)	466.4319
		Jackknife UCL	462.3604
		Standard Bootstrap UCL	448.7733
		Bootstrap-t UCL	517.2046
RECOMMENDATION		Hall's Bootstrap UCL	473.3093
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	459.6429
		BCA Bootstrap UCL	479.2857
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	639.607
		97.5% Chebyshev (Mean, Sd) UCL	768.7835
		99% Chebyshev (Mean, Sd) UCL	1022.526

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_17
Benzo(g,h,i)perylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.776419
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.874
Minimum	82	Data not normal at 5% significance level	
Maximum	1200		
Mean	373.3571	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	530.6221
Standard Deviation	332.272		
Variance	110404.7	Gamma Distribution Test	
Coefficient of Variation	0.889958	A-D Test Statistic	1.06127
Skewness	1.468175	A-D 5% Critical Value	0.748776
		K-S Test Statistic	0.341971
Gamma Statistics		K-S 5% Critical Value	0.232297
k hat	1.698471	Data do not follow gamma distribution	
k star (bias corrected)	1.382132	at 5% significance level	
Theta hat	219.8196		
Theta star	270.1314	95% UCLs (Assuming Gamma Distribution)	
nu hat	47.55718	Approximate Gamma UCL	567.7521
nu star	38.69969	Adjusted Gamma UCL	601.2859
Approx.Chi Square Value (.05)	25.44914		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	24.02985	Shapiro-Wilk Test Statisitic	0.889884
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.406719		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.600141	95% H-I	660.2811
Standard Deviation of log data	0.811517	95% Chebyshev (MVUE) UCL	732.0793
Variance of log data	0.65856	97.5% Chebyshev (MVUE) UCL	890.9064
		99% Chebyshev (MVUE) UCL	1202.892
		95% Non-parametric UCLs	
		CLT UCL	519.4258
		Adj-CLT UCL (Adjusted for skewness)	556.6584
		Mod-t UCL (Adjusted for skewness)	536.4296
		Jackknife UCL	530.6221
		Standard Bootstrap UCL	514.4098
		Bootstrap-t UCL	626.945
RECOMMENDATION		Hall's Bootstrap UCL	577.4498
Data are lognormal (0.05)		Percentile Bootstrap UCL	519.7857
		BCA Bootstrap UCL	563.2143
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	760.4424
		97.5% Chebyshev (Mean, Sd) UCL	927.9344
		99% Chebyshev (Mean, Sd) UCL	1256.94

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_18
Benzo(k)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.739784
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	150	Data not normal at 5% significance level	
Maximum	890		
Mean	339.6429	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	454.6017
Standard Deviation	242.887		
Variance	58994.09	Gamma Distribution Test	
Coefficient of Variation	0.715125	A-D Test Statistic	1.709147
Skewness	1.281197	A-D 5% Critical Value	0.743654
		K-S Test Statistic	0.385405
Gamma Statistics		K-S 5% Critical Value	0.230879
k hat	2.667346	Data do not follow gamma distribution	
k star (bias corrected)	2.143391	at 5% significance level	
Theta hat	127.3337		
Theta star	158.4606	95% UCLs (Assuming Gamma Distribution)	
nu hat	74.68568	Approximate Gamma UCL	471.8706
nu star	60.01494	Adjusted Gamma UCL	493.4403
Approx.Chi Square Value (.05)	43.19753		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	41.30924	Shapiro-Wilk Test Statisitic	0.770314
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.010635		
Maximum of log data	6.791221	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.628885	95% H-UCL	497.1987
Standard Deviation of log data	0.622308	95% Chebyshev (MVUE) UCL	583.4899
Variance of log data	0.387267	97.5% Chebyshev (MVUE) UCL	692.1005
		99% Chebyshev (MVUE) UCL	905.445
		95% Non-parametric UCLs	
		CLT UCL	446.4173
		Adj-CLT UCL (Adjusted for skewness)	470.1678
		Mod-t UCL (Adjusted for skewness)	458.3063
		Jackknife UCL	454.6017
		Standard Bootstrap UCL	439.3357
		Bootstrap-t UCL	507.5219
RECOMMENDATION		Hall's Bootstrap UCL	453.5245
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	442.5
		BCA Bootstrap UCL	461.7857
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	622.5976
		97.5% Chebyshev (Mean, Sd) UCL	745.0324
		99% Chebyshev (Mean, Sd) UCL	985.5318

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx			Variable:		_19		
Beryllium								
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			14	Shapiro-Wilk Test Statisitic				0.757391
Number of Unique Samples			9	Shapiro-Wilk 5% Critical Value				0.874
Minimum			0.23	Data not normal at 5% significance level				
Maximum			0.44					
Mean			0.275714	95% UCL (Assuming Normal Distribution)				
Median			0.26	Student				0.302534
Standard Deviation			0.056666					
Variance			0.003211	Gamma Distribution Test				
Coefficient of Variation			0.205523	A-D Test Statistic				0.971341
Skewness			2.123727	A-D 5% Critical Value				0.733624
				K-S Test Statistic				0.246158
Gamma Statistics				K-S 5% Critical Value				0.228187
k hat			30.76323	Data do not follow gamma distribution				
k star (bias corrected)			24.21873	at 5% significance level				
Theta hat			0.008962					
Theta star			0.011384	95% UCLs (Assuming Gamma Distribution)				
nu hat			861.3704	Approximate Gamma UCL				0.302198
nu star			678.1244	Adjusted Gamma UCL				0.305923
Approx.Chi Square Value (.05)			618.6947					
Adjusted Level of Significance			0.03122	Lognormal Distribution Test				
Adjusted Chi Square Value			611.1621	Shapiro-Wilk Test Statisitic				0.824495
				Shapiro-Wilk 5% Critical Value				0.874
Log-transformed Statistics				Data not lognormal at 5% significance level				
Minimum of log data			-1.469676					
Maximum of log data			-0.820981	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			-1.304731	95% H-UCL				0.30162
Standard Deviation of log data			0.179648	95% Chebyshev (MVUE) UCL				0.333187
Variance of log data			0.032273	97.5% Chebyshev (MVUE) UCL				0.358219
				99% Chebyshev (MVUE) UCL				0.40739
				95% Non-parametric UCLs				
				CLT UCL				0.300625
				Adj-CLT UCL (Adjusted for skewness)				0.30981
				Mod-t U				0.303967
				Jackknife UCL				0.302534
				Standard Bootstrap UCL				0.299941
				Bootstrap-t UCL				0.323787
RECOMMENDATION				Hall's Bootstrap UCL				0.398612
Data are Non-parametric (0.05)				Percentile Bootstrap UCL				0.300714
				BCA Bootstrap UCL				0.311429
Use Student's-t UCL				95% Chebyshev (Mean, Sd) UCL				0.341728
or Modified-t UCL				97.5% Chebyshev (Mean, Sd) UCL				0.370292
				99% Chebyshev (Mean, Sd) UCL				0.4264

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_20
Cadmium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.433987
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.13	Data not normal at 5% significance level	
Maximum	5.7		
Mean	0.788571	95% UCL (Assuming Normal Distribution)	
Median	0.405	Student's-t UCL	1.465496
Standard Deviation	1.430217		
Variance	2.045521	Gamma Distribution Test	
Coefficient of Variation	1.813681	A-D Test Statistic	1.505807
Skewness	3.594106	A-D 5% Critical Value	0.761536
		K-S Test Statistic	0.278429
Gamma Statistics		K-S 5% Critical Value	0.235494
k hat	0.963047	Data do not follow gamma distribution	
k star (bias corrected)	0.804299	at 5% significance level	
Theta hat	0.818829		
Theta star	0.980446	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.96532	Approximate Gamma UCL	1.395317
nu star	22.52037	Adjusted Gamma UCL	1.510149
Approx.Chi Square Value (.05)	12.72752		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	11.75972	Shapiro-Wilk Test Statisitic	0.873967
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.040221		
Maximum of log data	1.740466	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.839578	95% H-UCL	1.331037
Standard Deviation of log data	0.930078	95% Chebyshev (MVUE) UCL	1.384862
Variance of log data	0.865044	97.5% Chebyshev (MVUE) UCL	1.70766
		99% Chebyshev (MVUE) UCL	2.341734
		95% Non-parametric UCLs	
		CLT UCL	1.417303
		Adj-CLT UCL (Adjusted for skewness)	1.809627
		Mod-t UCL (Adjusted for skewness)	1.52669
		Jackknife UCL	1.465496
		Standard Bootstrap UCL	1.41933
		Bootstrap-t UCL	4.219594
RECOMMENDATION		Hall's Bootstrap UCL	4.025739
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.529286
		BCA Bootstrap UCL	1.943571
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.454724
		97.5% Chebyshev (Mean, Sd) UCL	3.175669
		99% Chebyshev (Mean, Sd) UCL	4.591827

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_21
Calcium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.802727
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	4520	Data not normal at 5% significance level	
Maximum	20900		
Mean	9058.571	95% UCL (Assuming Normal Distribution)	
Median	7125	Student's-t UCL	11461.19
Standard Deviation	5076.289		
Variance	25768705	Gamma Distribution Test	
Coefficient of Variation	0.560385	A-D Test Statistic	0.688001
Skewness	1.502715	A-D 5% Critical Value	0.739286
		K-S Test Statistic	0.175646
Gamma Statistics		K-S 5% Critical Value	0.229582
k hat	4.394618	Data follow gamma distribution	
k star (bias corrected)	3.500533	at 5% significance level	
Theta hat	2061.288		
Theta star	2587.769	95% UCLs (Assuming Gamma Distribution)	
nu hat	123.0493	Approximate Gamma UCL	11656.07
nu star	98.01493	Adjusted Gamma UCL	12060.04
Approx.Chi Square Value (.05)	76.17274		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	73.62127	Shapiro-Wilk Test Statisitic	0.908894
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.416267		
Maximum of log data	9.947504	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.993398	95% H-UCL	11903.41
Standard Deviation of log data	0.480322	95% Chebyshev (MVUE) UCL	14093.84
Variance of log data	0.230709	97.5% Chebyshev (MVUE) UCL	16318.22
		99% Chebyshev (MVUE) UCL	20687.58
		95% Non-parametric UCLs	
		CLT UCL	11290.14
		Adj-CLT UCL (Adjusted for skewness)	11872.34
		Mod-t UCL (Adjusted for skewness)	11552
		Jackknife UCL	11461.19
		Standard Bootstrap UCL	11237.43
		Bootstrap-t UCL	13269.24
RECOMMENDATION		Hall's Bootstrap UCL	12869.96
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	11372.14
		BCA Bootstrap UCL	11733.57
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	14972.27
		97.5% Chebyshev (Mean, Sd) UCL	17531.13
		99% Chebyshev (Mean, Sd) UCL	22557.52

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_22
Caprolactam			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.524566
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	175	Data not normal at 5% significance level	
Maximum	550		
Mean	228.9286	95% UCL (Assuming Normal Distribution)	
Median	190	Student	278.856
Standard Deviation	105.4875		
Variance	11127.61	Gamma Distribution Test	
Coefficient of Variation	0.460788	A-D Test Statistic	2.880438
Skewness	2.700883	A-D 5% Critical Value	0.73591
		K-S Test Statistic	0.412143
Gamma Statistics		K-S 5% Critical Value	0.228919
k hat	8.005674	Data do not follow gamma distribution	
k star (bias corrected)	6.337792	at 5% significance level	
Theta hat	28.59579		
Theta star	36.12119	95% UCLs (Assuming Gamma Distribution)	
nu hat	224.1589	Approximate Gamma UCL	275.1597
nu star	177.4582	Adjusted Gamma UCL	282.0494
Approx.Chi Square Value (.05)	147.6424		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	144.0359	Shapiro-Wilk Test Statisitic	0.582604
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.369656	95% H-UCL	270.9079
Standard Deviation of log data	0.331799	95% Chebyshev (MVUE) UCL	314.5168
Variance of log data	0.110091	97.5% Chebyshev (MVUE) UCL	352.812
		99% Chebyshev (MVUE) UCL	428.0356
		95% Non-parametric UCLs	
		CLT UCL	275.3015
		Adj-CLT UCL (Adjusted for skewness)	297.0464
		Mod-t UCL (Adjusted for skewness)	282.2478
		Jackknife UCL	278.856
		Standard Bootstrap UCL	273.8576
		Bootstrap-t UCL	556.8216
RECOMMENDATION		Hall's Bootstrap UCL	573.556
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	280.3571
		BCA Bootstrap UCL	303.5714
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	351.8178
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	404.992
		99% Chebyshev (Mean, Sd) UCL	509.4426

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_23
Chlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.305505
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	49		
Mean	8.678571	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	14.17205
Standard Deviation	11.60671		
Variance	134.7157	Gamma Distribution Test	
Coefficient of Variation	1.337398	A-D Test Statistic	4.722549
Skewness	3.740084	A-D 5% Critical Value	0.746978
		K-S Test Statistic	0.518256
Gamma Statistics		K-S 5% Critical Value	0.231882
k hat	1.888999	Data do not follow gamma distribution	
k star (bias corrected)	1.531832	at 5% significance level	
Theta hat	4.594271		
Theta star	5.665484	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.89196	Approximate Gamma UCL	12.89218
nu star	42.8913	Adjusted Gamma UCL	13.60863
Approx.Chi Square Value (.05)	28.87294		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	27.35288	Shapiro-Wilk Test Statisitic	0.326551
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	3.89182	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.873398	95% H-UCL	10.97645
Standard Deviation of log data	0.58179	95% Chebyshev (MVUE) UCL	12.95085
Variance of log data	0.338479	97.5% Chebyshev (MVUE) UCL	15.26356
		99% Chebyshev (MVUE) UCL	19.80643
		95% Non-parametric UCLs	
		CLT UCL	13.78095
		Adj-CLT UCL (Adjusted for skewness)	17.09411
		Mod-t UCL (Adjusted for skewness)	14.68883
		Jackknife UCL	14.17205
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	22.19998
		97.5% Chebyshev (Mean, Sd) UCL	28.0507
		99% Chebyshev (Mean, Sd) UCL	39.54331

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_24
Chromium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.791607
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	22.9	Data not normal at 5% significance level	
Maximum	348		
Mean	98.09286	95% UCL (Assuming Normal Distribution)	
Median	84	Student's-t UCL	140.5369
Standard Deviation	89.67653		
Variance	8041.879	Gamma Distribution Test	
Coefficient of Variation	0.9142	A-D Test Statistic	0.728122
Skewness	1.738374	A-D 5% Critical Value	0.750877
		K-S Test Statistic	0.243726
Gamma Statistics		K-S 5% Critical Value	0.232789
k hat	1.487785	Data follow approximate gamma distibution	
k star (bias corrected)	1.216593	at 5% significance level	
Theta hat	65.93215		
Theta star	80.62915	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.65798	Approximate Gamma UCL	153.8877
nu star	34.0646	Adjusted Gamma UCL	163.6988
Approx.Chi Square Value (.05)	21.71385		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	20.41245	Shapiro-Wilk Test Statisitic	0.878998
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.131137		
Maximum of log data	5.852202	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.213635	95% H-UCL	199.9649
Standard Deviation of log data	0.910241	95% Chebyshev (MVUE) UCL	210.6033
Variance of log data	0.828538	97.5% Chebyshev (MVUE) UCL	259.1554
		99% Chebyshev (MVUE) UCL	354.5266
		95% Non-parametric UCLs	
		CLT UCL	137.5152
		Adj-CLT UCL (Adjusted for skewness)	149.4132
		Mod-t UCL (Adjusted for skewness)	142.3928
		Jackknife UCL	140.5369
		Standard Bootstrap UCL	135.9312
		Bootstrap-t UCL	158.4921
RECOMMENDATION		Hall's Bootstrap UCL	198.9224
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	137.6786
		BCA Bootstrap UCL	151.3286
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	202.5628
		97.5% Chebyshev (Mean, Sd) UCL	247.7671
		99% Chebyshev (Mean, Sd) UCL	336.5621

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_25
Chrysene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.640401
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	110	Data not normal at 5% significance level	
Maximum	1500		
Mean	370.7143	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	543.727
Standard Deviation	365.5442		
Variance	133622.5	Gamma Distribution Test	
Coefficient of Variation	0.986054	A-D Test Statistic	1.4534
Skewness	2.56249	A-D 5% Critical Value	0.747018
		K-S Test Statistic	0.358524
Gamma Statistics		K-S 5% Critical Value	0.231891
k hat	1.884732	Data do not follow gamma distribution	
k star (bias corrected)	1.52848	at 5% significance level	
Theta hat	196.6934		
Theta star	242.5379	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.77249	Approximate Gamma UCL	550.9692
nu star	42.79744	Adjusted Gamma UCL	581.6274
Approx.Chi Square Value (.05)	28.79584		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	27.27798	Shapiro-Wilk Test Statisitic	0.82492
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.70048		
Maximum of log data	7.31322	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.627272	95% H-UCL	575.6217
Standard Deviation of log data	0.717443	95% Chebyshev (MVUE) UCL	660.9317
Variance of log data	0.514724	97.5% Chebyshev (MVUE) UCL	794.7667
		99% Chebyshev (MVUE) UCL	1057.66
		95% Non-parametric UCLs	
		CLT UCL	531.4096
		Adj-CLT UCL (Adjusted for skewness)	602.9011
		Mod-t UCL (Adjusted for skewness)	554.8782
		Jackknife UCL	543.727
		Standard Bootstrap UCL	526.5426
		Bootstrap-t UCL	737.8439
RECOMMENDATION		Hall's Bootstrap UCL	1095.525
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	541.0714
		BCA Bootstrap UCL	613.2143
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	796.5603
		97.5% Chebyshev (Mean, Sd) UCL	980.8243
		99% Chebyshev (Mean, Sd) UCL	1342.775

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_26
Cobalt			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.901651
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	3.4	Data are normal at 5% significance level	
Maximum	11.3		
Mean	6.007143	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	7.055082
Standard Deviation	2.214103		
Variance	4.902253	Gamma Distribution Test	
Coefficient of Variation	0.368578	A-D Test Statistic	0.300969
Skewness	1.191588	A-D 5% Critical Value	0.735232
		K-S Test Statistic	0.181027
Gamma Statistics		K-S 5% Critical Value	0.228792
k hat	8.985221	Data follow gamma distribution	
k star (bias corrected)	7.107436	at 5% significance level	
Theta hat	0.668558		
Theta star	0.845191	95% UCLs (Assuming Gamma Distribution)	
nu hat	251.5862	Approximate Gamma UCL	7.143017
nu star	199.0082	Adjusted Gamma UCL	7.311153
Approx.Chi Square Value (.05)	167.3622		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	163.5133	Shapiro-Wilk Test Statisitic	0.969059
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.223775		
Maximum of log data	2.424803	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.736271	95% H-UCL	7.232433
Standard Deviation of log data	0.342461	95% Chebyshev (MVUE) UCL	8.416547
Variance of log data	0.117279	97.5% Chebyshev (MVUE) UCL	9.465388
		99% Chebyshev (MVUE) UCL	11.52563
		95% Non-parametric UCLs	
		CLT UCL	6.980475
		Adj-CLT UCL (Adjusted for skewness)	7.181837
		Mod-t UCL (Adjusted for skewness)	7.08649
		Jackknife UCL	7.055082
		Standard Bootstrap UCL	6.952872
		Bootstrap-t UCL	7.398398
RECOMMENDATION		Hall's Bootstrap UCL	7.541489
Data are normal (0.05)		Percentile Bootstrap UCL	6.985714
		BCA Bootstrap UCL	7.192857
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	8.586495
		97.5% Chebyshev (Mean, Sd) UCL	9.702583
		99% Chebyshev (Mean, Sd) UCL	11.89492

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_27
Copper			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.695479
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	13.6	Data not normal at 5% significance level	
Maximum	409		
Mean	91.86429	95% UCL (Assuming Normal Distribution)	
Median	59.2	Student's-t UCL	141.6912
Standard Deviation	105.2751		
Variance	11082.86	Gamma Distribution Test	
Coefficient of Variation	1.145986	A-D Test Statistic	0.501297
Skewness	2.440243	A-D 5% Critical Value	0.754529
		K-S Test Statistic	0.229341
Gamma Statistics		K-S 5% Critical Value	0.23373
k hat	1.291696	Data follow gamma distribution	
k star (bias corrected)	1.062523	at 5% significance level	
Theta hat	71.1191		
Theta star	86.45861	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.1675	Approximate Gamma UCL	149.387
nu star	29.75065	Adjusted Gamma UCL	159.7274
Approx.Chi Square Value (.05)	18.29491		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	17.11054	Shapiro-Wilk Test Statisitic	0.975822
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.61007		
Maximum of log data	6.013715	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.085705	95% H-UCL	183.1384
Standard Deviation of log data	0.929599	95% Chebyshev (MVUE) UCL	190.6018
Variance of log data	0.864155	97.5% Chebyshev (MVUE) UCL	235.0176
		99% Chebyshev (MVUE) UCL	322.2639
		95% Non-parametric UCLs	
		CLT UCL	138.1438
		Adj-CLT UCL (Adjusted for skewness)	157.7508
		Mod-t UCL (Adjusted for skewness)	144.7495
		Jackknife UCL	141.6912
		Standard Bootstrap UCL	135.8
		Bootstrap-t UCL	208.0134
RECOMMENDATION		Hall's Bootstrap UCL	329.9254
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	140.8929
		BCA Bootstrap UCL	160.55
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	214.5061
		97.5% Chebyshev (Mean, Sd) UCL	267.5733
		99% Chebyshev (Mean, Sd) UCL	371.8136

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_28
Dibenz(a,h)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.659464
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	100	Data not normal at 5% significance level	
Maximum	550		
Mean	246.4286	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	312.7911
Standard Deviation	140.2118		
Variance	19659.34	Gamma Distribution Test	
Coefficient of Variation	0.568975	A-D Test Statistic	2.058208
Skewness	1.713567	A-D 5% Critical Value	0.738996
		K-S Test Statistic	0.391929
Gamma Statistics		K-S 5% Critical Value	0.229522
k hat	4.529817	Data do not follow gamma distribution	
k star (bias corrected)	3.606761	at 5% significance level	
Theta hat	54.40144		
Theta star	68.32406	95% UCLs (Assuming Gamma Distribution)	
nu hat	126.8349	Approximate Gamma UCL	315.8227
nu star	100.9893	Adjusted Gamma UCL	326.5878
Approx.Chi Square Value (.05)	78.79945		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	76.20202	Shapiro-Wilk Test Statisitic	0.761196
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.60517		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.392651	95% H-UCL	319.7898
Standard Deviation of log data	0.466713	95% Chebyshev (MVUE) UCL	378.4136
Variance of log data	0.217821	97.5% Chebyshev (MVUE) UCL	437.002
		99% Chebyshev (MVUE) UCL	552.0875
		95% Non-parametric UCLs	
		CLT UCL	308.0665
		Adj-CLT UCL (Adjusted for skewness)	326.4039
		Mod-t UCL (Adjusted for skewness)	315.6513
		Jackknife UCL	312.7911
		Standard Bootstrap UCL	305.6819
		Bootstrap-t UCL	379.8806
RECOMMENDATION		Hall's Bootstrap UCL	367.4435
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	311.0714
		BCA Bootstrap UCL	322.5
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	409.7703
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	480.4485
		99% Chebyshev (Mean, Sd) UCL	619.2819

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_29
Dieldrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.353103
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.2	Data not normal at 5% significance level	
Maximum	950		
Mean	80.95	95% UCL (Assuming Normal Distribution)	
Median	5.15	Student's-t UCL	199.8044
Standard Deviation	251.1175		
Variance	63059.99	Gamma Distribution Test	
Coefficient of Variation	3.102131	A-D Test Statistic	1.927333
Skewness	3.692413	A-D 5% Critical Value	0.831366
		K-S Test Statistic	0.331248
Gamma Statistics		K-S 5% Critical Value	0.247694
k hat	0.303427	Data do not follow gamma distribution	
k star (bias corrected)	0.286026	at 5% significance level	
Theta hat	266.7857		
Theta star	283.0162	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.495959	Approximate Gamma UCL	236.6606
nu star	8.00873	Adjusted Gamma UCL	276.1965
Approx.Chi Square Value (.05)	2.739394		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.347266	Shapiro-Wilk Test Statisitic	0.877934
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.182322		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.12545	95% H-UCL	487.9088
Standard Deviation of log data	1.87401	95% Chebyshev (MVUE) UCL	128.782
Variance of log data	3.511912	97.5% Chebyshev (MVUE) UCL	168.4614
		99% Chebyshev (MVUE) UCL	246.4037
		95% Non-parametric UCLs	
		CLT UCL	191.3427
		Adj-CLT UCL (Adjusted for skewness)	262.1111
		Mod-t UCL (Adjusted for skewness)	210.8428
		Jackknife UCL	199.8044
		Standard Bootstrap UCL	188.058
		Bootstrap-t UCL	2263.358
RECOMMENDATION		Hall's Bootstrap UCL	1164.528
Data are lognormal (0.05)		Percentile Bootstrap UCL	212.2429
		BCA Bootstrap UCL	286.6286
Use 99% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	373.493
		97.5% Chebyshev (Mean, Sd) UCL	500.0766
		99% Chebyshev (Mean, Sd) UCL	748.7256

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_30
Endosulfan sulfate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.358787
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	81.3	95% UCL (Assuming Normal Distribution)	
Median	1.925	Student's-t UCL	200.2493
Standard Deviation	251.318		
Variance	63160.74	Gamma Distribution Test	
Coefficient of Variation	3.091242	A-D Test Statistic	2.311659
Skewness	3.677781	A-D 5% Critical Value	0.838729
		K-S Test Statistic	0.304409
Gamma Statistics		K-S 5% Critical Value	0.248634
k hat	0.283841	Data do not follow gamma distribution	
k star (bias corrected)	0.270637	at 5% significance level	
Theta hat	286.4276		
Theta star	300.4021	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.947558	Approximate Gamma UCL	247.1818
nu star	7.577843	Adjusted Gamma UCL	290.2248
Approx.Chi Square Value (.05)	2.492411		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.122764	Shapiro-Wilk Test Statisitic	0.752797
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.946714	95% H-UCL	590.1209
Standard Deviation of log data	1.960887	95% Chebyshev (MVUE) UCL	126.4378
Variance of log data	3.845076	97.5% Chebyshev (MVUE) UCL	165.8781
		99% Chebyshev (MVUE) UCL	243.3509
		95% Non-parametric UCLs	
		CLT UCL	191.7808
		Adj-CLT UCL (Adjusted for skewness)	262.3251
		Mod-t UCL (Adjusted for skewness)	211.2527
		Jackknife UCL	200.2493
		Standard Bootstrap UCL	188.3271
		Bootstrap-t UCL	1867.097
RECOMMENDATION		Hall's Bootstrap UCL	1323.096
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	212.0643
		BCA Bootstrap UCL	289.75
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	374.0766
		97.5% Chebyshev (Mean, Sd) UCL	500.7613
		99% Chebyshev (Mean, Sd) UCL	749.6088

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_31
Endrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.358222
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.8	Data not normal at 5% significance level	
Maximum	950		
Mean	80.68571	95% UCL (Assuming Normal Distribution)	
Median	1.9	Student's-t UCL	199.7238
Standard Deviation	251.5057		
Variance	63255.11	Gamma Distribution Test	
Coefficient of Variation	3.117103	A-D Test Statistic	2.247144
Skewness	3.677349	A-D 5% Critical Value	0.845009
		K-S Test Statistic	0.357053
Gamma Statistics		K-S 5% Critical Value	0.249415
k hat	0.268695	Data do not follow gamma distribution	
k star (bias corrected)	0.258736	at 5% significance level	
Theta hat	300.2875		
Theta star	311.8452	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.523456	Approximate Gamma UCL	253.5768
nu star	7.24462	Adjusted Gamma UCL	299.2615
Approx.Chi Square Value (.05)	2.305169		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	1.953266	Shapiro-Wilk Test Statisitic	0.794693
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.223144		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.777748	95% H-UCL	757.1474
Standard Deviation of log data	2.054955	95% Chebyshev (MVUE) UCL	127.3526
Variance of log data	4.222839	97.5% Chebyshev (MVUE) UCL	167.5577
		99% Chebyshev (MVUE) UCL	246.5329
		95% Non-parametric UCLs	
		CLT UCL	191.249
		Adj-CLT UCL (Adjusted for skewness)	261.8377
		Mod-t UCL (Adjusted for skewness)	210.7342
		Jackknife UCL	199.7238
		Standard Bootstrap UCL	192.8544
		Bootstrap-t UCL	1915.177
RECOMMENDATION		Hall's Bootstrap UCL	1429.514
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	211.5393
		BCA Bootstrap UCL	280.625
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	373.681
		97.5% Chebyshev (Mean, Sd) UCL	500.4603
		99% Chebyshev (Mean, Sd) UCL	749.4936

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_32
Endrin aldehyde			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.358976
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	81.41429	95% UCL (Assuming Normal Distribution)	
Median	2.475	Student's-t UCL	200.3454
Standard Deviation	251.2797		
Variance	63141.49	Gamma Distribution Test	
Coefficient of Variation	3.086432	A-D Test Statistic	2.233296
Skewness	3.678038	A-D 5% Critical Value	0.837099
		K-S Test Statistic	0.298135
Gamma Statistics		K-S 5% Critical Value	0.248431
k hat	0.287773	Data do not follow gamma distribution	
k star (bias corrected)	0.273727	at 5% significance level	
Theta hat	282.911		
Theta star	297.429	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.057657	Approximate Gamma UCL	245.5127
nu star	7.664349	Adjusted Gamma UCL	287.9012
Approx.Chi Square Value (.05)	2.541569		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.167367	Shapiro-Wilk Test Statisitic	0.77406
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.987028	95% H-UCL	559.6866
Standard Deviation of log data	1.939296	95% Chebyshev (MVUE) UCL	126.4691
Variance of log data	3.76087	97.5% Chebyshev (MVUE) UCL	165.803
		99% Chebyshev (MVUE) UCL	243.067
		95% Non-parametric UCLs	
		CLT UCL	191.8783
		Adj-CLT UCL (Adjusted for skewness)	262.4167
		Mod-t UCL (Adjusted for skewness)	211.348
		Jackknife UCL	200.3454
		Standard Bootstrap UCL	188.6784
		Bootstrap-t UCL	1871.636
RECOMMENDATION		Hall's Bootstrap UCL	1323.38
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	212.725
		BCA Bootstrap UCL	289.8393
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	374.1463
		97.5% Chebyshev (Mean, Sd) UCL	500.8116
		99% Chebyshev (Mean, Sd) UCL	749.6212

Data File	C:\lhilsche\AMCO\EPCS1_UCL\all._1EPCs1_	Variable:	_33
Endrin ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.35923
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	81.50714	95% UCL (Assuming Normal Distribution)	
Median	2.125	Student's-t UCL	200.4244
Standard Deviation	251.2503		
Variance	63126.72	Gamma Distribution Test	
Coefficient of Variation	3.082556	A-D Test Statistic	2.216606
Skewness	3.678154	A-D 5% Critical Value	0.836915
		K-S Test Statistic	0.294105
Gamma Statistics		K-S 5% Critical Value	0.248408
k hat	0.288218	Data do not follow gamma distribution	
k star (bias corrected)	0.274076	at 5% significance level	
Theta hat	282.7965		
Theta star	297.3885	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.070114	Approximate Gamma UCL	245.5679
nu star	7.674137	Adjusted Gamma UCL	287.9252
Approx.Chi Square Value (.05)	2.547145		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.172429	Shapiro-Wilk Test Statisitic	0.772607
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.992498	95% H-UCL	581.6265
Standard Deviation of log data	1.946959	95% Chebyshev (MVUE) UCL	128.9819
Variance of log data	3.79065	97.5% Chebyshev (MVUE) UCL	169.1398
		99% Chebyshev (MVUE) UCL	248.0221
		95% Non-parametric UCLs	
		CLT UCL	191.9582
		Adj-CLT UCL (Adjusted for skewness)	262.4906
		Mod-t UCL (Adjusted for skewness)	211.426
		Jackknife UCL	200.4244
		Standard Bootstrap UCL	187.2181
		Bootstrap-t UCL	1872.706
RECOMMENDATION		Hall's Bootstrap UCL	1308.725
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	214.8964
		BCA Bootstrap UCL	288.4893
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	374.2049
		97.5% Chebyshev (Mean, Sd) UCL	500.8555
		99% Chebyshev (Mean, Sd) UCL	749.636

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_34
Ethylbenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.353915
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.874
Minimum	3	Data not normal at 5% significance level	
Maximum	45		
Mean	8.107143	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	13.14712
Standard Deviation	10.64854		
Variance	113.3915	Gamma Distribution Test	
Coefficient of Variation	1.313477	A-D Test Statistic	3.627277
Skewness	3.70386	A-D 5% Critical Value	0.747206
		K-S Test Statistic	0.484116
Gamma Statistics		K-S 5% Critical Value	0.231935
k hat	1.864812	Data do not follow gamma distribution	
k star (bias corrected)	1.512828	at 5% significance level	
Theta hat	4.347432		
Theta star	5.358931	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.21473	Approximate Gamma UCL	12.07661
nu star	42.3592	Adjusted Gamma UCL	12.7527
Approx.Chi Square Value (.05)	28.43613		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	26.92859	Shapiro-Wilk Test Statisitic	0.521817
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	3.806662	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.801273	95% H-UCL	10.5649
Standard Deviation of log data	0.605841	95% Chebyshev (MVUE) UCL	12.42897
Variance of log data	0.367043	97.5% Chebyshev (MVUE) UCL	14.70485
		99% Chebyshev (MVUE) UCL	19.17539
		95% Non-parametric UCLs	
		CLT UCL	12.7883
		Adj-CLT UCL (Adjusted for skewness)	15.79852
		Mod-t UCL (Adjusted for skewness)	13.61665
		Jackknife UCL	13.14712
		Standard Bootstrap UCL	12.70659
		Bootstrap-t UCL	74.0989
RECOMMENDATION		Hall's Bootstrap UCL	70.10951
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	13.75
		BCA Bootstrap UCL	16.67857
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	20.51232
		97.5% Chebyshev (Mean, Sd) UCL	25.88005
		99% Chebyshev (Mean, Sd) UCL	36.42392

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_35
Fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.634293
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.874
Minimum	89	Data not normal at 5% significance level	
Maximum	1800		
Mean	393.1429	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	604.1836
Standard Deviation	445.8904		
Variance	198818.3	Gamma Distribution Test	
Coefficient of Variation	1.134169	A-D Test Statistic	0.97249
Skewness	2.748713	A-D 5% Critical Value	0.750595
		K-S Test Statistic	0.26606
Gamma Statistics		K-S 5% Critical Value	0.232717
k hat	1.505862	Data do not follow gamma distribution	
k star (bias corrected)	1.230796	at 5% significance level	
Theta hat	261.075		
Theta star	319.4216	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.16413	Approximate Gamma UCL	614.9512
nu star	34.46229	Adjusted Gamma UCL	653.8843
Approx.Chi Square Value (.05)	22.032		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	20.72019	Shapiro-Wilk Test Statisitic	0.907795
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.488636		
Maximum of log data	7.495542	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.606763	95% H-UCL	668.3204
Standard Deviation of log data	0.814487	95% Chebyshev (MVUE) UCL	740.0137
Variance of log data	0.663389	97.5% Chebyshev (MVUE) UCL	900.8815
		99% Chebyshev (MVUE) UCL	1216.875
		95% Non-parametric UCLs	
		CLT UCL	589.1588
		Adj-CLT UCL (Adjusted for skewness)	682.7015
		Mod-t UCL (Adjusted for skewness)	618.7744
		Jackknife UCL	604.1836
		Standard Bootstrap UCL	581.4006
		Bootstrap-t UCL	874.6773
RECOMMENDATION		Hall's Bootstrap UCL	1285.47
Data are lognormal (0.05)		Percentile Bootstrap UCL	617.5
		BCA Bootstrap UCL	693.8571
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	912.5895
		97.5% Chebyshev (Mean, Sd) UCL	1137.354
		99% Chebyshev (Mean, Sd) UCL	1578.862

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_36
Heptachlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.359893
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.65	Data not normal at 5% significance level	
Maximum	480		
Mean	41.09286	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	101.2068
Standard Deviation	127.0099		
Variance	16131.5	Gamma Distribution Test	
Coefficient of Variation	3.090801	A-D Test Statistic	2.369198
Skewness	3.674705	A-D 5% Critical Value	0.841557
		K-S Test Statistic	0.365498
Gamma Statistics		K-S 5% Critical Value	0.248986
k hat	0.277021	Data do not follow gamma distribution	
k star (bias corrected)	0.265279	at 5% significance level	
Theta hat	148.3382		
Theta star	154.9045	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.756597	Approximate Gamma UCL	126.7734
nu star	7.427803	Adjusted Gamma UCL	149.1849
Approx.Chi Square Value (.05)	2.407679		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.045982	Shapiro-Wilk Test Statisitic	0.74628
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.430783		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.194089	95% H-UCL	339.2518
Standard Deviation of log data	2.006184	95% Chebyshev (MVUE) UCL	64.82148
Variance of log data	4.024772	97.5% Chebyshev (MVUE) UCL	85.16203
		99% Chebyshev (MVUE) UCL	125.1171
		95% Non-parametric UCLs	
		CLT UCL	96.9271
		Adj-CLT UCL (Adjusted for skewness)	132.5486
		Mod-t UCL (Adjusted for skewness)	106.7631
		Jackknife UCL	101.2068
		Standard Bootstrap UCL	93.28083
		Bootstrap-t UCL	920.5808
RECOMMENDATION		Hall's Bootstrap UCL	655.3053
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	106.1964
		BCA Bootstrap UCL	141.6286
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	189.0549
		97.5% Chebyshev (Mean, Sd) UCL	253.0781
		99% Chebyshev (Mean, Sd) UCL	378.8395

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_37
Heptachlor epoxide			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.360144
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	41.24286	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	101.3331
Standard Deviation	126.9597		
Variance	16118.76	Gamma Distribution Test	
Coefficient of Variation	3.078344	A-D Test Statistic	2.271505
Skewness	3.675354	A-D 5% Critical Value	0.837616
		K-S Test Statistic	0.304191
Gamma Statistics		K-S 5% Critical Value	0.248495
k hat	0.286526	Data do not follow gamma distribution	
k star (bias corrected)	0.272747	at 5% significance level	
Theta hat	143.9409		
Theta star	151.2129	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.022739	Approximate Gamma UCL	124.6927
nu star	7.636914	Adjusted Gamma UCL	146.2794
Approx.Chi Square Value (.05)	2.525955		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.153195	Shapiro-Wilk Test Statisitic	0.75852
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.29474	95% H-UCL	299.8613
Standard Deviation of log data	1.955115	95% Chebyshev (MVUE) UCL	65.17346
Variance of log data	3.822476	97.5% Chebyshev (MVUE) UCL	85.48744
		99% Chebyshev (MVUE) UCL	125.3903
		95% Non-parametric UCLs	
		CLT UCL	97.05505
		Adj-CLT UCL (Adjusted for skewness)	132.6688
		Mod-t UCL (Adjusted for skewness)	106.8881
		Jackknife UCL	101.3331
		Standard Bootstrap UCL	95.04301
		Bootstrap-t UCL	985.016
RECOMMENDATION		Hall's Bootstrap UCL	658.8965
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	107.0393
		BCA Bootstrap UCL	146.6571
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	189.1464
		97.5% Chebyshev (Mean, Sd) UCL	253.1444
		99% Chebyshev (Mean, Sd) UCL	378.8561

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_38
Indeno(1,2,3-c,d)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.743471
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	82	Data not normal at 5% significance level	
Maximum	1100		
Mean	376.0714	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	540.9726
Standard Deviation	348.4059		
Variance	121386.7	Gamma Distribution Test	
Coefficient of Variation	0.926436	A-D Test Statistic	1.045293
Skewness	1.421343	A-D 5% Critical Value	0.750021
		K-S Test Statistic	0.329586
Gamma Statistics		K-S 5% Critical Value	0.232585
k hat	1.566581	Data do not follow gamma distribution	
k star (bias corrected)	1.278504	at 5% significance level	
Theta hat	240.0587		
Theta star	294.1495	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.86428	Approximate Gamma UCL	582.6978
nu star	35.79812	Adjusted Gamma UCL	618.7552
Approx.Chi Square Value (.05)	23.104		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	21.75764	Shapiro-Wilk Test Statisitic	0.883171
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.406719		
Maximum of log data	7.003065	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.577843	95% H-UCL	693.8074
Standard Deviation of log data	0.849693	95% Chebyshev (MVUE) UCL	755.4972
Variance of log data	0.721979	97.5% Chebyshev (MVUE) UCL	923.5107
		99% Chebyshev (MVUE) UCL	1253.541
		95% Non-parametric UCLs	
		CLT UCL	529.2326
		Adj-CLT UCL (Adjusted for skewness)	567.0278
		Mod-t UCL (Adjusted for skewness)	546.8679
		Jackknife UCL	540.9726
		Standard Bootstrap UCL	520.2525
		Bootstrap-t UCL	651.7145
RECOMMENDATION		Hall's Bootstrap UCL	618.5854
Data are lognormal (0.05)		Percentile Bootstrap UCL	529.0714
		BCA Bootstrap UCL	553.0714
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	781.952
		97.5% Chebyshev (Mean, Sd) UCL	957.5769
		99% Chebyshev (Mean, Sd) UCL	1302.558

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx			Variable:		_39		
Iron								
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			14	Shapiro-Wilk Test Statisitic				0.858935
Number of Unique Samples			14	Shapiro-Wilk 5% Critical Value				0.874
Minimum			10100	Data not normal at 5% significance level				
Maximum			40200					
Mean			19735.71	95% UCL (Assuming Normal Distribution)				
Median			16650	Student's-t UCL				24276.51
Standard Deviation			9593.877					
Variance			92042473	Gamma Distribution Test				
Coefficient of Variation			0.486118	A-D Test Statistic				0.601785
Skewness			0.981039	A-D 5% Critical Value				0.737881
				K-S Test Statistic				0.165758
Gamma Statistics				K-S 5% Critical Value				0.22929
k hat			5.15766	Data follow gamma distribution				
k star (bias corrected)			4.100067	at 5% significance level				
Theta hat			3826.486					
Theta star			4813.511	95% UCLs (Assuming Gamma Distribution)				
nu hat			144.4145	Approximate Gamma UCL				24881.1
nu star			114.8019	Adjusted Gamma UCL				25671.15
Approx.Chi Square Value (.05)			91.06097					
Adjusted Level of Significance			0.03122	Lognormal Distribution Test				
Adjusted Chi Square Value			88.25848	Shapiro-Wilk Test Statisitic				0.916989
				Shapiro-Wilk 5% Critical Value				0.874
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			9.220291					
Maximum of log data			10.60162	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			9.790121	95% H-UCL				25613.24
Standard Deviation of log data			0.454465	95% Chebyshev (MVUE) UCL				30286.18
Variance of log data			0.206539	97.5% Chebyshev (MVUE) UCL				34892.05
				99% Chebyshev (MVUE) UCL				43939.41
				95% Non-parametric UCLs				
				CLT UCL				23953.24
				Adj-CLT UCL (Adjusted for skewness)				24671.58
				Mod-t UCL (Adjusted for skewness)				24388.56
				Jackknife UCL				24276.51
				Standard Bootstrap UCL				23813.2
				Bootstrap-t UCL				25529.65
RECOMMENDATION				Hall's Bootstrap UCL				24220.46
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL				23871.43
				BCA Bootstrap UCL				24307.14
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL				30912.24
				97.5% Chebyshev (Mean, Sd) UCL				35748.34
				99% Chebyshev (Mean, Sd) UCL				45247.9

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_40
Isopropylbenzene (cumene)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.297817
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	430		
Mean	35.89286	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	89.58042
Standard Deviation	113.432		
Variance	12866.81	Gamma Distribution Test	
Coefficient of Variation	3.160294	A-D Test Statistic	5.060816
Skewness	3.741641	A-D 5% Critical Value	0.80866
		K-S Test Statistic	0.566732
Gamma Statistics		K-S 5% Critical Value	0.24408
k hat	0.420589	Data do not follow gamma distribution	
k star (bias corrected)	0.378082	at 5% significance level	
Theta hat	85.33954		
Theta star	94.93413	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.77649	Approximate Gamma UCL	88.14934
nu star	10.58629	Adjusted Gamma UCL	100.1659
Approx.Chi Square Value (.05)	4.31055		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	3.793426	Shapiro-Wilk Test Statisitic	0.311813
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	6.063785	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.028538	95% H-UCL	40.27189
Standard Deviation of log data	1.161848	95% Chebyshev (MVUE) UCL	34.62713
Variance of log data	1.349891	97.5% Chebyshev (MVUE) UCL	43.59887
		99% Chebyshev (MVUE) UCL	61.22211
		95% Non-parametric UCLs	
		CLT UCL	85.75819
		Adj-CLT UCL (Adjusted for skewness)	118.1511
		Mod-t UCL (Adjusted for skewness)	94.63306
		Jackknife UCL	89.58042
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	168.0371
		97.5% Chebyshev (Mean, Sd) UCL	225.216
		99% Chebyshev (Mean, Sd) UCL	337.533

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_41
Lead			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.472833
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	73.1	Data not normal at 5% significance level	
Maximum	5130		
Mean	685.0786	95% UCL (Assuming Normal Distribution)	
Median	195.5	Student's-t UCL	1339.917
Standard Deviation	1383.554		
Variance	1914222	Gamma Distribution Test	
Coefficient of Variation	2.019555	A-D Test Statistic	2.265536
Skewness	3.030315	A-D 5% Critical Value	0.779427
		K-S Test Statistic	0.386796
Gamma Statistics		K-S 5% Critical Value	0.239161
k hat	0.652788	Data do not follow gamma distribution	
k star (bias corrected)	0.560524	at 5% significance level	
Theta hat	1049.466		
Theta star	1222.212	95% UCLs (Assuming Gamma Distribution)	
nu hat	18.27805	Approximate Gamma UCL	1388.087
nu star	15.69466	Adjusted Gamma UCL	1532.45
Approx.Chi Square Value (.05)	7.745967		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	7.016267	Shapiro-Wilk Test Statisitic	0.784015
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.291828		
Maximum of log data	8.542861	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.594553	95% H-UCL	1392.592
Standard Deviation of log data	1.153026	95% Chebyshev (MVUE) UCL	1208.143
Variance of log data	1.329469	97.5% Chebyshev (MVUE) UCL	1520.112
		99% Chebyshev (MVUE) UCL	2132.915
		95% Non-parametric UCLs	
		CLT UCL	1293.297
		Adj-CLT UCL (Adjusted for skewness)	1613.287
		Mod-t UCL (Adjusted for skewness)	1389.829
		Jackknife UCL	1339.917
		Standard Bootstrap UCL	1254.241
		Bootstrap-t UCL	10087.26
RECOMMENDATION		Hall's Bootstrap UCL	4978.615
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1375.071
		BCA Bootstrap UCL	1766.571
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2296.87
		97.5% Chebyshev (Mean, Sd) UCL	2994.294
		99% Chebyshev (Mean, Sd) UCL	4364.248

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_42
Magnesium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.575496
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1670	Data not normal at 5% significance level	
Maximum	8440		
Mean	2720.714	95% UCL (Assuming Normal Distribution)	
Median	2255	Student's-t UCL	3542.893
Standard Deviation	1737.113		
Variance	3017561	Gamma Distribution Test	
Coefficient of Variation	0.638477	A-D Test Statistic	1.377983
Skewness	3.134079	A-D 5% Critical Value	0.73842
		K-S Test Statistic	0.256597
Gamma Statistics		K-S 5% Critical Value	0.2294
k hat	4.799242	Data do not follow gamma distribution	
k star (bias corrected)	3.818452	at 5% significance level	
Theta hat	566.905		
Theta star	712.5176	95% UCLs (Assuming Gamma Distribution)	
nu hat	134.3788	Approximate Gamma UCL	3460.957
nu star	106.9167	Adjusted Gamma UCL	3575.257
Approx.Chi Square Value (.05)	84.04892		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	81.36189	Shapiro-Wilk Test Statisitic	0.780244
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	7.420579		
Maximum of log data	9.040738	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.800864	95% H-UCL	3380.453
Standard Deviation of log data	0.422639	95% Chebyshev (MVUE) UCL	3985.773
Variance of log data	0.178624	97.5% Chebyshev (MVUE) UCL	4562.582
		99% Chebyshev (MVUE) UCL	5695.613
		95% Non-parametric UCLs	
		CLT UCL	3484.359
		Adj-CLT UCL (Adjusted for skewness)	3899.877
		Mod-t UCL (Adjusted for skewness)	3607.705
		Jackknife UCL	3542.893
		Standard Bootstrap UCL	3442.154
		Bootstrap-t UCL	5422.265
RECOMMENDATION		Hall's Bootstrap UCL	6668.198
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3546.429
		BCA Bootstrap UCL	3990.714
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4744.389
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	5620.035
		99% Chebyshev (Mean, Sd) UCL	7340.072

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_43
Manganese			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.947867
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	178	Data are normal at 5% significance level	
Maximum	528		
Mean	316.2143	95% UCL (Assuming Normal Distribution)	
Median	318	Student's-t UCL	359.5562
Standard Deviation	91.57358		
Variance	8385.72	Gamma Distribution Test	
Coefficient of Variation	0.289593	A-D Test Statistic	0.32091
Skewness	0.567531	A-D 5% Critical Value	0.734377
		K-S Test Statistic	0.138074
Gamma Statistics		K-S 5% Critical Value	0.228549
k hat	12.83501	Data follow gamma distribution	
k star (bias corrected)	10.13227	at 5% significance level	
Theta hat	24.63685		
Theta star	31.20863	95% UCLs (Assuming Gamma Distribution)	
nu hat	359.3803	Approximate Gamma UCL	365.1478
nu star	283.7036	Adjusted Gamma UCL	372.259
Approx.Chi Square Value (.05)	245.6844		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	240.9911	Shapiro-Wilk Test Statisitic	0.958759
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.181784		
Maximum of log data	6.269096	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.716959	95% H-UCL	370.5651
Standard Deviation of log data	0.29465	95% Chebyshev (MVUE) UCL	426.2
Variance of log data	0.086819	97.5% Chebyshev (MVUE) UCL	473.6896
		99% Chebyshev (MVUE) UCL	566.9739
		95% Non-parametric UCLs	
		CLT UCL	356.4705
		Adj-CLT UCL (Adjusted for skewness)	360.4371
		Mod-t UCL (Adjusted for skewness)	360.1749
		Jackknife UCL	359.5562
		Standard Bootstrap UCL	355.1946
		Bootstrap-t UCL	363.7179
RECOMMENDATION		Hall's Bootstrap UCL	370.5517
Data are normal (0.05)		Percentile Bootstrap UCL	353.5714
		BCA Bootstrap UCL	358.7143
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	422.8943
		97.5% Chebyshev (Mean, Sd) UCL	469.0548
		99% Chebyshev (Mean, Sd) UCL	559.7282

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_44
Methoxychlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.359827
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	7	Data not normal at 5% significance level	
Maximum	4800		
Mean	410.9286	95% UCL (Assuming Normal Distribution)	
Median	9.75	Student's-t UCL	1012.068
Standard Deviation	1270.098		
Variance	1613150	Gamma Distribution Test	
Coefficient of Variation	3.090801	A-D Test Statistic	2.389626
Skewness	3.674706	A-D 5% Critical Value	0.841493
		K-S Test Statistic	0.365661
Gamma Statistics		K-S 5% Critical Value	0.248978
k hat	0.277175	Data do not follow gamma distribution	
k star (bias corrected)	0.2654	at 5% significance level	
Theta hat	1482.558		
Theta star	1548.338	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.760911	Approximate Gamma UCL	1267.309
nu star	7.431192	Adjusted Gamma UCL	1491.272
Approx.Chi Square Value (.05)	2.409586		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.047708	Shapiro-Wilk Test Statisitic	0.738863
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.94591		
Maximum of log data	8.476371	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.498304	95% H-UCL	3366.312
Standard Deviation of log data	2.004069	95% Chebyshev (MVUE) UCL	646.7066
Variance of log data	4.016292	97.5% Chebyshev (MVUE) UCL	849.584
		99% Chebyshev (MVUE) UCL	1248.097
		95% Non-parametric UCLs	
		CLT UCL	969.271
		Adj-CLT UCL (Adjusted for skewness)	1325.486
		Mod-t UCL (Adjusted for skewness)	1067.631
		Jackknife UCL	1012.068
		Standard Bootstrap UCL	951.7774
		Bootstrap-t UCL	9772.471
RECOMMENDATION		Hall's Bootstrap UCL	6553.96
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1079.929
		BCA Bootstrap UCL	1444.107
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1890.548
		97.5% Chebyshev (Mean, Sd) UCL	2530.781
		99% Chebyshev (Mean, Sd) UCL	3788.394

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_45
Methyl ethyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.62852
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	41		
Mean	11.28571	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	16.37802
Standard Deviation	10.7591		
Variance	115.7582	Gamma Distribution Test	
Coefficient of Variation	0.953338	A-D Test Statistic	2.364328
Skewness	2.027738	A-D 5% Critical Value	0.746957
		K-S Test Statistic	0.416691
Gamma Statistics		K-S 5% Critical Value	0.231877
k hat	1.891228	Data do not follow gamma distribution	
k star (bias corrected)	1.533584	at 5% significance level	
Theta hat	5.967401		
Theta star	7.359047	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.95437	Approximate Gamma UCL	16.76093
nu star	42.94034	Adjusted Gamma UCL	17.69174
Approx.Chi Square Value (.05)	28.91322		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	27.39201	Shapiro-Wilk Test Statisitic	0.665414
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	3.713572	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.136443	95% H-UCL	17.29566
Standard Deviation of log data	0.708817	95% Chebyshev (MVUE) UCL	19.90926
Variance of log data	0.502421	97.5% Chebyshev (MVUE) UCL	23.91276
		99% Chebyshev (MVUE) UCL	31.77686
		95% Non-parametric UCLs	
		CLT UCL	16.01548
		Adj-CLT UCL (Adjusted for skewness)	17.68058
		Mod-t UCL (Adjusted for skewness)	16.63774
		Jackknife UCL	16.37802
		Standard Bootstrap UCL	15.83354
		Bootstrap-t UCL	21.18962
RECOMMENDATION		Hall's Bootstrap UCL	18.576
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	16.14286
		BCA Bootstrap UCL	17.53571
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	23.81969
		97.5% Chebyshev (Mean, Sd) UCL	29.24315
		99% Chebyshev (Mean, Sd) UCL	39.89648

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_46
Methyl isobutyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.353845
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	12		
Mean	6.035714	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.852677
Standard Deviation	1.726093		
Variance	2.979396	Gamma Distribution Test	
Coefficient of Variation	0.28598	A-D Test Statistic	4.053884
Skewness	3.672913	A-D 5% Critical Value	0.733979
		K-S Test Statistic	0.418097
Gamma Statistics		K-S 5% Critical Value	0.228267
k hat	20.33445	Data do not follow gamma distribution	
k star (bias corrected)	16.02468	at 5% significance level	
Theta hat	0.296822		
Theta star	0.376651	95% UCLs (Assuming Gamma Distribution)	
nu hat	569.3645	Approximate Gamma UCL	6.760789
nu star	448.6912	Adjusted Gamma UCL	6.864163
Approx.Chi Square Value (.05)	400.5704		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	394.5378	Shapiro-Wilk Test Statisitic	0.378594
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.484907	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.772904	95% H-UCL	6.681611
Standard Deviation of log data	0.207319	95% Chebyshev (MVUE) UCL	7.464709
Variance of log data	0.042981	97.5% Chebyshev (MVUE) UCL	8.095701
		99% Chebyshev (MVUE) UCL	9.335164
		95% Non-parametric UCLs	
		CLT UCL	6.794514
		Adj-CLT UCL (Adjusted for skewness)	7.278383
		Mod-t UCL (Adjusted for skewness)	6.928151
		Jackknife UCL	6.852677
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	8.046551
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8.916642
		99% Chebyshev (Mean, Sd) UCL	10.62577

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_47
Methylcyclohexane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.30676
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	440		
Mean	37.28571	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	92.15864
Standard Deviation	115.9364		
Variance	13441.26	Gamma Distribution Test	
Coefficient of Variation	3.109406	A-D Test Statistic	4.568271
Skewness	3.738612	A-D 5% Critical Value	0.80703
		K-S Test Statistic	0.50592
Gamma Statistics		K-S 5% Critical Value	0.24382
k hat	0.428999	Data do not follow gamma distribution	
k star (bias corrected)	0.38469	at 5% significance level	
Theta hat	86.91327		
Theta star	96.92412	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.01197	Approximate Gamma UCL	90.68911
nu star	10.77131	Adjusted Gamma UCL	102.9009
Approx.Chi Square Value (.05)	4.428493		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	3.902941	Shapiro-Wilk Test Statisitic	0.395982
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	6.086775	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.101845	95% H-UCL	45.10674
Standard Deviation of log data	1.17723	95% Chebyshev (MVUE) UCL	38.17231
Variance of log data	1.38587	97.5% Chebyshev (MVUE) UCL	48.11996
		99% Chebyshev (MVUE) UCL	67.66019
		95% Non-parametric UCLs	
		CLT UCL	88.25203
		Adj-CLT UCL (Adjusted for skewness)	121.3333
		Mod-t UCL (Adjusted for skewness)	97.31866
		Jackknife UCL	92.15864
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	172.3476
		97.5% Chebyshev (Mean, Sd) UCL	230.789
		99% Chebyshev (Mean, Sd) UCL	345.5857

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_48
Methylene Chloride			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.363946
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	11		
Mean	5.964286	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.655572
Standard Deviation	1.460562		
Variance	2.133242	Gamma Distribution Test	
Coefficient of Variation	0.244885	A-D Test Statistic	3.956479
Skewness	3.646419	A-D 5% Critical Value	0.733774
		K-S Test Statistic	0.420656
Gamma Statistics		K-S 5% Critical Value	0.228221
k hat	26.34292	Data do not follow gamma distribution	
k star (bias corrected)	20.74563	at 5% significance level	
Theta hat	0.226409		
Theta star	0.287496	95% UCLs (Assuming Gamma Distribution)	
nu hat	737.6018	Approximate Gamma UCL	6.587016
nu star	580.8776	Adjusted Gamma UCL	6.675013
Approx.Chi Square Value (.05)	525.9619		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	519.0282	Shapiro-Wilk Test Statisitic	0.38834
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.397895	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.766689	95% H-UCL	6.52876
Standard Deviation of log data	0.184366	95% Chebyshev (MVUE) UCL	7.226471
Variance of log data	0.033991	97.5% Chebyshev (MVUE) UCL	7.781213
		99% Chebyshev (MVUE) UCL	8.870897
		95% Non-parametric UCLs	
		CLT UCL	6.606357
		Adj-CLT UCL (Adjusted for skewness)	7.012837
		Mod-t UCL (Adjusted for skewness)	6.718975
		Jackknife UCL	6.655572
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.665789
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8.402031
		99% Chebyshev (Mean, Sd) UCL	9.848236

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_49
Naphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.667183
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	81	Data not normal at 5% significance level	
Maximum	600		
Mean	224	95% UCL (Assuming Normal Distribution)	
Median	187.5	Student's-t UCL	283.2278
Standard Deviation	125.1375		
Variance	15659.38	Gamma Distribution Test	
Coefficient of Variation	0.558649	A-D Test Statistic	1.60397
Skewness	2.417705	A-D 5% Critical Value	0.738032
		K-S Test Statistic	0.345637
Gamma Statistics		K-S 5% Critical Value	0.229319
k hat	4.980385	Data do not follow gamma distribution	
k star (bias corrected)	3.960779	at 5% significance level	
Theta hat	44.97644		
Theta star	56.55453	95% UCLs (Assuming Gamma Distribution)	
nu hat	139.4508	Approximate Gamma UCL	283.6205
nu star	110.9018	Adjusted Gamma UCL	292.7997
Approx.Chi Square Value (.05)	87.58889		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	84.84299	Shapiro-Wilk Test Statisitic	0.818001
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.394449		
Maximum of log data	6.39693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.307906	95% H-UCL	287.2711
Standard Deviation of log data	0.447301	95% Chebyshev (MVUE) UCL	339.5026
Variance of log data	0.200078	97.5% Chebyshev (MVUE) UCL	390.5807
		99% Chebyshev (MVUE) UCL	490.9137
		95% Non-parametric UCLs	
		CLT UCL	279.0111
		Adj-CLT UCL (Adjusted for skewness)	302.1021
		Mod-t UCL (Adjusted for skewness)	286.8295
		Jackknife UCL	283.2278
		Standard Bootstrap UCL	275.9147
		Bootstrap-t UCL	385.3112
RECOMMENDATION		Hall's Bootstrap UCL	612.2067
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	281.0714
		BCA Bootstrap UCL	310.3571
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	369.7807
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	432.8602
		99% Chebyshev (Mean, Sd) UCL	556.7675

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_50
Nickel			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.767826
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	17.9	Data not normal at 5% significance level	
Maximum	36.3		
Mean	23.06429	95% UCL (Assuming Normal Distribution)	
Median	21.1	Student's-t UCL	25.84161
Standard Deviation	5.867984		
Variance	34.43324	Gamma Distribution Test	
Coefficient of Variation	0.254419	A-D Test Statistic	1.185707
Skewness	1.558671	A-D 5% Critical Value	0.734004
		K-S Test Statistic	0.2684
Gamma Statistics		K-S 5% Critical Value	0.22828
k hat	19.74821	Data do not follow gamma distribution	
k star (bias corrected)	15.56407	at 5% significance level	
Theta hat	1.167918		
Theta star	1.481893	95% UCLs (Assuming Gamma Distribution)	
nu hat	552.9498	Approximate Gamma UCL	25.87954
nu star	435.7939	Adjusted Gamma UCL	26.28134
Approx.Chi Square Value (.05)	388.387		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	382.449	Shapiro-Wilk Test Statisitic	0.823224
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.884801		
Maximum of log data	3.591818	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.112753	95% H-UCL	25.86629
Standard Deviation of log data	0.225212	95% Chebyshev (MVUE) UCL	29.09392
Variance of log data	0.05072	97.5% Chebyshev (MVUE) UCL	31.72309
		99% Chebyshev (MVUE) UCL	36.88759
		95% Non-parametric UCLs	
		CLT UCL	25.64388
		Adj-CLT UCL (Adjusted for skewness)	26.34195
		Mod-t UCL (Adjusted for skewness)	25.9505
		Jackknife UCL	25.84161
		Standard Bootstrap UCL	25.59285
		Bootstrap-t UCL	27.93389
RECOMMENDATION		Hall's Bootstrap UCL	27.10053
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	25.69286
		BCA Bootstrap UCL	26.32857
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	29.90028
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	32.85822
		99% Chebyshev (Mean, Sd) UCL	38.66852

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_51
Phenanthrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.8326
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	78	Data not normal at 5% significance level	
Maximum	550		
Mean	272.7143	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	342.3322
Standard Deviation	147.0899		
Variance	21635.45	Gamma Distribution Test	
Coefficient of Variation	0.539355	A-D Test Statistic	0.839803
Skewness	1.013572	A-D 5% Critical Value	0.740074
		K-S Test Statistic	0.267271
Gamma Statistics		K-S 5% Critical Value	0.229748
k hat	4.02598	Data do not follow gamma distribution	
k star (bias corrected)	3.210889	at 5% significance level	
Theta hat	67.7386		
Theta star	84.93419	95% UCLs (Assuming Gamma Distribution)	
nu hat	112.7274	Approximate Gamma UCL	355.1396
nu star	89.9049	Adjusted Gamma UCL	368.0545
Approx.Chi Square Value (.05)	69.03862		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	66.61609	Shapiro-Wilk Test Statisitic	0.895875
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.356709		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.479121	95% H-UCL	377.7758
Standard Deviation of log data	0.53166	95% Chebyshev (MVUE) UCL	447.2861
Variance of log data	0.282662	97.5% Chebyshev (MVUE) UCL	522.7282
		99% Chebyshev (MVUE) UCL	670.9195
		95% Non-parametric UCLs	
		CLT UCL	337.3759
		Adj-CLT UCL (Adjusted for skewness)	348.7545
		Mod-t UCL (Adjusted for skewness)	344.1071
		Jackknife UCL	342.3322
		Standard Bootstrap UCL	334.4021
		Bootstrap-t UCL	369.8064
RECOMMENDATION		Hall's Bootstrap UCL	351.4628
Data are lognormal (0.05)		Percentile Bootstrap UCL	334.6429
		BCA Bootstrap UCL	346.0714
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	444.0689
		97.5% Chebyshev (Mean, Sd) UCL	518.2142
		99% Chebyshev (Mean, Sd) UCL	663.8582

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx			Variable:		_52		
Potassium								
Raw Statistics				Normal Distribution Test				
Number of Valid Samples			14	Shapiro-Wilk Test Statisitic				0.864492
Number of Unique Samples			12	Shapiro-Wilk 5% Critical Value				0.874
Minimum			722	Data not normal at 5% significance level				
Maximum			1750					
Mean			1078.643	95% UCL (Assuming Normal Distribution)				
Median			1030	Student's-t UCL				1195.986
Standard Deviation			247.9254					
Variance			61467.02	Gamma Distribution Test				
Coefficient of Variation			0.229849	A-D Test Statistic				0.53153
Skewness			1.590809	A-D 5% Critical Value				0.733879
				K-S Test Statistic				0.184298
Gamma Statistics				K-S 5% Critical Value				0.228245
k hat			23.26369	Data follow gamma distribution				
k star (bias corrected)			18.32623	at 5% significance level				
Theta hat			46.36595					
Theta star			58.85787	95% UCLs (Assuming Gamma Distribution)				
nu hat			651.3832	Approximate Gamma UCL				1199.088
nu star			513.1344	Adjusted Gamma UCL				1216.178
Approx.Chi Square Value (.05)			461.5914					
Adjusted Level of Significance			0.03122	Lognormal Distribution Test				
Adjusted Chi Square Value			455.105	Shapiro-Wilk Test Statisitic				0.937803
				Shapiro-Wilk 5% Critical Value				0.874
Log-transformed Statistics				Data are lognormal at 5% significance level				
Minimum of log data			6.582025					
Maximum of log data			7.467371	95% UCLs (Assuming Lognormal Distribution)				
Mean of log data			6.961812	95% H-UCL				1200.771
Standard Deviation of log data			0.21056	95% Chebyshev (MVUE) UCL				1343.19
Variance of log data			0.044335	97.5% Chebyshev (MVUE) UCL				1458.168
				99% Chebyshev (MVUE) UCL				1684.021
				95% Non-parametric UCLs				
				CLT UCL				1187.632
				Adj-CLT UCL (Adjusted for skewness)				1217.734
				Mod-t UCL (Adjusted for skewness)				1200.682
				Jackknife UCL				1195.986
				Standard Bootstrap UCL				1183.907
				Bootstrap-t UCL				1275.204
RECOMMENDATION				Hall's Bootstrap UCL				1880.94
Data follow gamma distribution (0.05)				Percentile Bootstrap UCL				1176.214
				BCA Bootstrap UCL				1216.714
Use Approximate Gamma UCL				95% Chebyshev (Mean, Sd) UCL				1367.467
				97.5% Chebyshev (Mean, Sd) UCL				1492.442
				99% Chebyshev (Mean, Sd) UCL				1737.93

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_53
Pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.539618
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	120	Data not normal at 5% significance level	
Maximum	2900		
Mean	499.6429	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	844.3611
Standard Deviation	728.3265		
Variance	530459.5	Gamma Distribution Test	
Coefficient of Variation	1.457694	A-D Test Statistic	1.328689
Skewness	3.160959	A-D 5% Critical Value	0.757324
		K-S Test Statistic	0.28281
Gamma Statistics		K-S 5% Critical Value	0.23445
k hat	1.141572	Data do not follow gamma distribution	
k star (bias corrected)	0.944569	at 5% significance level	
Theta hat	437.6796		
Theta star	528.964	95% UCLs (Assuming Gamma Distribution)	
nu hat	31.96402	Approximate Gamma UCL	840.4645
nu star	26.44792	Adjusted Gamma UCL	903.0117
Approx.Chi Square Value (.05)	15.72287		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	14.63383	Shapiro-Wilk Test Statisitic	0.851766
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.787492		
Maximum of log data	7.972466	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.715761	95% H-UCL	869.0964
Standard Deviation of log data	0.894082	95% Chebyshev (MVUE) UCL	924.0409
Variance of log data	0.799383	97.5% Chebyshev (MVUE) UCL	1135.108
		99% Chebyshev (MVUE) UCL	1549.708
		95% Non-parametric UCLs	
		CLT UCL	819.8193
		Adj-CLT UCL (Adjusted for skewness)	995.5296
		Mod-t UCL (Adjusted for skewness)	871.7684
		Jackknife UCL	844.3611
		Standard Bootstrap UCL	801.2887
		Bootstrap-t UCL	1817.456
RECOMMENDATION		Hall's Bootstrap UCL	2020.588
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	847.8571
		BCA Bootstrap UCL	1073.214
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1348.118
		97.5% Chebyshev (Mean, Sd) UCL	1715.253
		99% Chebyshev (Mean, Sd) UCL	2436.42

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_54
Selenium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.71185
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.874
Minimum	1.1	Data not normal at 5% significance level	
Maximum	3.5		
Mean	3.028571	95% UCL (Assuming Normal Distribution)	
Median	3.5	Student's-t UCL	3.375596
Standard Deviation	0.7332		
Variance	0.537582	Gamma Distribution Test	
Coefficient of Variation	0.242094	A-D Test Statistic	1.910632
Skewness	-1.785818	A-D 5% Critical Value	0.734398
		K-S Test Statistic	0.302606
Gamma Statistics		K-S 5% Critical Value	0.228565
k hat	12.43906	Data do not follow gamma distribution	
k star (bias corrected)	9.821168	at 5% significance level	
Theta hat	0.243473		
Theta star	0.308372	95% UCLs (Assuming Gamma Distribution)	
nu hat	348.2938	Approximate Gamma UCL	3.505487
nu star	274.9927	Adjusted Gamma UCL	3.574898
Approx.Chi Square Value (.05)	237.5804		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	232.9675	Shapiro-Wilk Test Statisitic	0.640207
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.09531		
Maximum of log data	1.252763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.067357	95% H-UCL	3.660422
Standard Deviation of log data	0.329786	95% Chebyshev (MVUE) UCL	4.247684
Variance of log data	0.108759	97.5% Chebyshev (MVUE) UCL	4.762563
		99% Chebyshev (MVUE) UCL	5.773945
		95% Non-parametric UCLs	
		CLT UCL	3.35089
		Adj-CLT UCL (Adjusted for skewness)	3.250957
		Mod-t UCL (Adjusted for skewness)	3.360009
		Jackknife UCL	3.375596
		Standard Bootstrap UCL	3.334665
		Bootstrap-t UCL	3.299052
RECOMMENDATION		Hall's Bootstrap UCL	3.265031
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.314286
		BCA Bootstrap UCL	3.257143
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.882724
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	4.252316
		99% Chebyshev (Mean, Sd) UCL	4.978309

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_55
Silver			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.819465
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.095	Data not normal at 5% significance level	
Maximum	0.97		
Mean	0.365357	95% UCL (Assuming Normal Distribution)	
Median	0.31	Student's-t UCL	0.487996
Standard Deviation	0.259114		
Variance	0.06714	Gamma Distribution Test	
Coefficient of Variation	0.709208	A-D Test Statistic	0.447209
Skewness	1.490148	A-D 5% Critical Value	0.744076
		K-S Test Statistic	0.228745
Gamma Statistics		K-S 5% Critical Value	0.23102
k hat	2.543744	Data follow gamma distribution	
k star (bias corrected)	2.046275	at 5% significance level	
Theta hat	0.14363		
Theta star	0.178547	95% UCLs (Assuming Gamma Distribution)	
nu hat	71.22482	Approximate Gamma UCL	0.511907
nu star	57.2957	Adjusted Gamma UCL	0.535939
Approx.Chi Square Value (.05)	40.89294		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	39.05927	Shapiro-Wilk Test Statisitic	0.950286
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.353878		
Maximum of log data	-0.030459	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.216133	95% H-UCL	0.571698
Standard Deviation of log data	0.673131	95% Chebyshev (MVUE) UCL	0.664231
Variance of log data	0.453105	97.5% Chebyshev (MVUE) UCL	0.793828
		99% Chebyshev (MVUE) UCL	1.048398
		95% Non-parametric UCLs	
		CLT UCL	0.479265
		Adj-CLT UCL (Adjusted for skewness)	0.508735
		Mod-t UCL (Adjusted for skewness)	0.492593
		Jackknife UCL	0.487996
		Standard Bootstrap UCL	0.476299
		Bootstrap-t UCL	0.591395
RECOMMENDATION		Hall's Bootstrap UCL	1.083781
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.479286
		BCA Bootstrap UCL	0.497143
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.667216
		97.5% Chebyshev (Mean, Sd) UCL	0.797831
		99% Chebyshev (Mean, Sd) UCL	1.054398

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_56
Sodium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.841899
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.874
Minimum	144	Data not normal at 5% significance level	
Maximum	486		
Mean	270.0714	95% UCL (Assuming Normal Distribution)	
Median	233.5	Student's-t UCL	320.0995
Standard Deviation	105.7002		
Variance	11172.53	Gamma Distribution Test	
Coefficient of Variation	0.391379	A-D Test Statistic	0.755373
Skewness	1.144498	A-D 5% Critical Value	0.735832
		K-S Test Statistic	0.275845
Gamma Statistics		K-S 5% Critical Value	0.228905
k hat	8.118085	Data do not follow gamma distribution	
k star (bias corrected)	6.426115	at 5% significance level	
Theta hat	33.26787		
Theta star	42.02717	95% UCLs (Assuming Gamma Distribution)	
nu hat	227.3064	Approximate Gamma UCL	324.1781
nu star	179.9312	Adjusted Gamma UCL	332.2346
Approx.Chi Square Value (.05)	149.9		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	146.265	Shapiro-Wilk Test Statisitic	0.918117
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.969813		
Maximum of log data	6.186209	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.535833	95% H-UCL	328.1293
Standard Deviation of log data	0.358101	95% Chebyshev (MVUE) UCL	383.0781
Variance of log data	0.128236	97.5% Chebyshev (MVUE) UCL	432.3902
		99% Chebyshev (MVUE) UCL	529.2542
		95% Non-parametric UCLs	
		CLT UCL	316.5378
		Adj-CLT UCL (Adjusted for skewness)	325.7708
		Mod-t UCL (Adjusted for skewness)	321.5397
		Jackknife UCL	320.0995
		Standard Bootstrap UCL	314.6816
		Bootstrap-t UCL	336.1249
RECOMMENDATION		Hall's Bootstrap UCL	321.6471
Data are lognormal (0.05)		Percentile Bootstrap UCL	316.4286
		BCA Bootstrap UCL	323.9286
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	393.2084
Use Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	446.4899
Use H-UCL		99% Chebyshev (Mean, Sd) UCL	551.1511

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_57
Tetrachloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.363946
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	11		
Mean	5.964286	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.655572
Standard Deviation	1.460562		
Variance	2.133242	Gamma Distribution Test	
Coefficient of Variation	0.244885	A-D Test Statistic	3.956479
Skewness	3.646419	A-D 5% Critical Value	0.733774
		K-S Test Statistic	0.420656
Gamma Statistics		K-S 5% Critical Value	0.228221
k hat	26.34292	Data do not follow gamma distribution	
k star (bias corrected)	20.74563	at 5% significance level	
Theta hat	0.226409		
Theta star	0.287496	95% UCLs (Assuming Gamma Distribution)	
nu hat	737.6018	Approximate Gamma UCL	6.587016
nu star	580.8776	Adjusted Gamma UCL	6.675013
Approx.Chi Square Value (.05)	525.9619		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	519.0282	Shapiro-Wilk Test Statisitic	0.38834
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.397895	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.766689	95% H-UCL	6.52876
Standard Deviation of log data	0.184366	95% Chebyshev (MVUE) UCL	7.226471
Variance of log data	0.033991	97.5% Chebyshev (MVUE) UCL	7.781213
		99% Chebyshev (MVUE) UCL	8.870897
		95% Non-parametric UCLs	
		CLT UCL	6.606357
		Adj-CLT UCL (Adjusted for skewness)	7.012837
		Mod-t UCL (Adjusted for skewness)	6.718975
		Jackknife UCL	6.655572
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.665789
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8.402031
		99% Chebyshev (Mean, Sd) UCL	9.848236

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_58
Thallium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.727202
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.36	Data not normal at 5% significance level	
Maximum	2.6		
Mean	1.760714	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	2.21626
Standard Deviation	0.962484		
Variance	0.926376	Gamma Distribution Test	
Coefficient of Variation	0.546644	A-D Test Statistic	1.828102
Skewness	-0.612871	A-D 5% Critical Value	0.744838
		K-S Test Statistic	0.3541
Gamma Statistics		K-S 5% Critical Value	0.231275
k hat	2.320302	Data do not follow gamma distribution	
k star (bias corrected)	1.870713	at 5% significance level	
Theta hat	0.75883		
Theta star	0.941199	95% UCLs (Assuming Gamma Distribution)	
nu hat	64.96846	Approximate Gamma UCL	2.509365
nu star	52.37998	Adjusted Gamma UCL	2.633436
Approx.Chi Square Value (.05)	36.75279		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	35.02123	Shapiro-Wilk Test Statisitic	0.732807
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.021651		
Maximum of log data	0.955511	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.335018	95% H-UCL	3.316353
Standard Deviation of log data	0.795818	95% Chebyshev (MVUE) UCL	3.701957
Variance of log data	0.633326	97.5% Chebyshev (MVUE) UCL	4.496578
		99% Chebyshev (MVUE) UCL	6.057457
		95% Non-parametric UCLs	
		CLT UCL	2.183828
		Adj-CLT UCL (Adjusted for skewness)	2.138807
		Mod-t UCL (Adjusted for skewness)	2.209238
		Jackknife UCL	2.21626
		Standard Bootstrap UCL	2.16742
		Bootstrap-t UCL	2.166524
RECOMMENDATION		Hall's Bootstrap UCL	2.102153
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.155
		BCA Bootstrap UCL	2.112857
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.881975
		97.5% Chebyshev (Mean, Sd) UCL	3.367145
		99% Chebyshev (Mean, Sd) UCL	4.320168
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_59
Toluene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.299204
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	170		
Mean	17.32143	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	38.12034
Standard Deviation	43.94429		
Variance	1931.1	Gamma Distribution Test	
Coefficient of Variation	2.53699	A-D Test Statistic	4.967564
Skewness	3.741547	A-D 5% Critical Value	0.7768
		K-S Test Statistic	0.552417
Gamma Statistics		K-S 5% Critical Value	0.238692
k hat	0.68179	Data do not follow gamma distribution	
k star (bias corrected)	0.583312	at 5% significance level	
Theta hat	25.4058		
Theta star	29.69499	95% UCLs (Assuming Gamma Distribution)	
nu hat	19.09013	Approximate Gamma UCL	34.51697
nu star	16.33272	Adjusted Gamma UCL	38.01313
Approx.Chi Square Value (.05)	8.196144		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	7.442325	Shapiro-Wilk Test Statisitic	0.315833
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.135798	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.962253	95% H-UCL	21.20773
Standard Deviation of log data	0.913948	95% Chebyshev (MVUE) UCL	22.28624
Variance of log data	0.835302	97.5% Chebyshev (MVUE) UCL	27.43481
		99% Chebyshev (MVUE) UCL	37.54816
		95% Non-parametric UCLs	
		CLT UCL	36.63958
		Adj-CLT UCL (Adjusted for skewness)	49.18849
		Mod-t UCL (Adjusted for skewness)	40.07771
		Jackknife UCL	38.12034
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	68.51497
		97.5% Chebyshev (Mean, Sd) UCL	90.66646
		99% Chebyshev (Mean, Sd) UCL	134.1788

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_60
Trichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.647187
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.874
Minimum	3	Data not normal at 5% significance level	
Maximum	6		
Mean	5.142857	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	5.541329
Standard Deviation	0.841897		
Variance	0.708791	Gamma Distribution Test	
Coefficient of Variation	0.163702	A-D Test Statistic	2.694282
Skewness	-1.765576	A-D 5% Critical Value	0.733563
		K-S Test Statistic	0.457762
Gamma Statistics		K-S 5% Critical Value	0.228174
k hat	32.56096	Data do not follow gamma distribution	
k star (bias corrected)	25.63123	at 5% significance level	
Theta hat	0.157945		
Theta star	0.200648	95% UCLs (Assuming Gamma Distribution)	
nu hat	911.707	Approximate Gamma UCL	5.622063
nu star	717.6745	Adjusted Gamma UCL	5.689344
Approx.Chi Square Value (.05)	656.5024		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	648.7387	Shapiro-Wilk Test Statisitic	0.62254
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	1.791759	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.622174	95% H-UCL	5.684266
Standard Deviation of log data	0.192621	95% Chebyshev (MVUE) UCL	6.313303
Variance of log data	0.037103	97.5% Chebyshev (MVUE) UCL	6.815809
		99% Chebyshev (MVUE) UCL	7.802884
		95% Non-parametric UCLs	
		CLT UCL	5.51296
		Adj-CLT UCL (Adjusted for skewness)	5.399512
		Mod-t UCL (Adjusted for skewness)	5.523633
		Jackknife UCL	5.541329
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.123638
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.548023
		99% Chebyshev (Mean, Sd) UCL	7.381644

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_61
Vanadium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.733993
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	17.5	Data not normal at 5% significance level	
Maximum	58.3		
Mean	28.17857	95% UCL (Assuming Normal Distribution)	
Median	26.6	Student's-t UCL	32.75187
Standard Deviation	9.662551		
Variance	93.36489	Gamma Distribution Test	
Coefficient of Variation	0.342904	A-D Test Statistic	0.72881
Skewness	2.522307	A-D 5% Critical Value	0.734403
		K-S Test Statistic	0.196604
Gamma Statistics		K-S 5% Critical Value	0.228568
k hat	12.34795	Data follow gamma distribution	
k star (bias corrected)	9.749578	at 5% significance level	
Theta hat	2.282045		
Theta star	2.890235	95% UCLs (Assuming Gamma Distribution)	
nu hat	345.7425	Approximate Gamma UCL	32.63414
nu star	272.9882	Adjusted Gamma UCL	33.28283
Approx.Chi Square Value (.05)	235.7169		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	231.1227	Shapiro-Wilk Test Statisitic	0.887102
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	4.065602	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.297523	95% H-UCL	32.54723
Standard Deviation of log data	0.279919	95% Chebyshev (MVUE) UCL	37.27653
Variance of log data	0.078355	97.5% Chebyshev (MVUE) UCL	41.27098
		99% Chebyshev (MVUE) UCL	49.11729
		95% Non-parametric UCLs	
		CLT UCL	32.42628
		Adj-CLT UCL (Adjusted for skewness)	34.28641
		Mod-t UCL (Adjusted for skewness)	33.04202
		Jackknife UCL	32.75187
		Standard Bootstrap UCL	32.13879
		Bootstrap-t UCL	36.28635
RECOMMENDATION		Hall's Bootstrap UCL	51.62352
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	32.6
		BCA Bootstrap UCL	34.55714
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	39.4351
		97.5% Chebyshev (Mean, Sd) UCL	44.30581
		99% Chebyshev (Mean, Sd) UCL	53.87338

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_62
Xylenes, total			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.307494
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.874
Minimum	5.5	Data not normal at 5% significance level	
Maximum	370		
Mean	32.21429	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	78.24168
Standard Deviation	97.24745		
Variance	9457.066	Gamma Distribution Test	
Coefficient of Variation	3.018768	A-D Test Statistic	4.559969
Skewness	3.738198	A-D 5% Critical Value	0.800407
		K-S Test Statistic	0.503835
Gamma Statistics		K-S 5% Critical Value	0.242766
k hat	0.463175	Data do not follow gamma distribution	
k star (bias corrected)	0.411542	at 5% significance level	
Theta hat	69.55105		
Theta star	78.27703	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.96889	Approximate Gamma UCL	75.54624
nu star	11.52318	Adjusted Gamma UCL	85.24681
Approx.Chi Square Value (.05)	4.913692		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	4.354543	Shapiro-Wilk Test Statisitic	0.394323
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.913503	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.08454	95% H-UCL	39.20723
Standard Deviation of log data	1.129408	95% Chebyshev (MVUE) UCL	34.81398
Variance of log data	1.275562	97.5% Chebyshev (MVUE) UCL	43.72086
		99% Chebyshev (MVUE) UCL	61.21668
		95% Non-parametric UCLs	
		CLT UCL	74.96481
		Adj-CLT UCL (Adjusted for skewness)	102.7103
		Mod-t UCL (Adjusted for skewness)	82.56942
		Jackknife UCL	78.24168
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	145.5041
		97.5% Chebyshev (Mean, Sd) UCL	194.5247
		99% Chebyshev (Mean, Sd) UCL	290.8162

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_63
Zinc			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.598643
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.874
Minimum	43.8	Data not normal at 5% significance level	
Maximum	1390		
Mean	291.9071	95% UCL (Assuming Normal Distribution)	
Median	216	Student's-t UCL	449.8295
Standard Deviation	333.661		
Variance	111329.6	Gamma Distribution Test	
Coefficient of Variation	1.143038	A-D Test Statistic	0.671407
Skewness	3.109733	A-D 5% Critical Value	0.750182
		K-S Test Statistic	0.19296
Gamma Statistics		K-S 5% Critical Value	0.232622
k hat	1.549542	Data follow gamma distribution	
k star (bias corrected)	1.265116	at 5% significance level	
Theta hat	188.3829		
Theta star	230.7355	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.38716	Approximate Gamma UCL	453.4691
nu star	35.42325	Adjusted Gamma UCL	481.7077
Approx.Chi Square Value (.05)	22.80265		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	21.46592	Shapiro-Wilk Test Statisitic	0.9561
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.779634		
Maximum of log data	7.237059	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.320289	95% H-UCL	513.6875
Standard Deviation of log data	0.827019	95% Chebyshev (MVUE) UCL	565.5434
Variance of log data	0.68396	97.5% Chebyshev (MVUE) UCL	689.5041
		99% Chebyshev (MVUE) UCL	933.0011
		95% Non-parametric UCLs	
		CLT UCL	438.5864
		Adj-CLT UCL (Adjusted for skewness)	517.7783
		Mod-t UCL (Adjusted for skewness)	462.1818
		Jackknife UCL	449.8295
		Standard Bootstrap UCL	433.1186
		Bootstrap-t UCL	723.6002
RECOMMENDATION		Hall's Bootstrap UCL	1086.332
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	462.6
		BCA Bootstrap UCL	549.6929
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	680.6104
		97.5% Chebyshev (Mean, Sd) UCL	848.8026
		99% Chebyshev (Mean, Sd) UCL	1179.184

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_64
alpha-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.358025
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	40.86429	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	101.0082
Standard Deviation	127.073		
Variance	16147.54	Gamma Distribution Test	
Coefficient of Variation	3.109634	A-D Test Statistic	2.51351
Skewness	3.67508	A-D 5% Critical Value	0.841562
		K-S Test Statistic	0.365058
Gamma Statistics		K-S 5% Critical Value	0.248986
k hat	0.277008	Data do not follow gamma distribution	
k star (bias corrected)	0.265268	at 5% significance level	
Theta hat	147.5202		
Theta star	154.0489	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.756228	Approximate Gamma UCL	126.0718
nu star	7.427513	Adjusted Gamma UCL	148.36
Approx.Chi Square Value (.05)	2.407516		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.045834	Shapiro-Wilk Test Statisitic	0.715074
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.188372	95% H-UCL	288.1229
Standard Deviation of log data	1.970394	95% Chebyshev (MVUE) UCL	60.28578
Variance of log data	3.882453	97.5% Chebyshev (MVUE) UCL	79.11494
		99% Chebyshev (MVUE) UCL	116.1012
		95% Non-parametric UCLs	
		CLT UCL	96.72628
		Adj-CLT UCL (Adjusted for skewness)	132.3691
		Mod-t UCL (Adjusted for skewness)	106.5677
		Jackknife UCL	101.0082
		Standard Bootstrap UCL	93.45568
		Bootstrap-t UCL	974.3288
RECOMMENDATION		Hall's Bootstrap UCL	815.1947
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	106.125
		BCA Bootstrap UCL	141.9786
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	188.8998
		97.5% Chebyshev (Mean, Sd) UCL	252.9549
		99% Chebyshev (Mean, Sd) UCL	378.7787

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_65
alpha-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.416798
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.95	Data not normal at 5% significance level	
Maximum	480		
Mean	47.35	95% UCL (Assuming Normal Distribution)	
Median	4	Student's-t UCL	107.2994
Standard Deviation	126.6621		
Variance	16043.29	Gamma Distribution Test	
Coefficient of Variation	2.675018	A-D Test Statistic	1.437293
Skewness	3.539142	A-D 5% Critical Value	0.826385
		K-S Test Statistic	0.264049
Gamma Statistics		K-S 5% Critical Value	0.246901
k hat	0.329127	Data do not follow gamma distribution	
k star (bias corrected)	0.306219	at 5% significance level	
Theta hat	143.8655		
Theta star	154.6281	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.21555	Approximate Gamma UCL	132.1951
nu star	8.574123	Adjusted Gamma UCL	153.1887
Approx.Chi Square Value (.05)	3.071102		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.650226	Shapiro-Wilk Test Statisitic	0.872014
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.051293		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.793884	95% H-UCL	523.9466
Standard Deviation of log data	1.968673	95% Chebyshev (MVUE) UCL	110.1017
Variance of log data	3.875673	97.5% Chebyshev (MVUE) UCL	144.4821
		99% Chebyshev (MVUE) UCL	212.0157
		95% Non-parametric UCLs	
		CLT UCL	103.0314
		Adj-CLT UCL (Adjusted for skewness)	137.2448
		Mod-t UCL (Adjusted for skewness)	112.636
		Jackknife UCL	107.2994
		Standard Bootstrap UCL	100.1507
		Bootstrap-t UCL	433.9559
RECOMMENDATION		Hall's Bootstrap UCL	379.0625
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	112.025
		BCA Bootstrap UCL	148.8357
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	194.9069
		97.5% Chebyshev (Mean, Sd) UCL	258.7549
		99% Chebyshev (Mean, Sd) UCL	384.1719

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_66
beta-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.372109
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	43.39643	95% UCL (Assuming Normal Distribution)	
Median	4.2	Student's-t UCL	103.2078
Standard Deviation	126.3705		
Variance	15969.49	Gamma Distribution Test	
Coefficient of Variation	2.912001	A-D Test Statistic	1.568579
Skewness	3.671455	A-D 5% Critical Value	0.824618
		K-S Test Statistic	0.258234
Gamma Statistics		K-S 5% Critical Value	0.24662
k hat	0.338248	Data do not follow gamma distribution	
k star (bias corrected)	0.313385	at 5% significance level	
Theta hat	128.2977		
Theta star	138.4763	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.470941	Approximate Gamma UCL	119.3429
nu star	8.774787	Adjusted Gamma UCL	137.9753
Approx.Chi Square Value (.05)	3.190759		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.759875	Shapiro-Wilk Test Statisitic	0.89609
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.771279	95% H-UCL	287.4674
Standard Deviation of log data	1.831385	95% Chebyshev (MVUE) UCL	83.60632
Variance of log data	3.353972	97.5% Chebyshev (MVUE) UCL	109.1987
		99% Chebyshev (MVUE) UCL	159.47
		95% Non-parametric UCLs	
		CLT UCL	98.94959
		Adj-CLT UCL (Adjusted for skewness)	134.3604
		Mod-t UCL (Adjusted for skewness)	108.7312
		Jackknife UCL	103.2078
		Standard Bootstrap UCL	97.86155
		Bootstrap-t UCL	700.4952
RECOMMENDATION		Hall's Bootstrap UCL	401.676
Data are lognormal (0.05)		Percentile Bootstrap UCL	109.4643
		BCA Bootstrap UCL	146.5893
Use 99% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	190.6136
		97.5% Chebyshev (Mean, Sd) UCL	254.3145
		99% Chebyshev (Mean, Sd) UCL	379.4428

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_67
bis(2-Ethylhexyl)phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.471553
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.874
Minimum	175	Data not normal at 5% significance level	
Maximum	2300		
Mean	415	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	679.701
Standard Deviation	559.2646		
Variance	312776.9	Gamma Distribution Test	
Coefficient of Variation	1.347626	A-D Test Statistic	2.149607
Skewness	3.383191	A-D 5% Critical Value	0.750768
		K-S Test Statistic	0.345324
Gamma Statistics		K-S 5% Critical Value	0.23276
k hat	1.49368	Data do not follow gamma distribution	
k star (bias corrected)	1.221224	at 5% significance level	
Theta hat	277.8374		
Theta star	339.8229	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.82303	Approximate Gamma UCL	650.4228
nu star	34.19428	Adjusted Gamma UCL	691.7958
Approx.Chi Square Value (.05)	21.81754		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	20.51274	Shapiro-Wilk Test Statisitic	0.693227
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	7.740664	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.657601	95% H-UCL	609.8001
Standard Deviation of log data	0.733846	95% Chebyshev (MVUE) UCL	696.5995
Variance of log data	0.53853	97.5% Chebyshev (MVUE) UCL	839.4938
		99% Chebyshev (MVUE) UCL	1120.182
		95% Non-parametric UCLs	
		CLT UCL	660.8559
		Adj-CLT UCL (Adjusted for skewness)	805.2655
		Mod-t UCL (Adjusted for skewness)	702.2259
		Jackknife UCL	679.701
		Standard Bootstrap UCL	654.7411
		Bootstrap-t UCL	1411.443
RECOMMENDATION		Hall's Bootstrap UCL	1460.254
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	692.1429
		BCA Bootstrap UCL	828.9286
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1066.524
		97.5% Chebyshev (Mean, Sd) UCL	1348.438
		99% Chebyshev (Mean, Sd) UCL	1902.205

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_68
cis-1,2-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.391124
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.874
Minimum	3	Data not normal at 5% significance level	
Maximum	44		
Mean	8.5	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	13.37206
Standard Deviation	10.29376		
Variance	105.9615	Gamma Distribution Test	
Coefficient of Variation	1.211031	A-D Test Statistic	3.082709
Skewness	3.646703	A-D 5% Critical Value	0.745807
		K-S Test Statistic	0.37596
Gamma Statistics		K-S 5% Critical Value	0.231599
k hat	2.035959	Data do not follow gamma distribution	
k star (bias corrected)	1.647301	at 5% significance level	
Theta hat	4.174938		
Theta star	5.159956	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.00684	Approximate Gamma UCL	12.43073
nu star	46.12442	Adjusted Gamma UCL	13.09264
Approx.Chi Square Value (.05)	31.53939		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	29.94488	Shapiro-Wilk Test Statisitic	0.598297
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	3.78419	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.874817	95% H-UCL	11.19726
Standard Deviation of log data	0.595004	95% Chebyshev (MVUE) UCL	13.19151
Variance of log data	0.354029	97.5% Chebyshev (MVUE) UCL	15.58029
		99% Chebyshev (MVUE) UCL	20.27259
		95% Non-parametric UCLs	
		CLT UCL	13.0252
		Adj-CLT UCL (Adjusted for skewness)	15.89021
		Mod-t UCL (Adjusted for skewness)	13.81894
		Jackknife UCL	13.37206
		Standard Bootstrap UCL	12.9222
		Bootstrap-t UCL	45.61469
RECOMMENDATION		Hall's Bootstrap UCL	50.58503
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	13.75
		BCA Bootstrap UCL	16.85714
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	20.49187
		97.5% Chebyshev (Mean, Sd) UCL	25.68076
		99% Chebyshev (Mean, Sd) UCL	35.87333

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_69
gamma-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.467652
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.9	Data not normal at 5% significance level	
Maximum	420		
Mean	45.68571	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	99.33315
Standard Deviation	113.3472		
Variance	12847.59	Gamma Distribution Test	
Coefficient of Variation	2.481021	A-D Test Statistic	2.05865
Skewness	3.216045	A-D 5% Critical Value	0.8366
		K-S Test Statistic	0.385765
Gamma Statistics		K-S 5% Critical Value	0.248369
k hat	0.288976	Data do not follow gamma distribution	
k star (bias corrected)	0.274672	at 5% significance level	
Theta hat	158.0951		
Theta star	166.3284	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.091334	Approximate Gamma UCL	137.43
nu star	7.69081	Adjusted Gamma UCL	161.0962
Approx.Chi Square Value (.05)	2.556649		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.181058	Shapiro-Wilk Test Statisitic	0.72334
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.040255	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.420936	95% H-UCL	998.3456
Standard Deviation of log data	2.189809	95% Chebyshev (MVUE) UCL	115.2509
Variance of log data	4.795263	97.5% Chebyshev (MVUE) UCL	152.1879
		99% Chebyshev (MVUE) UCL	224.7436
		95% Non-parametric UCLs	
		CLT UCL	95.51378
		Adj-CLT UCL (Adjusted for skewness)	123.3356
		Mod-t UCL (Adjusted for skewness)	103.6728
		Jackknife UCL	99.33315
		Standard Bootstrap UCL	93.08243
		Bootstrap-t UCL	385.0197
RECOMMENDATION		Hall's Bootstrap UCL	347.8983
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	100.2071
		BCA Bootstrap UCL	132.3429
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	177.7312
		97.5% Chebyshev (Mean, Sd) UCL	234.8674
		99% Chebyshev (Mean, Sd) UCL	347.1004

Data File	C:\lhilsche\AMCO\EPCS1_ucl\all._1EPCs1.tx	Variable:	_70
gamma-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	14	Shapiro-Wilk Test Statisitic	0.420208
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.874
Minimum	0.95	Data not normal at 5% significance level	
Maximum	480		
Mean	48.16429	95% UCL (Assuming Normal Distribution)	
Median	7.35	Student's-t UCL	108.0205
Standard Deviation	126.4653		
Variance	15993.47	Gamma Distribution Test	
Coefficient of Variation	2.625707	A-D Test Statistic	1.262374
Skewness	3.535625	A-D 5% Critical Value	0.822333
		K-S Test Statistic	0.260244
Gamma Statistics		K-S 5% Critical Value	0.246256
k hat	0.350034	Data do not follow gamma distribution	
k star (bias corrected)	0.322646	at 5% significance level	
Theta hat	137.5989		
Theta star	149.2792	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.80095	Approximate Gamma UCL	130.0113
nu star	9.03408	Adjusted Gamma UCL	149.8806
Approx.Chi Square Value (.05)	3.346786		
Adjusted Level of Significance	0.03122	Lognormal Distribution Test	
Adjusted Chi Square Value	2.903111	Shapiro-Wilk Test Statisitic	0.905576
		Shapiro-Wilk 5% Critical Value	0.874
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.051293		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.953586	95% H-UCL	490.8129
Standard Deviation of log data	1.916375	95% Chebyshev (MVUE) UCL	117.234
Variance of log data	3.672492	97.5% Chebyshev (MVUE) UCL	153.5788
		99% Chebyshev (MVUE) UCL	224.9712
		95% Non-parametric UCLs	
		CLT UCL	103.7591
		Adj-CLT UCL (Adjusted for skewness)	137.8855
		Mod-t UCL (Adjusted for skewness)	113.3436
		Jackknife UCL	108.0205
		Standard Bootstrap UCL	101.2681
		Bootstrap-t UCL	446.3301
RECOMMENDATION		Hall's Bootstrap UCL	374.2049
Data are lognormal (0.05)		Percentile Bootstrap UCL	111.4
		BCA Bootstrap UCL	151.3643
Use 99% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	195.4919
		97.5% Chebyshev (Mean, Sd) UCL	259.2406
		99% Chebyshev (Mean, Sd) UCL	384.4628

Large Vacant Lot – Deep Soil

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_1
1,1-Dichloroethane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.320352
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	15		
Mean	6.130435	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student	6.830522
Standard Deviation	1.955281		
Variance	3.823123	Gamma Distribution Test	
Coefficient of Variation	0.318946	A-D Test Statistic	5.502963
Skewness	4.625448	A-D 5% Critical Value	0.742283
		K-S Test Statistic	0.418683
Gamma Statistics		K-S 5% Critical Value	0.18112
k hat	18.43484	Data do not follow gamma distribution	
k star (bias corrected)	16.05928	at 5% significance level	
Theta hat	0.332546		
Theta star	0.381738	95% UCLs (Assuming Gamma Distribution)	
nu hat	848.0024	Approximate Gamma UCL	6.692881
nu star	738.7267	Adjusted Gamma UCL	6.735648
Approx.Chi Square Value (.05)	676.6467		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	672.3505	Shapiro-Wilk Test Statisitic	0.389108
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.70805	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.785898	95% H-UCL	6.589356
Standard Deviation of log data	0.207104	95% Chebyshev (MVUE) UCL	7.242743
Variance of log data	0.042892	97.5% Chebyshev (MVUE) UCL	7.742205
		99% Chebyshev (MVUE) UCL	8.723301
		95% Non-parametric UCLs	
		CLT UCL	6.801049
		Adj-CLT UCL (Adjusted for skewness)	7.221209
		Mod-t UCL (Adjusted for skewness)	6.896058
		Jackknife UCL	6.830522
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.907576
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8.676547
		99% Chebyshev (Mean, Sd) UCL	10.18704

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_2
1,2-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.218231
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	2200		
Mean	101.8696	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	265.6351
Standard Deviation	457.3827		
Variance	209198.9	Gamma Distribution Test	
Coefficient of Variation	4.489886	A-D Test Statistic	8.317027
Skewness	4.795614	A-D 5% Critical Value	0.859967
		K-S Test Statistic	0.506396
Gamma Statistics		K-S 5% Critical Value	0.197948
k hat	0.275318	Data do not follow gamma distribution	
k star (bias corrected)	0.268392	at 5% significance level	
Theta hat	370.0074		
Theta star	379.5549	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.66461	Approximate Gamma UCL	230.5657
nu star	12.34604	Adjusted Gamma UCL	245.3963
Approx.Chi Square Value (.05)	5.454783		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.12512	Shapiro-Wilk Test Statisitic	0.326019
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	7.696213	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.083796	95% H-UCL	37.95079
Standard Deviation of log data	1.250965	95% Chebyshev (MVUE) UCL	38.88008
Variance of log data	1.564913	97.5% Chebyshev (MVUE) UCL	48.51265
		99% Chebyshev (MVUE) UCL	67.43396
		95% Non-parametric UCLs	
		CLT UCL	258.7407
		Adj-CLT UCL (Adjusted for skewness)	360.6413
		Mod-t UCL (Adjusted for skewness)	281.5296
		Jackknife UCL	265.6351
		Standard Bootstrap UCL	259.2464
		Bootstrap-t UCL	28645.13
RECOMMENDATION		Hall's Bootstrap UCL	27457.23
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	292.587
		BCA Bootstrap UCL	389.2391
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	517.5816
		97.5% Chebyshev (Mean, Sd) UCL	697.4606
		99% Chebyshev (Mean, Sd) UCL	1050.798

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_3
1,3-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.495679
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	2	Data not normal at 5% significance level	
Maximum	6.5		
Mean	5.565217	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	5.862363
Standard Deviation	0.829901		
Variance	0.688735	Gamma Distribution Test	
Coefficient of Variation	0.149123	A-D Test Statistic	4.86445
Skewness	-3.818887	A-D 5% Critical Value	0.741796
		K-S Test Statistic	0.457247
Gamma Statistics		K-S 5% Critical Value	0.181012
k hat	27.57408	Data do not follow gamma distribution	
k star (bias corrected)	24.00645	at 5% significance level	
Theta hat	0.201828		
Theta star	0.231822	95% UCLs (Assuming Gamma Distribution)	
nu hat	1268.408	Approximate Gamma UCL	5.977485
nu star	1104.297	Adjusted Gamma UCL	6.008533
Approx.Chi Square Value (.05)	1028.133		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1022.821	Shapiro-Wilk Test Statisitic	0.388075
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	1.871802	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.698293	95% H-UCL	6.102872
Standard Deviation of log data	0.224707	95% Chebyshev (MVUE) UCL	6.751005
Variance of log data	0.050493	97.5% Chebyshev (MVUE) UCL	7.249889
		99% Chebyshev (MVUE) UCL	8.229852
		95% Non-parametric UCLs	
		CLT UCL	5.849853
		Adj-CLT UCL (Adjusted for skewness)	5.702617
		Mod-t UCL (Adjusted for skewness)	5.839397
		Jackknife UCL	5.862363
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.319509
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.645891
		99% Chebyshev (Mean, Sd) UCL	7.287006

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_4
1,4-Dichlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.223762
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	2	Data not normal at 5% significance level	
Maximum	300		
Mean	18.36957	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	40.35339
Standard Deviation	61.39889		
Variance	3769.823	Gamma Distribution Test	
Coefficient of Variation	3.342425	A-D Test Statistic	7.890967
Skewness	4.794383	A-D 5% Critical Value	0.796328
		K-S Test Statistic	0.546254
Gamma Statistics		K-S 5% Critical Value	0.190637
k hat	0.595599	Data do not follow gamma distribution	
k star (bias corrected)	0.546898	at 5% significance level	
Theta hat	30.84214		
Theta star	33.58864	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.39758	Approximate Gamma UCL	31.37265
nu star	25.15731	Adjusted Gamma UCL	32.65398
Approx.Chi Square Value (.05)	14.73031		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	14.1523	Shapiro-Wilk Test Statisitic	0.357598
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	5.703782	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.872165	95% H-UCL	14.61702
Standard Deviation of log data	0.86496	95% Chebyshev (MVUE) UCL	17.2793
Variance of log data	0.748156	97.5% Chebyshev (MVUE) UCL	20.75276
		99% Chebyshev (MVUE) UCL	27.5757
		95% Non-parametric UCLs	
		CLT UCL	39.42789
		Adj-CLT UCL (Adjusted for skewness)	53.10347
		Mod-t UCL (Adjusted for skewness)	42.48651
		Jackknife UCL	40.35339
		Standard Bootstrap UCL	38.61594
		Bootstrap-t UCL	2687.761
RECOMMENDATION		Hall's Bootstrap UCL	969.4653
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	43.95652
		BCA Bootstrap UCL	56.80435
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	74.1746
		97.5% Chebyshev (Mean, Sd) UCL	98.32148
		99% Chebyshev (Mean, Sd) UCL	145.7534

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_5
2-Methylnapthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.404318
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	77	Data not normal at 5% significance level	
Maximum	4600		
Mean	488.2174	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	829.8482
Standard Deviation	954.1445		
Variance	910391.8	Gamma Distribution Test	
Coefficient of Variation	1.954344	A-D Test Statistic	3.930295
Skewness	4.015538	A-D 5% Critical Value	0.774559
		K-S Test Statistic	0.411449
Gamma Statistics		K-S 5% Critical Value	0.18749
k hat	0.898399	Data do not follow gamma distribution	
k star (bias corrected)	0.810202	at 5% significance level	
Theta hat	543.4305		
Theta star	602.5873	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.32635	Approximate Gamma UCL	749.0854
nu star	37.26929	Adjusted Gamma UCL	773.2678
Approx.Chi Square Value (.05)	24.29031		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	23.53068	Shapiro-Wilk Test Statisitic	0.733873
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.343805		
Maximum of log data	8.433812	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.539893	95% H-UCL	622.1824
Standard Deviation of log data	0.915827	95% Chebyshev (MVUE) UCL	728.1585
Variance of log data	0.838738	97.5% Chebyshev (MVUE) UCL	879.7229
		99% Chebyshev (MVUE) UCL	1177.442
		95% Non-parametric UCLs	
		CLT UCL	815.4658
		Adj-CLT UCL (Adjusted for skewness)	993.4619
		Mod-t UCL (Adjusted for skewness)	857.612
		Jackknife UCL	829.8482
		Standard Bootstrap UCL	806.6973
		Bootstrap-t UCL	1549.69
RECOMMENDATION		Hall's Bootstrap UCL	1751.206
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	853.7826
		BCA Bootstrap UCL	1061.087
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1355.433
		97.5% Chebyshev (Mean, Sd) UCL	1730.678
		99% Chebyshev (Mean, Sd) UCL	2467.774

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_6
4,4'-DDD			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.587675
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.9	Data not normal at 5% significance level	
Maximum	11000		
Mean	1493.33	95% UCL (Assuming Normal Distribution)	
Median	82	Student's-t UCL	2524.835
Standard Deviation	2880.901		
Variance	8299591	Gamma Distribution Test	
Coefficient of Variation	1.929179	A-D Test Statistic	1.05994
Skewness	2.253682	A-D 5% Critical Value	0.872306
		K-S Test Statistic	0.187123
Gamma Statistics		K-S 5% Critical Value	0.199156
k hat	0.247946	Data follow approximate gamma distibution	
k star (bias corrected)	0.244591	at 5% significance level	
Theta hat	6022.81		
Theta star	6105.43	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.40551	Approximate Gamma UCL	3546.841
nu star	11.25117	Adjusted Gamma UCL	3789.739
Approx.Chi Square Value (.05)	4.73709		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	4.433473	Shapiro-Wilk Test Statisitic	0.895935
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.641854		
Maximum of log data	9.305651	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.440254	95% H-UCL	465010.8
Standard Deviation of log data	3.073249	95% Chebyshev (MVUE) UCL	18947.84
Variance of log data	9.444857	97.5% Chebyshev (MVUE) UCL	25303.93
		99% Chebyshev (MVUE) UCL	37789.22
		95% Non-parametric UCLs	
		CLT UCL	2481.409
		Adj-CLT UCL (Adjusted for skewness)	2783.039
		Mod-t UCL (Adjusted for skewness)	2571.883
		Jackknife UCL	2524.835
		Standard Bootstrap UCL	2464.755
		Bootstrap-t UCL	3453.434
RECOMMENDATION		Hall's Bootstrap UCL	2561.04
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	2558.874
		BCA Bootstrap UCL	2781.861
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	4111.762
		97.5% Chebyshev (Mean, Sd) UCL	5244.759
		99% Chebyshev (Mean, Sd) UCL	7470.314

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_7
4,4'-DDE			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.451619
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.3	Data not normal at 5% significance level	
Maximum	8600		
Mean	850.2826	95% UCL (Assuming Normal Distribution)	
Median	49	Student's-t UCL	1608.983
Standard Deviation	2118.982		
Variance	4490086	Gamma Distribution Test	
Coefficient of Variation	2.492092	A-D Test Statistic	1.159553
Skewness	3.14969	A-D 5% Critical Value	0.866535
		K-S Test Statistic	0.156509
Gamma Statistics		K-S 5% Critical Value	0.198591
k hat	0.260748	Data follow approximate gamma distibution	
k star (bias corrected)	0.255723	at 5% significance level	
Theta hat	3260.938		
Theta star	3325.017	95% UCLs (Assuming Gamma Distribution)	
nu hat	11.9944	Approximate Gamma UCL	1972.598
nu star	11.76325	Adjusted Gamma UCL	2103.675
Approx.Chi Square Value (.05)	5.070514		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	4.754577	Shapiro-Wilk Test Statisitic	0.943683
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.262364		
Maximum of log data	9.059517	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.039986	95% H-UCL	46634.2
Standard Deviation of log data	2.705867	95% Chebyshev (MVUE) UCL	5285.245
Variance of log data	7.321715	97.5% Chebyshev (MVUE) UCL	7016.981
		99% Chebyshev (MVUE) UCL	10418.64
		95% Non-parametric UCLs	
		CLT UCL	1577.042
		Adj-CLT UCL (Adjusted for skewness)	1887.103
		Mod-t UCL (Adjusted for skewness)	1657.346
		Jackknife UCL	1608.983
		Standard Bootstrap UCL	1572.439
		Bootstrap-t UCL	4984.557
RECOMMENDATION		Hall's Bootstrap UCL	4771.463
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	1606.548
		BCA Bootstrap UCL	1948.935
Use Adjusted Gamma UCL		95% Chebyshev (Mean, Sd) UCL	2776.211
		97.5% Chebyshev (Mean, Sd) UCL	3609.562
		99% Chebyshev (Mean, Sd) UCL	5246.519

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_8
4,4'-DDT			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.311903
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.8	Data not normal at 5% significance level	
Maximum	140000		
Mean	8266.743	95% UCL (Assuming Normal Distribution)	
Median	31	Student's-t UCL	18758.62
Standard Deviation	29302.87		
Variance	8.59E+08	Gamma Distribution Test	
Coefficient of Variation	3.544669	A-D Test Statistic	2.198382
Skewness	4.517358	A-D 5% Critical Value	0.903566
		K-S Test Statistic	0.27166
Gamma Statistics		K-S 5% Critical Value	0.202073
k hat	0.175801	Data do not follow gamma distribution	
k star (bias corrected)	0.181856	at 5% significance level	
Theta hat	47023.41		
Theta star	45457.74	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.086827	Approximate Gamma UCL	23460.7
nu star	8.365357	Adjusted Gamma UCL	25435.33
Approx.Chi Square Value (.05)	2.947664		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	2.718827	Shapiro-Wilk Test Statisitic	0.92116
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.587787		
Maximum of log data	11.8494	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.749987	95% H-UCL	1741704
Standard Deviation of log data	3.251941	95% Chebyshev (MVUE) UCL	40172.02
Variance of log data	10.57512	97.5% Chebyshev (MVUE) UCL	53763.94
		99% Chebyshev (MVUE) UCL	80462.63
		95% Non-parametric UCLs	
		CLT UCL	18316.92
		Adj-CLT UCL (Adjusted for skewness)	24466.52
		Mod-t UCL (Adjusted for skewness)	19717.83
		Jackknife UCL	18758.62
		Standard Bootstrap UCL	18278.89
		Bootstrap-t UCL	120031.1
RECOMMENDATION		Hall's Bootstrap UCL	81299.43
Data are lognormal (0.05)		Percentile Bootstrap UCL	20075.3
		BCA Bootstrap UCL	28210.4
Use Larger of:		95% Chebyshev (Mean, Sd) UCL	34899.92
99% Chebyshev (MVUE) UCL		97.5% Chebyshev (Mean, Sd) UCL	46424.12
99% Chebyshev (Mean, Sd) UCL		99% Chebyshev (Mean, Sd) UCL	69061.18

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_9
Acetone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.851715
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	150		
Mean	40.95652	95% UCL (Assuming Normal Distribution)	
Median	35	Student's-t UCL	55.04466
Standard Deviation	39.34692		
Variance	1548.18	Gamma Distribution Test	
Coefficient of Variation	0.9607	A-D Test Statistic	0.703535
Skewness	1.246872	A-D 5% Critical Value	0.768026
		K-S Test Statistic	0.181018
Gamma Statistics		K-S 5% Critical Value	0.186464
k hat	1.069235	Data follow gamma distribution	
k star (bias corrected)	0.958755	at 5% significance level	
Theta hat	38.3045		
Theta star	42.71843	95% UCLs (Assuming Gamma Distribution)	
nu hat	49.18482	Approximate Gamma UCL	60.47268
nu star	44.10275	Adjusted Gamma UCL	62.24232
Approx.Chi Square Value (.05)	29.86961		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	29.02037	Shapiro-Wilk Test Statisitic	0.889482
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.010635	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.176814	95% H-UCL	90.01941
Standard Deviation of log data	1.145179	95% Chebyshev (MVUE) UCL	97.4794
Variance of log data	1.311434	97.5% Chebyshev (MVUE) UCL	120.5358
		99% Chebyshev (MVUE) UCL	165.8256
		95% Non-parametric UCLs	
		CLT UCL	54.45156
		Adj-CLT UCL (Adjusted for skewness)	56.73077
		Mod-t UCL (Adjusted for skewness)	55.40017
		Jackknife UCL	55.04466
		Standard Bootstrap UCL	54.3738
		Bootstrap-t UCL	57.53011
RECOMMENDATION		Hall's Bootstrap UCL	57.21876
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	54.36957
		BCA Bootstrap UCL	56.23913
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	76.71867
		97.5% Chebyshev (Mean, Sd) UCL	92.19298
		99% Chebyshev (Mean, Sd) UCL	122.5893

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_10
Acetophenone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.539534
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	175	Data not normal at 5% significance level	
Maximum	420		
Mean	213.6957	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	235.8346
Standard Deviation	61.8322		
Variance	3823.221	Gamma Distribution Test	
Coefficient of Variation	0.289347	A-D Test Statistic	4.084444
Skewness	2.729257	A-D 5% Critical Value	0.742444
		K-S Test Statistic	0.367062
Gamma Statistics		K-S 5% Critical Value	0.181157
k hat	17.69818	Data do not follow gamma distribution	
k star (bias corrected)	15.41871	at 5% significance level	
Theta hat	12.07444		
Theta star	13.8595	95% UCLs (Assuming Gamma Distribution)	
nu hat	814.1165	Approximate Gamma UCL	233.7339
nu star	709.2607	Adjusted Gamma UCL	235.2592
Approx.Chi Square Value (.05)	648.4551		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	644.2508	Shapiro-Wilk Test Statisitic	0.603146
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	6.040255	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.336035	95% H-UCL	231.8916
Standard Deviation of log data	0.224341	95% Chebyshev (MVUE) UCL	256.4853
Variance of log data	0.050329	97.5% Chebyshev (MVUE) UCL	275.413
		99% Chebyshev (MVUE) UCL	312.5926
		95% Non-parametric UCLs	
		CLT UCL	234.9026
		Adj-CLT UCL (Adjusted for skewness)	242.7425
		Mod-t UCL (Adjusted for skewness)	237.0575
		Jackknife UCL	235.8346
		Standard Bootstrap UCL	234.2784
		Bootstrap-t UCL	276.6605
RECOMMENDATION		Hall's Bootstrap UCL	252.9942
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	234.7826
		BCA Bootstrap UCL	245.2174
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	269.8945
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	294.2118
		99% Chebyshev (Mean, Sd) UCL	341.9784

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_11
Aluminum			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.715722
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5400	Data not normal at 5% significance level	
Maximum	14000		
Mean	7527.391	95% UCL (Assuming Normal Distribution)	
Median	7010	Student's-t UCL	8240.815
Standard Deviation	1992.53		
Variance	3970175	Gamma Distribution Test	
Coefficient of Variation	0.264704	A-D Test Statistic	2.016602
Skewness	2.235805	A-D 5% Critical Value	0.7421
		K-S Test Statistic	0.267986
Gamma Statistics		K-S 5% Critical Value	0.181077
k hat	19.27102	Data do not follow gamma distribution	
k star (bias corrected)	16.78639	at 5% significance level	
Theta hat	390.6068		
Theta star	448.4222	95% UCLs (Assuming Gamma Distribution)	
nu hat	886.4668	Approximate Gamma UCL	8201.832
nu star	772.1741	Adjusted Gamma UCL	8253.055
Approx.Chi Square Value (.05)	708.6778		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	704.2794	Shapiro-Wilk Test Statisitic	0.809184
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	8.594154		
Maximum of log data	9.546813	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.900134	95% H-UCL	8168.348
Standard Deviation of log data	0.220605	95% Chebyshev (MVUE) UCL	9022.594
Variance of log data	0.048667	97.5% Chebyshev (MVUE) UCL	9679.057
		99% Chebyshev (MVUE) UCL	10968.55
		95% Non-parametric UCLs	
		CLT UCL	8210.781
		Adj-CLT UCL (Adjusted for skewness)	8417.743
		Mod-t UCL (Adjusted for skewness)	8273.097
		Jackknife UCL	8240.815
		Standard Bootstrap UCL	8181.919
		Bootstrap-t UCL	8878.691
RECOMMENDATION		Hall's Bootstrap UCL	8989.298
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8229.565
		BCA Bootstrap UCL	8383.043
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	9338.388
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	10122.01
		99% Chebyshev (Mean, Sd) UCL	11661.28

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_12
Anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.569407
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	81	Data not normal at 5% significance level	
Maximum	550		
Mean	226.5652	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	266.693
Standard Deviation	112.0734		
Variance	12560.44	Gamma Distribution Test	
Coefficient of Variation	0.494663	A-D Test Statistic	3.973982
Skewness	2.366994	A-D 5% Critical Value	0.745904
		K-S Test Statistic	0.390856
Gamma Statistics		K-S 5% Critical Value	0.181945
k hat	6.272293	Data do not follow gamma distribution	
k star (bias corrected)	5.483154	at 5% significance level	
Theta hat	36.12159		
Theta star	41.32024	95% UCLs (Assuming Gamma Distribution)	
nu hat	288.5255	Approximate Gamma UCL	264.0171
nu star	252.2251	Adjusted Gamma UCL	266.9762
Approx.Chi Square Value (.05)	216.4459		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	214.0469	Shapiro-Wilk Test Statisitic	0.68357
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.394449		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.341204	95% H-UCL	262.8251
Standard Deviation of log data	0.386801	95% Chebyshev (MVUE) UCL	304.9375
Variance of log data	0.149615	97.5% Chebyshev (MVUE) UCL	339.8718
		99% Chebyshev (MVUE) UCL	408.4934
		95% Non-parametric UCLs	
		CLT UCL	265.0037
		Adj-CLT UCL (Adjusted for skewness)	277.3277
		Mod-t UCL (Adjusted for skewness)	268.6153
		Jackknife UCL	266.693
		Standard Bootstrap UCL	264.0574
		Bootstrap-t UCL	306.5293
RECOMMENDATION		Hall's Bootstrap UCL	454.0372
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	264.8261
		BCA Bootstrap UCL	278.4783
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	328.4279
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	372.504
		99% Chebyshev (Mean, Sd) UCL	459.083

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_13
Antimony			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.68647
Number of Unique Samples	18	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.26	Data not normal at 5% significance level	
Maximum	10.9		
Mean	2.123478	95% UCL (Assuming Normal Distribution)	
Median	1.3	Student's-t UCL	3.024091
Standard Deviation	2.515332		
Variance	6.326896	Gamma Distribution Test	
Coefficient of Variation	1.184534	A-D Test Statistic	0.902755
Skewness	2.389203	A-D 5% Critical Value	0.765948
		K-S Test Statistic	0.237414
Gamma Statistics		K-S 5% Critical Value	0.186061
k hat	1.182163	Data do not follow gamma distribution	
k star (bias corrected)	1.056954	at 5% significance level	
Theta hat	1.796265		
Theta star	2.009055	95% UCLs (Assuming Gamma Distribution)	
nu hat	54.37951	Approximate Gamma UCL	3.071706
nu star	48.61987	Adjusted Gamma UCL	3.156677
Approx.Chi Square Value (.05)	33.61104		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	32.70631	Shapiro-Wilk Test Statisitic	0.965947
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.347074		
Maximum of log data	2.388763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.273825	95% H-UCL	3.476907
Standard Deviation of log data	0.961804	95% Chebyshev (MVUE) UCL	4.023825
Variance of log data	0.925068	97.5% Chebyshev (MVUE) UCL	4.886197
		99% Chebyshev (MVUE) UCL	6.58016
		95% Non-parametric UCLs	
		CLT UCL	2.986176
		Adj-CLT UCL (Adjusted for skewness)	3.265367
		Mod-t UCL (Adjusted for skewness)	3.067639
		Jackknife UCL	3.024091
		Standard Bootstrap UCL	2.969006
		Bootstrap-t UCL	3.685075
RECOMMENDATION		Hall's Bootstrap UCL	3.477277
Data are lognormal (0.05)		Percentile Bootstrap UCL	3.013043
		BCA Bootstrap UCL	3.250435
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	4.409647
		97.5% Chebyshev (Mean, Sd) UCL	5.398874
		99% Chebyshev (Mean, Sd) UCL	7.342018

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_14
Aroclor-1260			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.268424
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.914
Minimum	17.5	Data not normal at 5% significance level	
Maximum	9500		
Mean	511.4348	95% UCL (Assuming Normal Distribution)	
Median	20	Student's-t UCL	1216.852
Standard Deviation	1970.168		
Variance	3881561	Gamma Distribution Test	
Coefficient of Variation	3.852236	A-D Test Statistic	4.879852
Skewness	4.71454	A-D 5% Critical Value	0.851693
		K-S Test Statistic	0.368389
Gamma Statistics		K-S 5% Critical Value	0.197139
k hat	0.293671	Data do not follow gamma distribution	
k star (bias corrected)	0.284351	at 5% significance level	
Theta hat	1741.526		
Theta star	1798.603	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.50884	Approximate Gamma UCL	1125.149
nu star	13.08015	Adjusted Gamma UCL	1194.786
Approx.Chi Square Value (.05)	5.945564		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.59903	Shapiro-Wilk Test Statisitic	0.660768
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	9.159047	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.880946	95% H-UCL	641.7771
Standard Deviation of log data	1.646792	95% Chebyshev (MVUE) UCL	475.956
Variance of log data	2.711925	97.5% Chebyshev (MVUE) UCL	609.7991
		99% Chebyshev (MVUE) UCL	872.7078
		95% Non-parametric UCLs	
		CLT UCL	1187.154
		Adj-CLT UCL (Adjusted for skewness)	1618.669
		Mod-t UCL (Adjusted for skewness)	1284.159
		Jackknife UCL	1216.852
		Standard Bootstrap UCL	1171.93
		Bootstrap-t UCL	11275.48
RECOMMENDATION		Hall's Bootstrap UCL	6863.918
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1318.5
		BCA Bootstrap UCL	1764.804
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2302.107
		97.5% Chebyshev (Mean, Sd) UCL	3076.932
		99% Chebyshev (Mean, Sd) UCL	4598.926

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_15
Arsenic			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.771374
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.914
Minimum	2.5	Data not normal at 5% significance level	
Maximum	53.7		
Mean	12.84783	95% UCL (Assuming Normal Distribution)	
Median	6.9	Student's-t UCL	17.49702
Standard Deviation	12.98478		
Variance	168.6044	Gamma Distribution Test	
Coefficient of Variation	1.010659	A-D Test Statistic	0.770147
Skewness	1.846329	A-D 5% Critical Value	0.762656
		K-S Test Statistic	0.17558
Gamma Statistics		K-S 5% Critical Value	0.185424
k hat	1.361098	Data follow approximate gamma distibution	
k star (bias corrected)	1.212549	at 5% significance level	
Theta hat	9.439307		
Theta star	10.59571	95% UCLs (Assuming Gamma Distribution)	
nu hat	62.61053	Approximate Gamma UCL	18.09164
nu star	55.77727	Adjusted Gamma UCL	18.55429
Approx.Chi Square Value (.05)	39.61038		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	38.62269	Shapiro-Wilk Test Statisitic	0.941874
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	3.983413	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.142843	95% H-UCL	20.5339
Standard Deviation of log data	0.907391	95% Chebyshev (MVUE) UCL	24.07542
Variance of log data	0.823358	97.5% Chebyshev (MVUE) UCL	29.05874
		99% Chebyshev (MVUE) UCL	38.84749
		95% Non-parametric UCLs	
		CLT UCL	17.30129
		Adj-CLT UCL (Adjusted for skewness)	18.41506
		Mod-t UCL (Adjusted for skewness)	17.67074
		Jackknife UCL	17.49702
		Standard Bootstrap UCL	16.97945
		Bootstrap-t UCL	19.7312
RECOMMENDATION		Hall's Bootstrap UCL	20.08906
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	17.63913
		BCA Bootstrap UCL	18.4
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	24.6496
		97.5% Chebyshev (Mean, Sd) UCL	29.75624
		99% Chebyshev (Mean, Sd) UCL	39.78724

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_16
Barium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.466478
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	78.5	Data not normal at 5% significance level	
Maximum	1990		
Mean	291.1522	95% UCL (Assuming Normal Distribution)	
Median	167	Student's-t UCL	433.1289
Standard Deviation	396.5284		
Variance	157234.8	Gamma Distribution Test	
Coefficient of Variation	1.361928	A-D Test Statistic	2.205708
Skewness	3.947981	A-D 5% Critical Value	0.759351
		K-S Test Statistic	0.249157
Gamma Statistics		K-S 5% Critical Value	0.184775
k hat	1.569628	Data do not follow gamma distribution	
k star (bias corrected)	1.39388	at 5% significance level	
Theta hat	185.4912		
Theta star	208.879	95% UCLs (Assuming Gamma Distribution)	
nu hat	72.2029	Approximate Gamma UCL	399.8092
nu star	64.11846	Adjusted Gamma UCL	409.2573
Approx.Chi Square Value (.05)	46.69285		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	45.6149	Shapiro-Wilk Test Statisitic	0.846575
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.363099		
Maximum of log data	7.59589	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.322653	95% H-UCL	364.8457
Standard Deviation of log data	0.705637	95% Chebyshev (MVUE) UCL	438.0561
Variance of log data	0.497924	97.5% Chebyshev (MVUE) UCL	515.3481
		99% Chebyshev (MVUE) UCL	667.1733
		95% Non-parametric UCLs	
		CLT UCL	427.1518
		Adj-CLT UCL (Adjusted for skewness)	499.8799
		Mod-t UCL (Adjusted for skewness)	444.473
		Jackknife UCL	433.1289
		Standard Bootstrap UCL	424.7935
		Bootstrap-t UCL	835.6651
RECOMMENDATION		Hall's Bootstrap UCL	983.774
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	444.1957
		BCA Bootstrap UCL	576.1522
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	651.5542
		97.5% Chebyshev (Mean, Sd) UCL	807.5004
		99% Chebyshev (Mean, Sd) UCL	1113.827

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_17
Benzo(a)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.61018
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.914
Minimum	80	Data not normal at 5% significance level	
Maximum	1200		
Mean	280.2174	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	364.8793
Standard Deviation	236.4533		
Variance	55910.18	Gamma Distribution Test	
Coefficient of Variation	0.843821	A-D Test Statistic	2.207612
Skewness	3.008517	A-D 5% Critical Value	0.751712
		K-S Test Statistic	0.334791
Gamma Statistics		K-S 5% Critical Value	0.183056
k hat	2.688443	Data do not follow gamma distribution	
k star (bias corrected)	2.366762	at 5% significance level	
Theta hat	104.2304		
Theta star	118.3969	95% UCLs (Assuming Gamma Distribution)	
nu hat	123.6684	Approximate Gamma UCL	355.6324
nu star	108.8711	Adjusted Gamma UCL	361.8962
Approx.Chi Square Value (.05)	85.78398		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	84.29921	Shapiro-Wilk Test Statisitic	0.852507
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.382027		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.438205	95% H-UCL	350.4079
Standard Deviation of log data	0.579246	95% Chebyshev (MVUE) UCL	419.1697
Variance of log data	0.335526	97.5% Chebyshev (MVUE) UCL	483.8094
		99% Chebyshev (MVUE) UCL	610.7816
		95% Non-parametric UCLs	
		CLT UCL	361.3151
		Adj-CLT UCL (Adjusted for skewness)	394.3635
		Mod-t UCL (Adjusted for skewness)	370.0342
		Jackknife UCL	364.8793
		Standard Bootstrap UCL	359.26
		Bootstrap-t UCL	452.3084
RECOMMENDATION		Hall's Bootstrap UCL	660.2455
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	368.913
		BCA Bootstrap UCL	396.9565
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	495.1282
		97.5% Chebyshev (Mean, Sd) UCL	588.1203
		99% Chebyshev (Mean, Sd) UCL	770.7853

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_18
Benzo(a)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.644341
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	81	Data not normal at 5% significance level	
Maximum	1400		
Mean	336.7826	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	447.2956
Standard Deviation	308.6531		
Variance	95266.72	Gamma Distribution Test	
Coefficient of Variation	0.916476	A-D Test Statistic	2.897438
Skewness	2.308874	A-D 5% Critical Value	0.754436
		K-S Test Statistic	0.389967
Gamma Statistics		K-S 5% Critical Value	0.183748
k hat	2.065028	Data do not follow gamma distribution	
k star (bias corrected)	1.824662	at 5% significance level	
Theta hat	163.0886		
Theta star	184.5726	95% UCLs (Assuming Gamma Distribution)	
nu hat	94.9913	Approximate Gamma UCL	442.9612
nu star	83.93446	Adjusted Gamma UCL	451.9655
Approx.Chi Square Value (.05)	63.81522		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	62.54385	Shapiro-Wilk Test Statisitic	0.797293
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.394449		
Maximum of log data	7.244228	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.558185	95% H-UCL	442.2112
Standard Deviation of log data	0.672577	95% Chebyshev (MVUE) UCL	531.13
Variance of log data	0.45236	97.5% Chebyshev (MVUE) UCL	621.8893
		99% Chebyshev (MVUE) UCL	800.1683
		95% Non-parametric UCLs	
		CLT UCL	442.6431
		Adj-CLT UCL (Adjusted for skewness)	475.7504
		Mod-t UCL (Adjusted for skewness)	452.4597
		Jackknife UCL	447.2956
		Standard Bootstrap UCL	439.3945
		Bootstrap-t UCL	520.1452
RECOMMENDATION		Hall's Bootstrap UCL	497.881
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	446.5217
		BCA Bootstrap UCL	475.4348
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	617.3153
		97.5% Chebyshev (Mean, Sd) UCL	738.702
		99% Chebyshev (Mean, Sd) UCL	977.1428

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_19
Benzo(b)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.645395
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.914
Minimum	130	Data not normal at 5% significance level	
Maximum	860		
Mean	303.0435	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	381.2142
Standard Deviation	218.3239		
Variance	47665.32	Gamma Distribution Test	
Coefficient of Variation	0.720437	A-D Test Statistic	3.447533
Skewness	1.748706	A-D 5% Critical Value	0.75034
		K-S Test Statistic	0.394858
Gamma Statistics		K-S 5% Critical Value	0.182707
k hat	3.008143	Data do not follow gamma distribution	
k star (bias corrected)	2.644762	at 5% significance level	
Theta hat	100.7411		
Theta star	114.5825	95% UCLs (Assuming Gamma Distribution)	
nu hat	138.3746	Approximate Gamma UCL	379.3665
nu star	121.6591	Adjusted Gamma UCL	385.6552
Approx.Chi Square Value (.05)	97.18302		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	95.59831	Shapiro-Wilk Test Statisitic	0.725406
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.867534		
Maximum of log data	6.756932	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.538549	95% H-UCL	375.9083
Standard Deviation of log data	0.552245	95% Chebyshev (MVUE) UCL	448.5483
Variance of log data	0.304975	97.5% Chebyshev (MVUE) UCL	515.4275
		99% Chebyshev (MVUE) UCL	646.7986
		95% Non-parametric UCLs	
		CLT UCL	377.9233
		Adj-CLT UCL (Adjusted for skewness)	395.6599
		Mod-t UCL (Adjusted for skewness)	383.9807
		Jackknife UCL	381.2142
		Standard Bootstrap UCL	377.3374
		Bootstrap-t UCL	421.2126
RECOMMENDATION		Hall's Bootstrap UCL	387.5933
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	380
		BCA Bootstrap UCL	399.5652
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	501.4766
		97.5% Chebyshev (Mean, Sd) UCL	587.3387
		99% Chebyshev (Mean, Sd) UCL	755.9983

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_20
Benzo(g,h,i)perylene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.695295
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.914
Minimum	82	Data not normal at 5% significance level	
Maximum	1200		
Mean	327.4783	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	427.4019
Standard Deviation	279.0778		
Variance	77884.44	Gamma Distribution Test	
Coefficient of Variation	0.852203	A-D Test Statistic	2.50659
Skewness	1.894584	A-D 5% Critical Value	0.754098
		K-S Test Statistic	0.360811
Gamma Statistics		K-S 5% Critical Value	0.183662
k hat	2.142397	Data do not follow gamma distribution	
k star (bias corrected)	1.891939	at 5% significance level	
Theta hat	152.856		
Theta star	173.0913	95% UCLs (Assuming Gamma Distribution)	
nu hat	98.55026	Approximate Gamma UCL	428.4482
nu star	87.02921	Adjusted Gamma UCL	436.9845
Approx.Chi Square Value (.05)	66.51953		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	65.2201	Shapiro-Wilk Test Statisitic	0.834727
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.406719		
Maximum of log data	7.090077	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.540244	95% H-UCL	435.4004
Standard Deviation of log data	0.674464	95% Chebyshev (MVUE) UCL	522.9528
Variance of log data	0.454901	97.5% Chebyshev (MVUE) UCL	612.4832
		99% Chebyshev (MVUE) UCL	788.3483
		95% Non-parametric UCLs	
		CLT UCL	423.1952
		Adj-CLT UCL (Adjusted for skewness)	447.7588
		Mod-t UCL (Adjusted for skewness)	431.2333
		Jackknife UCL	427.4019
		Standard Bootstrap UCL	421.248
		Bootstrap-t UCL	476.6338
RECOMMENDATION		Hall's Bootstrap UCL	452.7047
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	430.4348
		BCA Bootstrap UCL	446.1739
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	581.1302
		97.5% Chebyshev (Mean, Sd) UCL	690.8856
		99% Chebyshev (Mean, Sd) UCL	906.4789

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2_	Variable:	_21
Benzo(k)fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.660322
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	150	Data not normal at 5% significance level	
Maximum	890		
Mean	303.0435	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	378.668
Standard Deviation	211.2126		
Variance	44610.77	Gamma Distribution Test	
Coefficient of Variation	0.696971	A-D Test Statistic	3.515702
Skewness	1.663862	A-D 5% Critical Value	0.750184
		K-S Test Statistic	0.400701
Gamma Statistics		K-S 5% Critical Value	0.18267
k hat	3.129742	Data do not follow gamma distribution	
k star (bias corrected)	2.750501	at 5% significance level	
Theta hat	96.82697		
Theta star	110.1776	95% UCLs (Assuming Gamma Distribution)	
nu hat	143.9681	Approximate Gamma UCL	377.6118
nu star	126.523	Adjusted Gamma UCL	383.7393
Approx.Chi Square Value (.05)	101.5381		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	99.91674	Shapiro-Wilk Test Statisitic	0.712341
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.010635		
Maximum of log data	6.791221	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.545694	95% H-UCL	374.9617
Standard Deviation of log data	0.543352	95% Chebyshev (MVUE) UCL	446.9909
Variance of log data	0.295231	97.5% Chebyshev (MVUE) UCL	512.8727
		99% Chebyshev (MVUE) UCL	642.2846
		95% Non-parametric UCLs	
		CLT UCL	375.4843
		Adj-CLT UCL (Adjusted for skewness)	391.8107
		Mod-t UCL (Adjusted for skewness)	381.2146
		Jackknife UCL	378.668
		Standard Bootstrap UCL	372.174
		Bootstrap-t UCL	405.571
RECOMMENDATION		Hall's Bootstrap UCL	377.4244
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	376.9565
		BCA Bootstrap UCL	398.4783
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	495.0132
		97.5% Chebyshev (Mean, Sd) UCL	578.0787
		99% Chebyshev (Mean, Sd) UCL	741.2447

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2_	Variable:	_22
Benzyl butyl phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.519783
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	175	Data not normal at 5% significance level	
Maximum	550		
Mean	234.1304	95% UCL (Assuming Normal Distribution)	
Median	190	Student	272.8091
Standard Deviation	108.0262		
Variance	11669.66	Gamma Distribution Test	
Coefficient of Variation	0.461393	A-D Test Statistic	4.450807
Skewness	2.53557	A-D 5% Critical Value	0.745191
		K-S Test Statistic	0.396277
Gamma Statistics		K-S 5% Critical Value	0.181786
k hat	7.77128	Data do not follow gamma distribution	
k star (bias corrected)	6.78662	at 5% significance level	
Theta hat	30.12766		
Theta star	34.49883	95% UCLs (Assuming Gamma Distribution)	
nu hat	357.4789	Approximate Gamma UCL	268.4796
nu star	312.1845	Adjusted Gamma UCL	271.168
Approx.Chi Square Value (.05)	272.2438		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	269.5447	Shapiro-Wilk Test Statisitic	0.589915
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.390161	95% H-UCL	263.9202
Standard Deviation of log data	0.331593	95% Chebyshev (MVUE) UCL	301.9413
Variance of log data	0.109954	97.5% Chebyshev (MVUE) UCL	332.6162
		99% Chebyshev (MVUE) UCL	392.8709
		95% Non-parametric UCLs	
		CLT UCL	271.1808
		Adj-CLT UCL (Adjusted for skewness)	283.9058
		Mod-t UCL (Adjusted for skewness)	274.794
		Jackknife UCL	272.8091
		Standard Bootstrap UCL	269.7817
		Bootstrap-t UCL	326.1725
RECOMMENDATION		Hall's Bootstrap UCL	285.5609
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	273.913
		BCA Bootstrap UCL	287.1739
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	332.3147
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	374.7992
		99% Chebyshev (Mean, Sd) UCL	458.2516

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_23
Beryllium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.851443
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.18	Data not normal at 5% significance level	
Maximum	0.44		
Mean	0.262174	95% UCL (Assuming Normal Distribution)	
Median	0.26	Student's-t UCL	0.280777
Standard Deviation	0.051958		
Variance	0.0027	Gamma Distribution Test	
Coefficient of Variation	0.19818	A-D Test Statistic	0.689009
Skewness	1.802102	A-D 5% Critical Value	0.74174
		K-S Test Statistic	0.160623
Gamma Statistics		K-S 5% Critical Value	0.181001
k hat	30.50672	Data follow gamma distribution	
k star (bias corrected)	26.55657	at 5% significance level	
Theta hat	0.008594		
Theta star	0.009872	95% UCLs (Assuming Gamma Distribution)	
nu hat	1403.309	Approximate Gamma UCL	0.280587
nu star	1221.602	Adjusted Gamma UCL	0.281971
Approx.Chi Square Value (.05)	1141.435		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1135.833	Shapiro-Wilk Test Statisitic	0.931739
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.714798		
Maximum of log data	-0.820981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.355227	95% H-UCL	0.280509
Standard Deviation of log data	0.180936	95% Chebyshev (MVUE) UCL	0.305272
Variance of log data	0.032738	97.5% Chebyshev (MVUE) UCL	0.324014
		99% Chebyshev (MVUE) UCL	0.360831
		95% Non-parametric UCLs	
		CLT UCL	0.279994
		Adj-CLT UCL (Adjusted for skewness)	0.284344
		Mod-t UCL (Adjusted for skewness)	0.281456
		Jackknife UCL	0.280777
		Standard Bootstrap UCL	0.279766
		Bootstrap-t UCL	0.287134
RECOMMENDATION		Hall's Bootstrap UCL	0.309695
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.280435
		BCA Bootstrap UCL	0.285217
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.309398
		97.5% Chebyshev (Mean, Sd) UCL	0.329832
		99% Chebyshev (Mean, Sd) UCL	0.36997

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_24
Cadmium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.413056
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.13	Data not normal at 5% significance level	
Maximum	5.7		
Mean	0.683478	95% UCL (Assuming Normal Distribution)	
Median	0.45	Student's-t UCL	1.086093
Standard Deviation	1.124466		
Variance	1.264424	Gamma Distribution Test	
Coefficient of Variation	1.645211	A-D Test Statistic	1.658622
Skewness	4.388044	A-D 5% Critical Value	0.764899
		K-S Test Statistic	0.253077
Gamma Statistics		K-S 5% Critical Value	0.185859
k hat	1.239178	Data do not follow gamma distribution	
k star (bias corrected)	1.106532	at 5% significance level	
Theta hat	0.551558		
Theta star	0.617676	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.00219	Approximate Gamma UCL	0.9796
nu star	50.90045	Adjusted Gamma UCL	1.005995
Approx.Chi Square Value (.05)	35.51382		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	34.58203	Shapiro-Wilk Test Statisitic	0.906531
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.040221		
Maximum of log data	1.740466	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.835498	95% H-UCL	0.900341
Standard Deviation of log data	0.813756	95% Chebyshev (MVUE) UCL	1.072419
Variance of log data	0.662198	97.5% Chebyshev (MVUE) UCL	1.279936
		99% Chebyshev (MVUE) UCL	1.687564
		95% Non-parametric UCLs	
		CLT UCL	1.069143
		Adj-CLT UCL (Adjusted for skewness)	1.298372
		Mod-t UCL (Adjusted for skewness)	1.121848
		Jackknife UCL	1.086093
		Standard Bootstrap UCL	1.061257
		Bootstrap-t UCL	2.173823
RECOMMENDATION		Hall's Bootstrap UCL	2.513671
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.131739
		BCA Bootstrap UCL	1.366087
Use 95% Chebyshev (Mean, Sd) UCL		95% Ch	1.705498
		97.5% Chebyshev (Mean, Sd) UCL	2.147726
		99% Chebyshev (Mean, Sd) UCL	3.016399

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_25
Calcium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.770276
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3040	Data not normal at 5% significance level	
Maximum	20900		
Mean	7648.696	95% UCL (Assuming Normal Distribution)	
Median	5790	Student's-t UCL	9241.957
Standard Deviation	4449.837		
Variance	19801048	Gamma Distribution Test	
Coefficient of Variation	0.581777	A-D Test Statistic	0.993634
Skewness	1.921639	A-D 5% Critical Value	0.748332
		K-S Test Statistic	0.171903
Gamma Statistics		K-S 5% Critical Value	0.182308
k hat	4.288121	Data follow approximate gamma distibution	
k star (bias corrected)	3.757786	at 5% significance level	
Theta hat	1783.694		
Theta star	2035.426	95% UCLs (Assuming Gamma Distribution)	
nu hat	197.2536	Approximate Gamma UCL	9216.901
nu star	172.8582	Adjusted Gamma UCL	9343.265
Approx.Chi Square Value (.05)	143.4473		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	141.5072	Shapiro-Wilk Test Statisitic	0.92758
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.019613		
Maximum of log data	9.947504	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.821181	95% H-UCL	9242.614
Standard Deviation of log data	0.474559	95% Chebyshev (MVUE) UCL	10913.36
Variance of log data	0.225206	97.5% Chebyshev (MVUE) UCL	12371.6
		99% Chebyshev (MVUE) UCL	15236.03
		95% Non-parametric UCLs	
		CLT UCL	9174.882
		Adj-CLT UCL (Adjusted for skewness)	9572.136
		Mod-t UCL (Adjusted for skewness)	9303.92
		Jackknife UCL	9241.957
		Standard Bootstrap UCL	9158.234
		Bootstrap-t UCL	10160.58
RECOMMENDATION		Hall's Bootstrap UCL	10796.5
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	9250
		BCA Bootstrap UCL	9657.826
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	11693.12
		97.5% Chebyshev (Mean, Sd) UCL	13443.15
		99% Chebyshev (Mean, Sd) UCL	16880.74

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_26
Caprolactam			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.44738
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	175	Data not normal at 5% significance level	
Maximum	550		
Mean	217.1739	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	246.7626
Standard Deviation	82.63867		
Variance	6829.15	Gamma Distribution Test	
Coefficient of Variation	0.380518	A-D Test Statistic	4.634269
Skewness	3.560275	A-D 5% Critical Value	0.743645
		K-S Test Statistic	0.377914
Gamma Statistics		K-S 5% Critical Value	0.181437
k hat	12.21505	Data do not follow gamma distribution	
k star (bias corrected)	10.65077	at 5% significance level	
Theta hat	17.7792		
Theta star	20.39044	95% UCLs (Assuming Gamma Distribution)	
nu hat	561.8925	Approximate Gamma UCL	242.0419
nu star	489.9355	Adjusted Gamma UCL	243.9559
Approx.Chi Square Value (.05)	439.5983		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	436.1493	Shapiro-Wilk Test Statisitic	0.534077
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.339207	95% H-UCL	238.0252
Standard Deviation of log data	0.25943	95% Chebyshev (MVUE) UCL	266.4531
Variance of log data	0.067304	97.5% Chebyshev (MVUE) UCL	288.6503
		99% Chebyshev (MVUE) UCL	332.2525
		95% Non-parametric UCLs	
		CLT UCL	245.517
		Adj-CLT UCL (Adjusted for skewness)	259.1854
		Mod-t UCL (Adjusted for skewness)	248.8946
		Jackknife UCL	246.7626
		Standard Bootstrap UCL	245.2409
		Bootstrap-t UCL	388.3034
RECOMMENDATION		Hall's Bootstrap UCL	378.0027
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	247.6087
		BCA Bootstrap UCL	262.1739
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	292.2836
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	324.7837
		99% Chebyshev (Mean, Sd) UCL	388.6237

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_27
Chlorobenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.218764
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	4700		
Mean	211.7174	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	562.0517
Standard Deviation	978.4528		
Variance	957369.8	Gamma Distribution Test	
Coefficient of Variation	4.621504	A-D Test Statistic	8.35493
Skewness	4.795166	A-D 5% Critical Value	0.883024
		K-S Test Statistic	0.554377
Gamma Statistics		K-S 5% Critical Value	0.200204
k hat	0.22417	Data do not follow gamma distribution	
k star (bias corrected)	0.223916	at 5% significance level	
Theta hat	944.4506		
Theta star	945.5221	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.31181	Approximate Gamma UCL	528.1025
nu star	10.30013	Adjusted Gamma UCL	566.522
Approx.Chi Square Value (.05)	4.129343		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	3.849306	Shapiro-Wilk Test Statisitic	0.323768
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	8.455318	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.130869	95% H-UCL	64.55733
Standard Deviation of log data	1.450167	95% Chebyshev (MVUE) UCL	57.5681
Variance of log data	2.102983	97.5% Chebyshev (MVUE) UCL	72.88885
		99% Chebyshev (MVUE) UCL	102.9835
		95% Non-parametric UCLs	
		CLT UCL	547.3029
		Adj-CLT UCL (Adjusted for skewness)	765.2726
		Mod-t UCL (Adjusted for skewness)	596.0506
		Jackknife UCL	562.0517
		Standard Bootstrap UCL	528.1452
		Bootstrap-t UCL	703655
RECOMMENDATION		Hall's Bootstrap UCL	225797.3
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	619.8261
		BCA Bootstrap UCL	825.8043
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1101.027
		97.5% Chebyshev (Mean, Sd) UCL	1485.831
		99% Chebyshev (Mean, Sd) UCL	2241.706

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_28
Chromium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.805825
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	22.9	Data not normal at 5% significance level	
Maximum	348		
Mean	92.19565	95% UCL (Assuming Normal Distribution)	
Median	68.4	Student's-t UCL	121.2631
Standard Deviation	81.1828		
Variance	6590.648	Gamma Distribution Test	
Coefficient of Variation	0.880549	A-D Test Statistic	1.154617
Skewness	1.577391	A-D 5% Critical Value	0.759175
		K-S Test Statistic	0.246073
Gamma Statistics		K-S 5% Critical Value	0.184739
k hat	1.585973	Data do not follow gamma distribution	
k star (bias corrected)	1.408093	at 5% significance level	
Theta hat	58.13191		
Theta star	65.47556	95% UCLs (Assuming Gamma Distribution)	
nu hat	72.95476	Approximate Gamma UCL	126.3814
nu star	64.77226	Adjusted Gamma UCL	129.351
Approx.Chi Square Value (.05)	47.25157		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	46.1668	Shapiro-Wilk Test Statisitic	0.885506
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	3.131137		
Maximum of log data	5.852202	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.176651	95% H-UCL	143.3485
Standard Deviation of log data	0.851456	95% Chebyshev (MVUE) UCL	169.8381
Variance of log data	0.724977	97.5% Chebyshev (MVUE) UCL	203.6478
		99% Chebyshev (MVUE) UCL	270.0604
		95% Non-parametric UCLs	
		CLT UCL	120.0394
		Adj-CLT UCL (Adjusted for skewness)	125.9885
		Mod-t UCL (Adjusted for skewness)	122.191
		Jackknife UCL	121.2631
		Standard Bootstrap UCL	120.1029
		Bootstrap-t UCL	130.5339
RECOMMENDATION		Hall's Bootstrap UCL	134.3613
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	122.3478
		BCA Bootstrap UCL	123.8
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	165.9822
		97.5% Chebyshev (Mean, Sd) UCL	197.9096
		99% Chebyshev (Mean, Sd) UCL	260.625

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_29
Chrysene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.57233
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	110	Data not normal at 5% significance level	
Maximum	1500		
Mean	322.8261	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	430.8209
Standard Deviation	301.62		
Variance	90974.6	Gamma Distribution Test	
Coefficient of Variation	0.934311	A-D Test Statistic	3.120043
Skewness	3.020776	A-D 5% Critical Value	0.753334
		K-S Test Statistic	0.388392
Gamma Statistics		K-S 5% Critical Value	0.183468
k hat	2.317091	Data do not follow gamma distribution	
k star (bias corrected)	2.043847	at 5% significance level	
Theta hat	139.3239		
Theta star	157.9502	95% UCLs (Assuming Gamma Distribution)	
nu hat	106.5862	Approximate Gamma UCL	417.7686
nu star	94.01698	Adjusted Gamma UCL	425.7443
Approx.Chi Square Value (.05)	72.65059		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	71.28958	Shapiro-Wilk Test Statisitic	0.753582
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.70048		
Maximum of log data	7.31322	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.546072	95% H-UCL	404.8296
Standard Deviation of log data	0.61072	95% Chebyshev (MVUE) UCL	485.3206
Variance of log data	0.372979	97.5% Chebyshev (MVUE) UCL	562.9702
		99% Chebyshev (MVUE) UCL	715.4978
		95% Non-parametric UCLs	
		CLT UCL	426.2744
		Adj-CLT UCL (Adjusted for skewness)	468.6027
		Mod-t UCL (Adjusted for skewness)	437.4233
		Jackknife UCL	430.8209
		Standard Bootstrap UCL	422.1242
		Bootstrap-t UCL	538.4562
RECOMMENDATION		Hall's Bootstrap UCL	778.4991
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	431.5217
		BCA Bootstrap UCL	484.7826
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	596.9664
		97.5% Chebyshev (Mean, Sd) UCL	715.5872
		99% Chebyshev (Mean, Sd) UCL	948.5947

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_30
Cobalt			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.858093
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3.4	Data not normal at 5% significance level	
Maximum	11.3		
Mean	5.756522	95% UCL (Assuming Normal Distribution)	
Median	5.2	Student's-t UCL	6.465245
Standard Deviation	1.9794		
Variance	3.918024	Gamma Distribution Test	
Coefficient of Variation	0.343853	A-D Test Statistic	0.764716
Skewness	1.40318	A-D 5% Critical Value	0.744025
		K-S Test Statistic	0.18983
Gamma Statistics		K-S 5% Critical Value	0.181526
k hat	10.47971	Data do not follow gamma distribution	
k star (bias corrected)	9.141776	at 5% significance level	
Theta hat	0.549302		
Theta star	0.629694	95% UCLs (Assuming Gamma Distribution)	
nu hat	482.0666	Approximate Gamma UCL	6.473025
nu star	420.5217	Adjusted Gamma UCL	6.528461
Approx.Chi Square Value (.05)	373.9739		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	370.7983	Shapiro-Wilk Test Statisitic	0.939348
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.223775		
Maximum of log data	2.424803	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.701864	95% H-UCL	6.485737
Standard Deviation of log data	0.308169	95% Chebyshev (MVUE) UCL	7.370982
Variance of log data	0.094968	97.5% Chebyshev (MVUE) UCL	8.077358
		99% Chebyshev (MVUE) UCL	9.464896
		95% Non-parametric UCLs	
		CLT UCL	6.435408
		Adj-CLT UCL (Adjusted for skewness)	6.56444
		Mod-t UCL (Adjusted for skewness)	6.485371
		Jackknife UCL	6.465245
		Standard Bootstrap UCL	6.433915
		Bootstrap-t UCL	6.694257
RECOMMENDATION		Hall's Bootstrap UCL	6.676819
Data are lognormal (0.05)		Percentile Bootstrap UCL	6.46087
		BCA Bootstrap UCL	6.534783
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.555585
Use Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8.334041
Use H-UCL		99% Chebyshev (Mean, Sd) UCL	9.863167

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_31
Copper			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.694551
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	7.3	Data not normal at 5% significance level	
Maximum	409		
Mean	79.93478	95% UCL (Assuming Normal Distribution)	
Median	49.4	Student's-t UCL	112.5659
Standard Deviation	91.1359		
Variance	8305.752	Gamma Distribution Test	
Coefficient of Variation	1.140128	A-D Test Statistic	0.643588
Skewness	2.532409	A-D 5% Critical Value	0.764509
		K-S Test Statistic	0.194709
Gamma Statistics		K-S 5% Critical Value	0.185783
k hat	1.26038	Data follow approximate gamma distibution	
k star (bias corrected)	1.124968	at 5% significance level	
Theta hat	63.4212		
Theta star	71.05518	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.97746	Approximate Gamma UCL	114.1938
nu star	51.74851	Adjusted Gamma UCL	117.2417
Approx.Chi Square Value (.05)	36.22357		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	35.28188	Shapiro-Wilk Test Statisitic	0.985212
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.987874		
Maximum of log data	6.013715	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.934701	95% H-UCL	131.8208
Standard Deviation of log data	0.947139	95% Chebyshev (MVUE) UCL	153.1368
Variance of log data	0.897073	97.5% Chebyshev (MVUE) UCL	185.6594
		99% Chebyshev (MVUE) UCL	249.5439
		95% Non-parametric UCLs	
		CLT UCL	111.1922
		Adj-CLT UCL (Adjusted for skewness)	121.9142
		Mod-t UCL (Adjusted for skewness)	114.2383
		Jackknife UCL	112.5659
		Standard Bootstrap UCL	111.1935
		Bootstrap-t UCL	137.775
RECOMMENDATION		Hall's Bootstrap UCL	151.8449
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	112.9478
		BCA Bootstrap UCL	121.8217
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	162.7676
		97.5% Chebyshev (Mean, Sd) UCL	198.6094
		99% Chebyshev (Mean, Sd) UCL	269.0137

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_32
Dibenz(a,h)anthracene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.569428
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	100	Data not normal at 5% significance level	
Maximum	550		
Mean	226.7391	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	266.5023
Standard Deviation	111.0549		
Variance	12333.2	Gamma Distribution Test	
Coefficient of Variation	0.489792	A-D Test Statistic	3.797278
Skewness	2.448417	A-D 5% Critical Value	0.745718
		K-S Test Statistic	0.395523
Gamma Statistics		K-S 5% Critical Value	0.181904
k hat	6.663476	Data do not follow gamma distribution	
k star (bias corrected)	5.823312	at 5% significance level	
Theta hat	34.02716		
Theta star	38.93646	95% UCLs (Assuming Gamma Distribution)	
nu hat	306.5199	Approximate Gamma UCL	262.9732
nu star	267.8724	Adjusted Gamma UCL	265.8281
Approx.Chi Square Value (.05)	230.9633		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	228.4828	Shapiro-Wilk Test Statisitic	0.697867
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.60517		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.346892	95% H-UCL	259.9749
Standard Deviation of log data	0.366954	95% Chebyshev (MVUE) UCL	300.1912
Variance of log data	0.134655	97.5% Chebyshev (MVUE) UCL	333.2102
		99% Chebyshev (MVUE) UCL	398.0695
		95% Non-parametric UCLs	
		CLT UCL	264.8283
		Adj-CLT UCL (Adjusted for skewness)	277.4604
		Mod-t UCL (Adjusted for skewness)	268.4726
		Jackknife UCL	266.5023
		Standard Bootstrap UCL	263.7883
		Bootstrap-t UCL	311.9861
RECOMMENDATION		Hall's Bootstrap UCL	431.7117
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	266.7391
		BCA Bootstrap UCL	280.6522
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	327.6762
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	371.3518
		99% Chebyshev (Mean, Sd) UCL	457.144

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_33
Dieldrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.265211
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.2	Data not normal at 5% significance level	
Maximum	950		
Mean	51.32174	95% UCL (Assuming Normal Distribution)	
Median	4.4	Student's-t UCL	121.762
Standard Deviation	196.7334		
Variance	38704.04	Gamma Distribution Test	
Coefficient of Variation	3.833335	A-D Test Statistic	3.863199
Skewness	4.732575	A-D 5% Critical Value	0.844774
		K-S Test Statistic	0.324766
Gamma Statistics		K-S 5% Critical Value	0.196398
k hat	0.318571	Data do not follow gamma distribution	
k star (bias corrected)	0.306004	at 5% significance level	
Theta hat	161.0999		
Theta star	167.7161	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.65426	Approximate Gamma UCL	109.0866
nu star	14.07617	Adjusted Gamma UCL	115.5186
Approx.Chi Square Value (.05)	6.622385		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	6.253653	Shapiro-Wilk Test Statisitic	0.828317
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.182322		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.794675	95% H-UCL	65.75766
Standard Deviation of log data	1.580466	95% Chebyshev (MVUE) UCL	52.17488
Variance of log data	2.497872	97.5% Chebyshev (MVUE) UCL	66.59771
		99% Chebyshev (MVUE) UCL	94.92857
		95% Non-parametric UCLs	
		CLT UCL	118.7965
		Adj-CLT UCL (Adjusted for skewness)	162.0507
		Mod-t UCL (Adjusted for skewness)	128.5088
		Jackknife UCL	121.762
		Standard Bootstrap UCL	114.5709
		Bootstrap-t UCL	1300.43
RECOMMENDATION		Hall's Bootstrap UCL	589.5284
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	132.0696
		BCA Bootstrap UCL	177.7283
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	230.1314
		97.5% Chebyshev (Mean, Sd) UCL	307.5025
		99% Chebyshev (Mean, Sd) UCL	459.4831

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_34
Endosulfan I			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.269576
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.74	Data not normal at 5% significance level	
Maximum	480		
Mean	25.89304	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	61.53998
Standard Deviation	99.55872		
Variance	9911.939	Gamma Distribution Test	
Coefficient of Variation	3.844999	A-D Test Statistic	4.894255
Skewness	4.710947	A-D 5% Critical Value	0.853027
		K-S Test Statistic	0.390528
Gamma Statistics		K-S 5% Critical Value	0.19727
k hat	0.290713	Data do not follow gamma distribution	
k star (bias corrected)	0.281779	at 5% significance level	
Theta hat	89.06747		
Theta star	91.89127	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.37278	Approximate Gamma UCL	57.21487
nu star	12.96184	Adjusted Gamma UCL	60.77744
Approx.Chi Square Value (.05)	5.865984		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.52214	Shapiro-Wilk Test Statisitic	0.661468
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.301105		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.869795	95% H-UCL	33.55221
Standard Deviation of log data	1.666984	95% Chebyshev (MVUE) UCL	24.34924
Variance of log data	2.778836	97.5% Chebyshev (MVUE) UCL	31.23043
		99% Chebyshev (MVUE) UCL	44.74721
		95% Non-parametric UCLs	
		CLT UCL	60.03927
		Adj-CLT UCL (Adjusted for skewness)	81.82841
		Mod-t UCL (Adjusted for skewness)	64.93864
		Jackknife UCL	61.53998
		Standard Bootstrap UCL	60.36665
		Bootstrap-t UCL	545.2071
RECOMMENDATION		Hall's Bootstrap UCL	368.1959
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	66.13217
		BCA Bootstrap UCL	89.37826
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	116.3813
		97.5% Chebyshev (Mean, Sd) UCL	155.5356
		99% Chebyshev (Mean, Sd) UCL	232.4468

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_35
Endosulfan sulfate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.268627
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	51.17826	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	121.7169
Standard Deviation	197.0082		
Variance	38812.22	Gamma Distribution Test	
Coefficient of Variation	3.84945	A-D Test Statistic	4.797285
Skewness	4.714611	A-D 5% Critical Value	0.851458
		K-S Test Statistic	0.363957
Gamma Statistics		K-S 5% Critical Value	0.197116
k hat	0.294193	Data do not follow gamma distribution	
k star (bias corrected)	0.284805	at 5% significance level	
Theta hat	173.9618		
Theta star	179.6957	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.53286	Approximate Gamma UCL	112.505
nu star	13.10104	Adjusted Gamma UCL	119.4608
Approx.Chi Square Value (.05)	5.959629		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.612623	Shapiro-Wilk Test Statisitic	0.670818
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.583903	95% H-UCL	64.972
Standard Deviation of log data	1.649079	95% Chebyshev (MVUE) UCL	48.06778
Variance of log data	2.71946	97.5% Chebyshev (MVUE) UCL	61.59253
		99% Chebyshev (MVUE) UCL	88.15927
		95% Non-parametric UCLs	
		CLT UCL	118.7473
		Adj-CLT UCL (Adjusted for skewness)	161.8975
		Mod-t UCL (Adjusted for skewness)	128.4475
		Jackknife UCL	121.7169
		Standard Bootstrap UCL	117.4234
		Bootstrap-t UCL	1081.73
RECOMMENDATION		Hall's Bootstrap UCL	697.8727
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	131.25
		BCA Bootstrap UCL	177.8848
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	230.2377
		97.5% Chebyshev (Mean, Sd) UCL	307.7168
		99% Chebyshev (Mean, Sd) UCL	459.9096

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_36
Endrin			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.268189
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.8	Data not normal at 5% significance level	
Maximum	950		
Mean	50.7587	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	121.3308
Standard Deviation	197.1017		
Variance	38849.1	Gamma Distribution Test	
Coefficient of Variation	3.883113	A-D Test Statistic	4.642342
Skewness	4.714549	A-D 5% Critical Value	0.856792
		K-S Test Statistic	0.37614
Gamma Statistics		K-S 5% Critical Value	0.197638
k hat	0.282359	Data do not follow gamma distribution	
k star (bias corrected)	0.274515	at 5% significance level	
Theta hat	179.7664		
Theta star	184.903	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.98852	Approximate Gamma UCL	113.6015
nu star	12.6277	Adjusted Gamma UCL	120.7993
Approx.Chi Square Value (.05)	5.642227		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.306038	Shapiro-Wilk Test Statisitic	0.726677
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.223144		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.460681	95% H-UCL	67.90059
Standard Deviation of log data	1.704697	95% Chebyshev (MVUE) UCL	47.25269
Variance of log data	2.905992	97.5% Chebyshev (MVUE) UCL	60.72632
		99% Chebyshev (MVUE) UCL	87.19266
		95% Non-parametric UCLs	
		CLT UCL	118.3598
		Adj-CLT UCL (Adjusted for skewness)	161.5299
		Mod-t UCL (Adjusted for skewness)	128.0645
		Jackknife UCL	121.3308
		Standard Bootstrap UCL	116.9966
		Bootstrap-t UCL	1156.973
RECOMMENDATION		Hall's Bootstrap UCL	709.9864
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	131.8674
		BCA Bootstrap UCL	177.6609
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	229.9031
		97.5% Chebyshev (Mean, Sd) UCL	307.4191
		99% Chebyshev (Mean, Sd) UCL	459.6841

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_37
Endrin aldehyde			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.268816
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	51.24783	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	121.7801
Standard Deviation	196.9904		
Variance	38805.23	Gamma Distribution Test	
Coefficient of Variation	3.843879	A-D Test Statistic	4.689835
Skewness	4.714797	A-D 5% Critical Value	0.850324
		K-S Test Statistic	0.354648
Gamma Statistics		K-S 5% Critical Value	0.197005
k hat	0.296709	Data do not follow gamma distribution	
k star (bias corrected)	0.286993	at 5% significance level	
Theta hat	172.7208		
Theta star	178.5679	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.64862	Approximate Gamma UCL	112.2452
nu star	13.2017	Adjusted Gamma UCL	119.1497
Approx.Chi Square Value (.05)	6.027504		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.678221	Shapiro-Wilk Test Statisitic	0.686821
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.608442	95% H-UCL	64.77541
Standard Deviation of log data	1.639732	95% Chebyshev (MVUE) UCL	48.3985
Variance of log data	2.688722	97.5% Chebyshev (MVUE) UCL	61.98466
		99% Chebyshev (MVUE) UCL	88.67204
		95% Non-parametric UCLs	
		CLT UCL	118.8108
		Adj-CLT UCL (Adjusted for skewness)	161.9588
		Mod-t UCL (Adjusted for skewness)	128.5103
		Jackknife UCL	121.7801
		Standard Bootstrap UCL	116.635
		Bootstrap-t UCL	1082.492
RECOMMENDATION		Hall's Bootstrap UCL	667.2599
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	132.1391
		BCA Bootstrap UCL	180.4174
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	230.2911
		97.5% Chebyshev (Mean, Sd) UCL	307.7633
		99% Chebyshev (Mean, Sd) UCL	459.9423

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_38
Endrin ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.269066
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1.75	Data not normal at 5% significance level	
Maximum	950		
Mean	51.30435	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	121.8319
Standard Deviation	196.9773		
Variance	38800.07	Gamma Distribution Test	
Coefficient of Variation	3.839389	A-D Test Statistic	4.662914
Skewness	4.714842	A-D 5% Critical Value	0.850213
		K-S Test Statistic	0.344262
Gamma Statistics		K-S 5% Critical Value	0.196994
k hat	0.296953	Data do not follow gamma distribution	
k star (bias corrected)	0.287206	at 5% significance level	
Theta hat	172.769		
Theta star	178.6327	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.65986	Approximate Gamma UCL	112.3292
nu star	13.21147	Adjusted Gamma UCL	119.2355
Approx.Chi Square Value (.05)	6.034099		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.684595	Shapiro-Wilk Test Statisitic	0.686536
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.559616		
Maximum of log data	6.856462	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.611772	95% H-UCL	66.18204
Standard Deviation of log data	1.645892	95% Chebyshev (MVUE) UCL	49.12892
Variance of log data	2.708962	97.5% Chebyshev (MVUE) UCL	62.94133
		99% Chebyshev (MVUE) UCL	90.07311
		95% Non-parametric UCLs	
		CLT UCL	118.8628
		Adj-CLT UCL (Adjusted for skewness)	162.0083
		Mod-t UCL (Adjusted for skewness)	128.5618
		Jackknife UCL	121.8319
		Standard Bootstrap UCL	117.6275
		Bootstrap-t UCL	1106.674
RECOMMENDATION		Hall's Bootstrap UCL	683.6785
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	133.0391
		BCA Bootstrap UCL	176.387
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	230.3357
		97.5% Chebyshev (Mean, Sd) UCL	307.8027
		99% Chebyshev (Mean, Sd) UCL	459.9717

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_39
Ethylbenzene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.294334
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3	Data not normal at 5% significance level	
Maximum	45		
Mean	7.152174	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	10.12363
Standard Deviation	8.299007		
Variance	68.87352	Gamma Distribution Test	
Coefficient of Variation	1.160347	A-D Test Statistic	5.322548
Skewness	4.701831	A-D 5% Critical Value	0.751875
		K-S Test Statistic	0.440504
Gamma Statistics		K-S 5% Critical Value	0.183097
k hat	2.651015	Data do not follow gamma distribution	
k star (bias corrected)	2.334216	at 5% significance level	
Theta hat	2.697901		
Theta star	3.064059	95% UCLs (Assuming Gamma Distribution)	
nu hat	121.9467	Approximate Gamma UCL	9.093124
nu star	107.3739	Adjusted Gamma UCL	9.254501
Approx.Chi Square Value (.05)	84.45468		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	82.98199	Shapiro-Wilk Test Statisitic	0.519091
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	3.806662	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.76711	95% H-UCL	8.096455
Standard Deviation of log data	0.488657	95% Chebyshev (MVUE) UCL	9.581679
Variance of log data	0.238786	97.5% Chebyshev (MVUE) UCL	10.88977
		99% Chebyshev (MVUE) UCL	13.45927
		95% Non-parametric UCLs	
		CLT UCL	9.998532
		Adj-CLT UCL (Adjusted for skewness)	11.81131
		Mod-t UCL (Adjusted for skewness)	10.40639
		Jackknife UCL	10.12363
		Standard Bootstrap UCL	9.950934
		Bootstrap-t UCL	27.20344
RECOMMENDATION		Hall's Bootstrap UCL	31.15778
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	10.47826
		BCA Bootstrap UCL	12.32609
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	14.69509
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	17.95891
		99% Chebyshev (Mean, Sd) UCL	24.37006

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_40
Fluoranthene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.593801
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.914
Minimum	89	Data not normal at 5% significance level	
Maximum	1800		
Mean	361.087	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	508.5429
Standard Deviation	411.8313		
Variance	169605	Gamma Distribution Test	
Coefficient of Variation	1.140532	A-D Test Statistic	2.408698
Skewness	2.668675	A-D 5% Critical Value	0.759418
		K-S Test Statistic	0.329695
Gamma Statistics		K-S 5% Critical Value	0.184789
k hat	1.563358	Data do not follow gamma distribution	
k star (bias corrected)	1.388427	at 5% significance level	
Theta hat	230.9688		
Theta star	260.0691	95% UCLs (Assuming Gamma Distribution)	
nu hat	71.91446	Approximate Gamma UCL	496.1801
nu star	63.86765	Adjusted Gamma UCL	507.9316
Approx.Chi Square Value (.05)	46.47864		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	45.40331	Shapiro-Wilk Test Statisitic	0.839392
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.488636		
Maximum of log data	7.495542	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.536394	95% H-UCL	486.8829
Standard Deviation of log data	0.759944	95% Chebyshev (MVUE) UCL	583.0251
Variance of log data	0.577515	97.5% Chebyshev (MVUE) UCL	691.0147
		99% Chebyshev (MVUE) UCL	903.1394
		95% Non-parametric UCLs	
		CLT UCL	502.3351
		Adj-CLT UCL (Adjusted for skewness)	553.3935
		Mod-t UCL (Adjusted for skewness)	516.5069
		Jackknife UCL	508.5429
		Standard Bootstrap UCL	497.3038
		Bootstrap-t UCL	701.0756
RECOMMENDATION		Hall's Bootstrap UCL	1070.424
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	512.5652
		BCA Bootstrap UCL	550.8261
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	735.3976
		97.5% Chebyshev (Mean, Sd) UCL	897.3621
		99% Chebyshev (Mean, Sd) UCL	1215.51

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_41
Heptachlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.269662
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.65	Data not normal at 5% significance level	
Maximum	480		
Mean	25.89348	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	61.54037
Standard Deviation	99.55862		
Variance	9911.919	Gamma Distribution Test	
Coefficient of Variation	3.84493	A-D Test Statistic	4.853971
Skewness	4.710948	A-D 5% Critical Value	0.853088
		K-S Test Statistic	0.390393
Gamma Statistics		K-S 5% Critical Value	0.197276
k hat	0.290576	Data do not follow gamma distribution	
k star (bias corrected)	0.28166	at 5% significance level	
Theta hat	89.11083		
Theta star	91.93156	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.3665	Approximate Gamma UCL	57.22752
nu star	12.95638	Adjusted Gamma UCL	60.79188
Approx.Chi Square Value (.05)	5.862314		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.518594	Shapiro-Wilk Test Statisitic	0.671629
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.430783		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.868508	95% H-UCL	33.70926
Standard Deviation of log data	1.668975	95% Chebyshev (MVUE) UCL	24.41026
Variance of log data	2.785477	97.5% Chebyshev (MVUE) UCL	31.31202
		99% Chebyshev (MVUE) UCL	44.8692
		95% Non-parametric UCLs	
		CLT UCL	60.03967
		Adj-CLT UCL (Adjusted for skewness)	81.82879
		Mod-t UCL (Adjusted for skewness)	64.93904
		Jackknife UCL	61.54037
		Standard Bootstrap UCL	59.84157
		Bootstrap-t UCL	515.6407
RECOMMENDATION		Hall's Bootstrap UCL	328.7591
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	66.67609
		BCA Bootstrap UCL	89.05217
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	116.3816
		97.5% Chebyshev (Mean, Sd) UCL	155.5359
		99% Chebyshev (Mean, Sd) UCL	232.447

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_42
Heptachlor epoxide			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.269913
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	25.98478	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	61.62337
Standard Deviation	99.53542		
Variance	9907.3	Gamma Distribution Test	
Coefficient of Variation	3.830527	A-D Test Statistic	4.727007
Skewness	4.711414	A-D 5% Critical Value	0.850299
		K-S Test Statistic	0.353338
Gamma Statistics		K-S 5% Critical Value	0.197003
k hat	0.296763	Data do not follow gamma distribution	
k star (bias corrected)	0.287041	at 5% significance level	
Theta hat	87.56065		
Theta star	90.52654	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.65111	Approximate Gamma UCL	56.90853
nu star	13.20386	Adjusted Gamma UCL	60.40875
Approx.Chi Square Value (.05)	6.028965		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.679633	Shapiro-Wilk Test Statisitic	0.677145
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.929774	95% H-UCL	33.49822
Standard Deviation of log data	1.646259	95% Chebyshev (MVUE) UCL	24.85709
Variance of log data	2.710168	97.5% Chebyshev (MVUE) UCL	31.8462
		99% Chebyshev (MVUE) UCL	45.57494
		95% Non-parametric UCLs	
		CLT UCL	60.12301
		Adj-CLT UCL (Adjusted for skewness)	81.90921
		Mod-t UCL (Adjusted for skewness)	65.02158
		Jackknife UCL	61.62337
		Standard Bootstrap UCL	59.55097
		Bootstrap-t UCL	564.1267
RECOMMENDATION		Hall's Bootstrap UCL	348.7936
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	66.76957
		BCA Bootstrap UCL	90.41522
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	116.4519
		97.5% Chebyshev (Mean, Sd) UCL	155.597
		99% Chebyshev (Mean, Sd) UCL	232.4901

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_43
Indeno(1,2,3-c,d)pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.688468
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.914
Minimum	82	Data not normal at 5% significance level	
Maximum	1100		
Mean	333.4783	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	438.6422
Standard Deviation	293.7137		
Variance	86267.72	Gamma Distribution Test	
Coefficient of Variation	0.880758	A-D Test Statistic	2.232621
Skewness	1.813032	A-D 5% Critical Value	0.754838
		K-S Test Statistic	0.336026
Gamma Statistics		K-S 5% Critical Value	0.183844
k hat	1.988996	Data do not follow gamma distribution	
k star (bias corrected)	1.758548	at 5% significance level	
Theta hat	167.6616		
Theta star	189.6328	95% UCLs (Assuming Gamma Distribution)	
nu hat	91.49383	Approximate Gamma UCL	441.0402
nu star	80.89319	Adjusted Gamma UCL	450.1912
Approx.Chi Square Value (.05)	61.16476		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	59.92147	Shapiro-Wilk Test Statisitic	0.85061
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.406719		
Maximum of log data	7.003065	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.537611	95% H-UCL	452.3289
Standard Deviation of log data	0.70562	95% Chebyshev (MVUE) UCL	543.094
Variance of log data	0.4979	97.5% Chebyshev (MVUE) UCL	638.9177
		99% Chebyshev (MVUE) UCL	827.1448
		95% Non-parametric UCLs	
		CLT UCL	434.2149
		Adj-CLT UCL (Adjusted for skewness)	458.9539
		Mod-t UCL (Adjusted for skewness)	442.501
		Jackknife UCL	438.6422
		Standard Bootstrap UCL	431.7085
		Bootstrap-t UCL	494.2448
RECOMMENDATION		Hall's Bootstrap UCL	462.1401
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	435.3478
		BCA Bootstrap UCL	454.4783
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	600.4326
		97.5% Chebyshev (Mean, Sd) UCL	715.944
		99% Chebyshev (Mean, Sd) UCL	942.8437

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_44
Iron			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.808633
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	8610	Data not normal at 5% significance level	
Maximum	40200		
Mean	17959.57	95% UCL (Assuming Normal Distribution)	
Median	14800	Student's-t UCL	21299.47
Standard Deviation	9328.047		
Variance	87012459	Gamma Distribution Test	
Coefficient of Variation	0.519392	A-D Test Statistic	1.173781
Skewness	1.294502	A-D 5% Critical Value	0.746994
		K-S Test Statistic	0.176531
Gamma Statistics		K-S 5% Critical Value	0.182141
k hat	4.810877	Data follow approximate gamma distibution	
k star (bias corrected)	4.212357	at 5% significance level	
Theta hat	3733.116		
Theta star	4263.543	95% UCLs (Assuming Gamma Distribution)	
nu hat	221.3004	Approximate Gamma UCL	21407.74
nu star	193.7684	Adjusted Gamma UCL	21683.82
Approx.Chi Square Value (.05)	162.5579		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	160.4882	Shapiro-Wilk Test Statisitic	0.906146
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	9.06068		
Maximum of log data	10.60162	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.688362	95% H-UCL	21574.3
Standard Deviation of log data	0.454283	95% Chebyshev (MVUE) UCL	25384.49
Variance of log data	0.206373	97.5% Chebyshev (MVUE) UCL	28668.56
		99% Chebyshev (MVUE) UCL	35119.5
		95% Non-parametric UCLs	
		CLT UCL	21158.86
		Adj-CLT UCL (Adjusted for skewness)	21719.84
		Mod-t UCL (Adjusted for skewness)	21386.97
		Jackknife UCL	21299.47
		Standard Bootstrap UCL	21044.93
		Bootstrap-t UCL	22063.8
RECOMMENDATION		Hall's Bootstrap UCL	21338.43
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	21065.65
		BCA Bootstrap UCL	21743.48
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	26437.76
		97.5% Chebyshev (Mean, Sd) UCL	30106.29
		99% Chebyshev (Mean, Sd) UCL	37312.39

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_45
Isopropylbenzene (cumene)			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.217919
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	430		
Mean	24.19565	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	55.86967
Standard Deviation	88.46272		
Variance	7825.653	Gamma Distribution Test	
Coefficient of Variation	3.656141	A-D Test Statistic	8.596459
Skewness	4.795746	A-D 5% Critical Value	0.804426
		K-S Test Statistic	0.563964
Gamma Statistics		K-S 5% Critical Value	0.191791
k hat	0.506838	Data do not follow gamma distribution	
k star (bias corrected)	0.469714	at 5% significance level	
Theta hat	47.73843		
Theta star	51.51144	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.31455	Approximate Gamma UCL	43.41248
nu star	21.60685	Adjusted Gamma UCL	45.35965
Approx.Chi Square Value (.05)	12.04243		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	11.52548	Shapiro-Wilk Test Statisitic	0.254362
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	6.063785	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.935583	95% H-UCL	16.52233
Standard Deviation of log data	0.901305	95% Chebyshev (MVUE) UCL	19.39671
Variance of log data	0.81235	97.5% Chebyshev (MVUE) UCL	23.39526
		99% Chebyshev (MVUE) UCL	31.24962
		95% Non-parametric UCLs	
		CLT UCL	54.53622
		Adj-CLT UCL (Adjusted for skewness)	74.24542
		Mod-t UCL (Adjusted for skewness)	58.94391
		Jackknife UCL	55.86967
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	104.5988
		97.5% Chebyshev (Mean, Sd) UCL	139.3893
		99% Chebyshev (Mean, Sd) UCL	207.7286

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_46
Lead			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.38873
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3.1	Data not normal at 5% significance level	
Maximum	5130		
Mean	465.0739	95% UCL (Assuming Normal Distribution)	
Median	180	Student's-t UCL	859.6063
Standard Deviation	1101.894		
Variance	1214170	Gamma Distribution Test	
Coefficient of Variation	2.369288	A-D Test Statistic	2.497094
Skewness	3.927673	A-D 5% Critical Value	0.797291
		K-S Test Statistic	0.320489
Gamma Statistics		K-S 5% Critical Value	0.190775
k hat	0.585037	Data do not follow gamma distribution	
k star (bias corrected)	0.537714	at 5% significance level	
Theta hat	794.9475		
Theta star	864.9101	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.91171	Approximate Gamma UCL	798.4636
nu star	24.73482	Adjusted Gamma UCL	831.4139
Approx.Chi Square Value (.05)	14.40707		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	13.83609	Shapiro-Wilk Test Statisitic	0.879728
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.131402		
Maximum of log data	8.542861	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.082107	95% H-UCL	1026.887
Standard Deviation of log data	1.377613	95% Chebyshev (MVUE) UCL	968.5219
Variance of log data	1.897817	97.5% Chebyshev (MVUE) UCL	1220.171
		99% Chebyshev (MVUE) UCL	1714.487
		95% Non-parametric UCLs	
		CLT UCL	842.9967
		Adj-CLT UCL (Adjusted for skewness)	1044.058
		Mod-t UCL (Adjusted for skewness)	890.9677
		Jackknife UCL	859.6063
		Standard Bootstrap UCL	833.9506
		Bootstrap-t UCL	4088.767
RECOMMENDATION		Hall's Bootstrap UCL	2962.784
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	874.187
		BCA Bootstrap UCL	1168.022
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1466.578
		97.5% Chebyshev (Mean, Sd) UCL	1899.929
		99% Chebyshev (Mean, Sd) UCL	2751.165

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_47
Magnesium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.491098
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1630	Data not normal at 5% significance level	
Maximum	8440		
Mean	2387.391	95% UCL (Assuming Normal Distribution)	
Median	1970	Student's-t UCL	2890.734
Standard Deviation	1405.791		
Variance	1976247	Gamma Distribution Test	
Coefficient of Variation	0.58884	A-D Test Statistic	2.540599
Skewness	3.962579	A-D 5% Critical Value	0.745965
		K-S Test Statistic	0.229911
Gamma Statistics		K-S 5% Critical Value	0.181959
k hat	6.144956	Data do not follow gamma distribution	
k star (bias corrected)	5.372425	at 5% significance level	
Theta hat	388.5124		
Theta star	444.3787	95% UCLs (Assuming Gamma Distribution)	
nu hat	282.668	Approximate Gamma UCL	2786.596
nu star	247.1316	Adjusted Gamma UCL	2818.167
Approx.Chi Square Value (.05)	211.7278		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	209.3558	Shapiro-Wilk Test Statisitic	0.712381
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	7.396335		
Maximum of log data	9.040738	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.694388	95% H-UCL	2697.451
Standard Deviation of log data	0.357119	95% Chebyshev (MVUE) UCL	3107.017
Variance of log data	0.127534	97.5% Chebyshev (MVUE) UCL	3441.614
		99% Chebyshev (MVUE) UCL	4098.864
		95% Non-parametric UCLs	
		CLT UCL	2869.543
		Adj-CLT UCL (Adjusted for skewness)	3128.336
		Mod-t UCL (Adjusted for skewness)	2931.1
		Jackknife UCL	2890.734
		Standard Bootstrap UCL	2857.575
		Bootstrap-t UCL	3993.58
RECOMMENDATION		Hall's Bootstrap UCL	4766.522
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2921.739
		BCA Bootstrap UCL	3313.043
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3665.105
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	4217.973
		99% Chebyshev (Mean, Sd) UCL	5303.974

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_48
Manganese			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.948805
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	139	Data are normal at 5% significance level	
Maximum	528		
Mean	288.0435	95% UCL (Assuming Normal Distribution)	
Median	291	Student's-t UCL	324.2056
Standard Deviation	100.9975		
Variance	10200.5	Gamma Distribution Test	
Coefficient of Variation	0.350633	A-D Test Statistic	0.311554
Skewness	0.643705	A-D 5% Critical Value	0.744757
		K-S Test Statistic	0.146849
Gamma Statistics		K-S 5% Critical Value	0.18169
k hat	8.682071	Data follow gamma distribution	
k star (bias corrected)	7.578612	at 5% significance level	
Theta hat	33.17682		
Theta star	38.00742	95% UCLs (Assuming Gamma Distribution)	
nu hat	399.3753	Approximate Gamma UCL	327.7933
nu star	348.6162	Adjusted Gamma UCL	330.8905
Approx.Chi Square Value (.05)	306.3413		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	303.4739	Shapiro-Wilk Test Statisitic	0.972966
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.934474		
Maximum of log data	6.269096	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.604417	95% H-UCL	332.5004
Standard Deviation of log data	0.352835	95% Chebyshev (MVUE) UCL	382.5634
Variance of log data	0.124492	97.5% Chebyshev (MVUE) UCL	423.3751
		99% Chebyshev (MVUE) UCL	503.5418
		95% Non-parametric UCLs	
		CLT UCL	322.6832
		Adj-CLT UCL (Adjusted for skewness)	325.7035
		Mod-t UCL (Adjusted for skewness)	324.6767
		Jackknife UCL	324.2056
		Standard Bootstrap UCL	322.6865
		Bootstrap-t UCL	327.5968
RECOMMENDATION		Hall's Bootstrap UCL	328.4949
Data are normal (0.05)		Percentile Bootstrap UCL	322.087
		BCA Bootstrap UCL	322.913
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	379.8394
		97.5% Chebyshev (Mean, Sd) UCL	419.5596
		99% Chebyshev (Mean, Sd) UCL	497.5822

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_49
Methoxychlor			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.269622
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	7	Data not normal at 5% significance level	
Maximum	4800		
Mean	258.9348	95% UCL (Assuming Normal Distribution)	
Median	10	Student's-t UCL	615.4037
Standard Deviation	995.5861		
Variance	991191.8	Gamma Distribution Test	
Coefficient of Variation	3.84493	A-D Test Statistic	4.871195
Skewness	4.710949	A-D 5% Critical Value	0.853041
		K-S Test Statistic	0.390497
Gamma Statistics		K-S 5% Critical Value	0.197271
k hat	0.29068	Data do not follow gamma distribution	
k star (bias corrected)	0.281751	at 5% significance level	
Theta hat	890.7897		
Theta star	919.0207	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.37128	Approximate Gamma UCL	572.1862
nu star	12.96053	Adjusted Gamma UCL	607.8167
Approx.Chi Square Value (.05)	5.865107		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.521292	Shapiro-Wilk Test Statisitic	0.666644
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.94591		
Maximum of log data	8.476371	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.172085	95% H-UCL	336.1176
Standard Deviation of log data	1.667675	95% Chebyshev (MVUE) UCL	243.7411
Variance of log data	2.781141	97.5% Chebyshev (MVUE) UCL	312.635
		99% Chebyshev (MVUE) UCL	447.9635
		95% Non-parametric UCLs	
		CLT UCL	600.3966
		Adj-CLT UCL (Adjusted for skewness)	818.2879
		Mod-t UCL (Adjusted for skewness)	649.3903
		Jackknife UCL	615.4037
		Standard Bootstrap UCL	590.933
		Bootstrap-t UCL	5450.869
RECOMMENDATION		Hall's Bootstrap UCL	3587.433
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	663.7174
		BCA Bootstrap UCL	922.3043
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1163.816
		97.5% Chebyshev (Mean, Sd) UCL	1555.359
		99% Chebyshev (Mean, Sd) UCL	2324.47

Data File	C:\lhilsche\AMCO\EPCs2_UCL\all._1EPCs2.t	Variable:	_50
Methyl ethyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.558067
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	41		
Mean	9.826087	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	13.02476
Standard Deviation	8.933604		
Variance	79.80929	Gamma Distribution Test	
Coefficient of Variation	0.909172	A-D Test Statistic	4.415316
Skewness	2.469903	A-D 5% Critical Value	0.75335
		K-S Test Statistic	0.423421
Gamma Statistics		K-S 5% Critical Value	0.183472
k hat	2.313436	Data do not follow gamma distribution	
k star (bias corrected)	2.040669	at 5% significance level	
Theta hat	4.2474		
Theta star	4.815131	95% UCLs (Assuming Gamma Distribution)	
nu hat	106.418	Approximate Gamma UCL	12.71866
nu star	93.87076	Adjusted Gamma UCL	12.96169
Approx.Chi Square Value (.05)	72.52196		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	71.16221	Shapiro-Wilk Test Statisitic	0.617722
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	3.713572	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.05361	95% H-UCL	12.25002
Standard Deviation of log data	0.606078	95% Chebyshev (MVUE) UCL	14.68168
Variance of log data	0.367331	97.5% Chebyshev (MVUE) UCL	17.01833
		99% Chebyshev (MVUE) UCL	21.60822
		95% Non-parametric UCLs	
		CLT UCL	12.8901
		Adj-CLT UCL (Adjusted for skewness)	13.91518
		Mod-t UCL (Adjusted for skewness)	13.18465
		Jackknife UCL	13.02476
		Standard Bootstrap UCL	12.82349
		Bootstrap-t UCL	14.98484
RECOMMENDATION		Hall's Bootstrap UCL	14.07807
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	13.21739
		BCA Bootstrap UCL	13.76087
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	17.94578
		97.5% Chebyshev (Mean, Sd) UCL	21.45918
		99% Chebyshev (Mean, Sd) UCL	28.36057

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_51
Methyl isobutyl ketone			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.37571
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	12		
Mean	6.021739	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.499919
Standard Deviation	1.335514		
Variance	1.783597	Gamma Distribution Test	
Coefficient of Variation	0.221782	A-D Test Statistic	4.655682
Skewness	4.432117	A-D 5% Critical Value	0.7417
		K-S Test Statistic	0.397985
Gamma Statistics		K-S 5% Critical Value	0.180994
k hat	32.63981	Data do not follow gamma distribution	
k star (bias corrected)	28.41143	at 5% significance level	
Theta hat	0.184491		
Theta star	0.211948	95% UCLs (Assuming Gamma Distribution)	
nu hat	1501.431	Approximate Gamma UCL	6.429889
nu star	1306.926	Adjusted Gamma UCL	6.46052
Approx.Chi Square Value (.05)	1223.966		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1218.163	Shapiro-Wilk Test Statisitic	0.446674
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.484907	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.779979	95% H-UCL	6.380048
Standard Deviation of log data	0.1616	95% Chebyshev (MVUE) UCL	6.889972
Variance of log data	0.026115	97.5% Chebyshev (MVUE) UCL	7.273238
		99% Chebyshev (MVUE) UCL	8.026091
		95% Non-parametric UCLs	
		CLT UCL	6.479788
		Adj-CLT UCL (Adjusted for skewness)	6.754775
		Mod-t UCL (Adjusted for skewness)	6.542811
		Jackknife UCL	6.499919
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.235579
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	7.760808
		99% Chebyshev (Mean, Sd) UCL	8.792519

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_52
Methylcyclohexane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.224377
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	440		
Mean	25.04348	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	57.43916
Standard Deviation	90.47826		
Variance	8186.316	Gamma Distribution Test	
Coefficient of Variation	3.612847	A-D Test Statistic	8.025427
Skewness	4.792235	A-D 5% Critical Value	0.804098
		K-S Test Statistic	0.528383
Gamma Statistics		K-S 5% Critical Value	0.191744
k hat	0.510439	Data do not follow gamma distribution	
k star (bias corrected)	0.472846	at 5% significance level	
Theta hat	49.0626		
Theta star	52.96331	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.48021	Approximate Gamma UCL	44.83226
nu star	21.75091	Adjusted Gamma UCL	46.83483
Approx.Chi Square Value (.05)	12.15014		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	11.63062	Shapiro-Wilk Test Statisitic	0.316712
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	6.086775	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.980204	95% H-UCL	17.77905
Standard Deviation of log data	0.918489	95% Chebyshev (MVUE) UCL	20.79505
Variance of log data	0.843621	97.5% Chebyshev (MVUE) UCL	25.13106
		99% Chebyshev (MVUE) UCL	33.64831
		95% Non-parametric UCLs	
		CLT UCL	56.07532
		Adj-CLT UCL (Adjusted for skewness)	76.21882
		Mod-t UCL (Adjusted for skewness)	60.58114
		Jackknife UCL	57.43916
		Standard Bootstrap UCL	55.50898
		Bootstrap-t UCL	5954.803
RECOMMENDATION		Hall's Bootstrap UCL	1529.356
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	62.45652
		BCA Bootstrap UCL	81.76087
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	107.2786
		97.5% Chebyshev (Mean, Sd) UCL	142.8617
		99% Chebyshev (Mean, Sd) UCL	212.758

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_53
Methylene chloride			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.568102
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	2	Data not normal at 5% significance level	
Maximum	11		
Mean	5.804348	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.307065
Standard Deviation	1.404046		
Variance	1.971344	Gamma Distribution Test	
Coefficient of Variation	0.241895	A-D Test Statistic	4.229982
Skewness	1.533393	A-D 5% Critical Value	0.742655
		K-S Test Statistic	0.402273
Gamma Statistics		K-S 5% Critical Value	0.181207
k hat	16.73391	Data do not follow gamma distribution	
k star (bias corrected)	14.58021	at 5% significance level	
Theta hat	0.346861		
Theta star	0.398098	95% UCLs (Assuming Gamma Distribution)	
nu hat	769.7599	Approximate Gamma UCL	6.365206
nu star	670.6897	Adjusted Gamma UCL	6.407964
Approx.Chi Square Value (.05)	611.5932		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	607.5122	Shapiro-Wilk Test Statisitic	0.541219
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	2.397895	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.72843	95% H-UCL	6.471473
Standard Deviation of log data	0.267935	95% Chebyshev (MVUE) UCL	7.264471
Variance of log data	0.071789	97.5% Chebyshev (MVUE) UCL	7.885928
		99% Chebyshev (MVUE) UCL	9.106661
		95% Non-parametric UCLs	
		CLT UCL	6.285901
		Adj-CLT UCL (Adjusted for skewness)	6.385921
		Mod-t UCL (Adjusted for skewness)	6.322666
		Jackknife UCL	6.307065
		Standard Bootstrap UCL	6.271568
		Bootstrap-t UCL	6.416012
RECOMMENDATION		Hall's Bootstrap UCL	7.388295
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.304348
		BCA Bootstrap UCL	6.391304
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.080475
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	7.632657
		99% Chebyshev (Mean, Sd) UCL	8.71731

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_54
Naphthalene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.563895
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.914
Minimum	81	Data not normal at 5% significance level	
Maximum	600		
Mean	214.1739	95% UCL (Assuming Normal Distribution)	
Median	190	Student's-t UCL	248.9606
Standard Deviation	97.15622		
Variance	9439.332	Gamma Distribution Test	
Coefficient of Variation	0.453632	A-D Test Statistic	3.26684
Skewness	3.188817	A-D 5% Critical Value	0.74516
		K-S Test Statistic	0.343769
Gamma Statistics		K-S 5% Critical Value	0.181779
k hat	7.835388	Data do not follow gamma distribution	
k star (bias corrected)	6.842366	at 5% significance level	
Theta hat	27.33418		
Theta star	31.30115	95% UCLs (Assuming Gamma Distribution)	
nu hat	360.4278	Approximate Gamma UCL	245.4526
nu star	314.7489	Adjusted Gamma UCL	247.8999
Approx.Chi Square Value (.05)	274.6395		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	271.9283	Shapiro-Wilk Test Statisitic	0.720685
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.394449		
Maximum of log data	6.39693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.30162	95% H-UCL	244.1077
Standard Deviation of log data	0.345014	95% Chebyshev (MVUE) UCL	280.2873
Variance of log data	0.119035	97.5% Chebyshev (MVUE) UCL	309.6673
		99% Chebyshev (MVUE) UCL	367.3787
		95% Non-parametric UCLs	
		CLT UCL	247.4961
		Adj-CLT UCL (Adjusted for skewness)	261.8892
		Mod-t UCL (Adjusted for skewness)	251.2057
		Jackknife UCL	248.9606
		Standard Bootstrap UCL	246.2934
		Bootstrap-t UCL	313.1093
RECOMMENDATION		Hall's Bootstrap UCL	450.841
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	249.3478
		BCA Bootstrap UCL	268.5217
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	302.4786
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	340.688
		99% Chebyshev (Mean, Sd) UCL	415.7432

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_55
Nickel			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.835458
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.914
Minimum	17.3	Data not normal at 5% significance level	
Maximum	36.3		
Mean	22.7	95% UCL (Assuming Normal Distribution)	
Median	21.4	Student's-t UCL	24.48663
Standard Deviation	4.989899		
Variance	24.89909	Gamma Distribution Test	
Coefficient of Variation	0.219819	A-D Test Statistic	0.933038
Skewness	1.549954	A-D 5% Critical Value	0.741842
		K-S Test Statistic	0.19512
Gamma Statistics		K-S 5% Critical Value	0.181021
k hat	25.1377	Data do not follow gamma distribution	
k star (bias corrected)	21.88786	at 5% significance level	
Theta hat	0.903026		
Theta star	1.037105	95% UCLs (Assuming Gamma Distribution)	
nu hat	1156.334	Approximate Gamma UCL	24.46591
nu star	1006.841	Adjusted Gamma UCL	24.59917
Approx.Chi Square Value (.05)	934.1692		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	929.1085	Shapiro-Wilk Test Statisitic	0.898762
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.850706		
Maximum of log data	3.591818	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.102343	95% H-UCL	24.44303
Standard Deviation of log data	0.197882	95% Chebyshev (MVUE) UCL	26.77438
Variance of log data	0.039157	97.5% Chebyshev (MVUE) UCL	28.55021
		99% Chebyshev (MVUE) UCL	32.03851
		95% Non-parametric UCLs	
		CLT UCL	24.41141
		Adj-CLT UCL (Adjusted for skewness)	24.77072
		Mod-t UCL (Adjusted for skewness)	24.54267
		Jackknife UCL	24.48663
		Standard Bootstrap UCL	24.32629
		Bootstrap-t UCL	25.21898
RECOMMENDATION		Hall's Bootstrap UCL	25.4197
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	24.4913
		BCA Bootstrap UCL	24.83043
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	27.23529
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	29.19771
		99% Chebyshev (Mean, Sd) UCL	33.0525

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_56
Phenanthrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.727595
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.914
Minimum	78	Data not normal at 5% significance level	
Maximum	550		
Mean	259.6957	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	307.748
Standard Deviation	134.2059		
Variance	18011.22	Gamma Distribution Test	
Coefficient of Variation	0.516781	A-D Test Statistic	2.355885
Skewness	1.435484	A-D 5% Critical Value	0.746858
		K-S Test Statistic	0.31285
Gamma Statistics		K-S 5% Critical Value	0.182123
k hat	4.864161	Data do not follow gamma distribution	
k star (bias corrected)	4.258691	at 5% significance level	
Theta hat	53.3896		
Theta star	60.98016	95% UCLs (Assuming Gamma Distribution)	
nu hat	223.7514	Approximate Gamma UCL	309.245
nu star	195.8998	Adjusted Gamma UCL	313.2099
Approx.Chi Square Value (.05)	164.5114		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	162.4289	Shapiro-Wilk Test Statisitic	0.819051
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.356709		
Maximum of log data	6.309918	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.45321	95% H-UCL	313.4433
Standard Deviation of log data	0.457981	95% Chebyshev (MVUE) UCL	369.0459
Variance of log data	0.209747	97.5% Chebyshev (MVUE) UCL	417.0788
		99% Chebyshev (MVUE) UCL	511.4303
		95% Non-parametric UCLs	
		CLT UCL	305.725
		Adj-CLT UCL (Adjusted for skewness)	314.675
		Mod-t UCL (Adjusted for skewness)	309.144
		Jackknife UCL	307.748
		Standard Bootstrap UCL	304.8242
		Bootstrap-t UCL	320.7569
RECOMMENDATION		Hall's Bootstrap UCL	308.6089
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	305.6522
		BCA Bootstrap UCL	315.7826
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	381.6745
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	434.4548
		99% Chebyshev (Mean, Sd) UCL	538.1316

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_57
Potassium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.8479
Number of Unique Samples	20	Shapiro-Wilk 5% Critical Value	0.914
Minimum	717	Data not normal at 5% significance level	
Maximum	1750		
Mean	1042.348	95% UCL (Assuming Normal Distribution)	
Median	1030	Student's-t UCL	1118.345
Standard Deviation	212.2526		
Variance	45051.15	Gamma Distribution Test	
Coefficient of Variation	0.203629	A-D Test Statistic	0.841934
Skewness	1.628219	A-D 5% Critical Value	0.741782
		K-S Test Statistic	0.182941
Gamma Statistics		K-S 5% Critical Value	0.181009
k hat	28.32798	Data do not follow gamma distribution	
k star (bias corrected)	24.66201	at 5% significance level	
Theta hat	36.7957		
Theta star	42.26532	95% UCLs (Assuming Gamma Distribution)	
nu hat	1303.087	Approximate Gamma UCL	1118.472
nu star	1134.452	Adjusted Gamma UCL	1124.202
Approx.Chi Square Value (.05)	1057.24		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1051.852	Shapiro-Wilk Test Statisitic	0.916465
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.575076		
Maximum of log data	7.467371	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.931477	95% H-UCL	1119.022
Standard Deviation of log data	0.188964	95% Chebyshev (MVUE) UCL	1221.599
Variance of log data	0.035707	97.5% Chebyshev (MVUE) UCL	1299.471
		99% Chebyshev (MVUE) UCL	1452.437
		95% Non-parametric UCLs	
		CLT UCL	1115.145
		Adj-CLT UCL (Adjusted for skewness)	1131.201
		Mod-t UCL (Adjusted for skewness)	1120.849
		Jackknife UCL	1118.345
		Standard Bootstrap UCL	1112.803
		Bootstrap-t UCL	1141.22
RECOMMENDATION		Hall's Bootstrap UCL	1255.998
Data are lognormal (0.05)		Percentile Bootstrap UCL	1118.87
		BCA Bootstrap UCL	1133.522
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1235.263
Use Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	1318.737
Use H-UCL		99% Chebyshev (Mean, Sd) UCL	1482.707

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_58
Pyrene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.514152
Number of Unique Samples	16	Shapiro-Wilk 5% Critical Value	0.914
Minimum	120	Data not normal at 5% significance level	
Maximum	2900		
Mean	442.1739	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	668.1784
Standard Deviation	631.2106		
Variance	398426.9	Gamma Distribution Test	
Coefficient of Variation	1.427517	A-D Test Statistic	3.102331
Skewness	3.213313	A-D 5% Critical Value	0.764906
		K-S Test Statistic	0.358716
Gamma Statistics		K-S 5% Critical Value	0.18586
k hat	1.238804	Data do not follow gamma distribution	
k star (bias corrected)	1.106206	at 5% significance level	
Theta hat	356.9362		
Theta star	399.7211	95% UCLs (Assuming Gamma Distribution)	
nu hat	56.98497	Approximate Gamma UCL	633.7861
nu star	50.88548	Adjusted Gamma UCL	650.8659
Approx.Chi Square Value (.05)	35.5013		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	34.56969	Shapiro-Wilk Test Statisitic	0.766953
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.787492		
Maximum of log data	7.972466	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.636614	95% H-UCL	582.1913
Standard Deviation of log data	0.813536	95% Chebyshev (MVUE) UCL	693.4815
Variance of log data	0.661841	97.5% Chebyshev (MVUE) UCL	827.6501
		99% Chebyshev (MVUE) UCL	1091.198
		95% Non-parametric UCLs	
		CLT UCL	658.6638
		Adj-CLT UCL (Adjusted for skewness)	752.8918
		Mod-t UCL (Adjusted for skewness)	682.8761
		Jackknife UCL	668.1784
		Standard Bootstrap UCL	652.5497
		Bootstrap-t UCL	1165.06
RECOMMENDATION		Hall's Bootstrap UCL	1456.111
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	681.7391
		BCA Bootstrap UCL	781.5217
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1015.877
		97.5% Chebyshev (Mean, Sd) UCL	1264.119
		99% Chebyshev (Mean, Sd) UCL	1751.742

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_59
Selenium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.791352
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.31	Data not normal at 5% significance level	
Maximum	3.5		
Mean	2.591739	95% UCL (Assuming Normal Distribution)	
Median	3	Student's-t UCL	2.983461
Standard Deviation	1.094044		
Variance	1.196933	Gamma Distribution Test	
Coefficient of Variation	0.422128	A-D Test Statistic	2.162832
Skewness	-0.758726	A-D 5% Critical Value	0.749474
		K-S Test Statistic	0.259757
Gamma Statistics		K-S 5% Critical Value	0.182498
k hat	3.684688	Data do not follow gamma distribution	
k star (bias corrected)	3.233062	at 5% significance level	
Theta hat	0.703381		
Theta star	0.801636	95% UCLs (Assuming Gamma Distribution)	
nu hat	169.4956	Approximate Gamma UCL	3.171631
nu star	148.7208	Adjusted Gamma UCL	3.218781
Approx.Chi Square Value (.05)	121.5291		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	119.7489	Shapiro-Wilk Test Statisitic	0.743431
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.171183		
Maximum of log data	1.252763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.810538	95% H-UCL	3.651936
Standard Deviation of log data	0.633467	95% Chebyshev (MVUE) UCL	4.382709
Variance of log data	0.40128	97.5% Chebyshev (MVUE) UCL	5.101791
		99% Chebyshev (MVUE) UCL	6.514288
		95% Non-parametric UCLs	
		CLT UCL	2.96697
		Adj-CLT UCL (Adjusted for skewness)	2.928407
		Mod-t UCL (Adjusted for skewness)	2.977446
		Jackknife UCL	2.983461
		Standard Bootstrap UCL	2.959352
		Bootstrap-t UCL	2.943021
RECOMMENDATION		Hall's Bootstrap UCL	2.932617
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.956522
		BCA Bootstrap UCL	2.93913
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.586109
		97.5% Chebyshev (Mean, Sd) UCL	4.016373
		99% Chebyshev (Mean, Sd) UCL	4.861545
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_60
Silver			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.797007
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.095	Data not normal at 5% significance level	
Maximum	1		
Mean	0.364565	95% UCL (Assuming Normal Distribution)	
Median	0.29	Student's-t UCL	0.460252
Standard Deviation	0.267246		
Variance	0.07142	Gamma Distribution Test	
Coefficient of Variation	0.733053	A-D Test Statistic	0.757862
Skewness	1.44449	A-D 5% Critical Value	0.752853
		K-S Test Statistic	0.221716
Gamma Statistics		K-S 5% Critical Value	0.183346
k hat	2.427187	Data do not follow gamma distribution	
k star (bias corrected)	2.139583	at 5% significance level	
Theta hat	0.150201		
Theta star	0.170391	95% UCLs (Assuming Gamma Distribution)	
nu hat	111.6506	Approximate Gamma UCL	0.468841
nu star	98.42083	Adjusted Gamma UCL	0.477569
Approx.Chi Square Value (.05)	76.53089		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	75.13223	Shapiro-Wilk Test Statisitic	0.950186
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.353878		
Maximum of log data	0	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.228971	95% H-UCL	0.494851
Standard Deviation of log data	0.666204	95% Chebyshev (MVUE) UCL	0.594329
Variance of log data	0.443828	97.5% Chebyshev (MVUE) UCL	0.695238
		99% Chebyshev (MVUE) UCL	0.893455
		95% Non-parametric UCLs	
		CLT UCL	0.456224
		Adj-CLT UCL (Adjusted for skewness)	0.474158
		Mod-t UCL (Adjusted for skewness)	0.46305
		Jackknife UCL	0.460252
		Standard Bootstrap UCL	0.455726
		Bootstrap-t UCL	0.492081
RECOMMENDATION		Hall's Bootstrap UCL	0.470477
Data are lognormal (0.05)		Percentile Bootstrap UCL	0.460652
		BCA Bootstrap UCL	0.47587
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	0.607463
		97.5% Chebyshev (Mean, Sd) UCL	0.712565
		99% Chebyshev (Mean, Sd) UCL	0.919018

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_61
Sodium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.877395
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	144	Data not normal at 5% significance level	
Maximum	490		
Mean	277.2174	95% UCL (Assuming Normal Distribution)	
Median	237	Student's-t UCL	315.7713
Standard Deviation	107.6775		
Variance	11594.45	Gamma Distribution Test	
Coefficient of Variation	0.388423	A-D Test Statistic	0.72549
Skewness	0.868911	A-D 5% Critical Value	0.74524
		K-S Test Statistic	0.193142
Gamma Statistics		K-S 5% Critical Value	0.181797
k hat	7.667857	Data follow approximate gamma distibution	
k star (bias corrected)	6.696687	at 5% significance level	
Theta hat	36.15318		
Theta star	41.3962	95% UCLs (Assuming Gamma Distribution)	
nu hat	352.7214	Approximate Gamma UCL	318.1907
nu star	308.0476	Adjusted Gamma UCL	321.3994
Approx.Chi Square Value (.05)	268.3804		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	265.701	Shapiro-Wilk Test Statisitic	0.936504
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.969813		
Maximum of log data	6.194405	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.55818	95% H-UCL	321.1145
Standard Deviation of log data	0.366862	95% Chebyshev (MVUE) UCL	370.7803
Variance of log data	0.134588	97.5% Chebyshev (MVUE) UCL	411.5556
		99% Chebyshev (MVUE) UCL	491.6509
		95% Non-parametric UCLs	
		CLT UCL	314.1482
		Adj-CLT UCL (Adjusted for skewness)	318.4948
		Mod-t UCL (Adjusted for skewness)	316.4492
		Jackknife UCL	315.7713
		Standard Bootstrap UCL	313.6245
		Bootstrap-t UCL	321.635
RECOMMENDATION		Hall's Bootstrap UCL	315.0286
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	313.5652
		BCA Bootstrap UCL	317.6522
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	375.0848
		97.5% Chebyshev (Mean, Sd) UCL	417.4321
		99% Chebyshev (Mean, Sd) UCL	500.6151

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_62
Tetrachloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.405853
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	11		
Mean	5.978261	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	6.383916
Standard Deviation	1.132959		
Variance	1.283597	Gamma Distribution Test	
Coefficient of Variation	0.189513	A-D Test Statistic	4.288998
Skewness	4.295089	A-D 5% Critical Value	0.741521
		K-S Test Statistic	0.383165
Gamma Statistics		K-S 5% Critical Value	0.180959
k hat	42.06442	Data do not follow gamma distribution	
k star (bias corrected)	36.60674	at 5% significance level	
Theta hat	0.142122		
Theta star	0.16331	95% UCLs (Assuming Gamma Distribution)	
nu hat	1934.963	Approximate Gamma UCL	6.333008
nu star	1683.91	Adjusted Gamma UCL	6.359507
Approx.Chi Square Value (.05)	1589.585		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1582.961	Shapiro-Wilk Test Statisitic	0.475169
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	2.397895	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.776196	95% H-UCL	6.2974
Standard Deviation of log data	0.144456	95% Chebyshev (MVUE) UCL	6.752705
Variance of log data	0.020868	97.5% Chebyshev (MVUE) UCL	7.092867
		99% Chebyshev (MVUE) UCL	7.761048
		95% Non-parametric UCLs	
		CLT UCL	6.366838
		Adj-CLT UCL (Adjusted for skewness)	6.592906
		Mod-t UCL (Adjusted for skewness)	6.419178
		Jackknife UCL	6.383916
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.008
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	7.453569
		99% Chebyshev (Mean, Sd) UCL	8.328803

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_63
Thallium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.628507
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.36	Data not normal at 5% significance level	
Maximum	2.6		
Mean	1.96	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	2.277256
Standard Deviation	0.886069		
Variance	0.785118	Gamma Distribution Test	
Coefficient of Variation	0.452076	A-D Test Statistic	4.362727
Skewness	-1.125072	A-D 5% Critical Value	0.751096
		K-S Test Statistic	0.42873
Gamma Statistics		K-S 5% Critical Value	0.182899
k hat	2.829359	Data do not follow gamma distribution	
k star (bias corrected)	2.489297	at 5% significance level	
Theta hat	0.692737		
Theta star	0.787371	95% UCLs (Assuming Gamma Distribution)	
nu hat	130.1505	Approximate Gamma UCL	2.471784
nu star	114.5077	Adjusted Gamma UCL	2.514135
Approx.Chi Square Value (.05)	90.79881		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	89.26931	Shapiro-Wilk Test Statisitic	0.625482
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.021651		
Maximum of log data	0.955511	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.485939	95% H-UCL	3.001424
Standard Deviation of log data	0.732443	95% Chebyshev (MVUE) UCL	3.600151
Variance of log data	0.536472	97.5% Chebyshev (MVUE) UCL	4.251171
		99% Chebyshev (MVUE) UCL	5.529974
		95% Non-parametric UCLs	
		CLT UCL	2.2639
		Adj-CLT UCL (Adjusted for skewness)	2.217587
		Mod-t UCL (Adjusted for skewness)	2.270033
		Jackknife UCL	2.277256
		Standard Bootstrap UCL	2.253455
		Bootstrap-t UCL	2.237872
RECOMMENDATION		Hall's Bootstrap UCL	2.215026
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.249565
		BCA Bootstrap UCL	2.217391
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.765342
		97.5% Chebyshev (Mean, Sd) UCL	3.113814
		99% Chebyshev (Mean, Sd) UCL	3.79832
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_64
Toluene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.221484
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	170		
Mean	12.8913	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	25.1544
Standard Deviation	34.24974		
Variance	1173.044	Gamma Distribution Test	
Coefficient of Variation	2.656809	A-D Test Statistic	8.200216
Skewness	4.79526	A-D 5% Critical Value	0.775213
		K-S Test Statistic	0.53808
Gamma Statistics		K-S 5% Critical Value	0.187587
k hat	0.885768	Data do not follow gamma distribution	
k star (bias corrected)	0.799218	at 5% significance level	
Theta hat	14.55382		
Theta star	16.12989	95% UCLs (Assuming Gamma Distribution)	
nu hat	40.74531	Approximate Gamma UCL	19.84473
nu star	36.76404	Adjusted Gamma UCL	20.49052
Approx.Chi Square Value (.05)	23.88224		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	23.12954	Shapiro-Wilk Test Statisitic	0.265209
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.135798	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.895235	95% H-UCL	11.88718
Standard Deviation of log data	0.708186	95% Chebyshev (MVUE) UCL	14.27153
Variance of log data	0.501527	97.5% Chebyshev (MVUE) UCL	16.79567
		99% Chebyshev (MVUE) UCL	21.75384
		95% Non-parametric UCLs	
		CLT UCL	24.63813
		Adj-CLT UCL (Adjusted for skewness)	32.26809
		Mod-t UCL (Adjusted for skewness)	26.34452
		Jackknife UCL	25.1544
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	44.02066
		97.5% Chebyshev (Mean, Sd) UCL	57.49036
		99% Chebyshev (Mean, Sd) UCL	83.94897

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_65
Trichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.717492
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3	Data not normal at 5% significance level	
Maximum	6.5		
Mean	5.478261	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student's-t UCL	5.761212
Standard Deviation	0.790257		
Variance	0.624506	Gamma Distribution Test	
Coefficient of Variation	0.144253	A-D Test Statistic	3.114812
Skewness	-1.964906	A-D 5% Critical Value	0.74156
		K-S Test Statistic	0.400567
Gamma Statistics		K-S 5% Critical Value	0.180967
k hat	39.98468	Data do not follow gamma distribution	
k star (bias corrected)	34.79827	at 5% significance level	
Theta hat	0.137009		
Theta star	0.157429	95% UCLs (Assuming Gamma Distribution)	
nu hat	1839.295	Approximate Gamma UCL	5.812074
nu star	1600.72	Adjusted Gamma UCL	5.837032
Approx.Chi Square Value (.05)	1508.784		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	1502.333	Shapiro-Wilk Test Statisitic	0.654744
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	1.871802	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.688231	95% H-UCL	5.855249
Standard Deviation of log data	0.172208	95% Chebyshev (MVUE) UCL	6.35025
Variance of log data	0.029656	97.5% Chebyshev (MVUE) UCL	6.723722
		99% Chebyshev (MVUE) UCL	7.457335
		95% Non-parametric UCLs	
		CLT UCL	5.7493
		Adj-CLT UCL (Adjusted for skewness)	5.677162
		Mod-t UCL (Adjusted for skewness)	5.74996
		Jackknife UCL	5.761212
		Standard Bootstrap UCL	5.751855
		Bootstrap-t UCL	5.700603
RECOMMENDATION		Hall's Bootstrap UCL	5.702828
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.73913
		BCA Bootstrap UCL	5.673913
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.19652
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.507311
		99% Chebyshev (Mean, Sd) UCL	7.117801

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_66
Vanadium			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.65739
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	17.5	Data not normal at 5% significance level	
Maximum	58.3		
Mean	26.4	95% UCL (Assuming Normal Distribution)	
Median	24.4	Student's-t UCL	29.2104
Standard Deviation	7.849204		
Variance	61.61	Gamma Distribution Test	
Coefficient of Variation	0.297318	A-D Test Statistic	1.375503
Skewness	3.243035	A-D 5% Critical Value	0.742598
		K-S Test Statistic	0.176568
Gamma Statistics		K-S 5% Critical Value	0.181193
k hat	16.99568	Data follow approximate gamma distibution	
k star (bias corrected)	14.80784	at 5% significance level	
Theta hat	1.553336		
Theta star	1.782839	95% UCLs (Assuming Gamma Distribution)	
nu hat	781.8014	Approximate Gamma UCL	28.92982
nu star	681.1606	Adjusted Gamma UCL	29.1226
Approx.Chi Square Value (.05)	621.5954		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	617.4806	Shapiro-Wilk Test Statisitic	0.826748
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	4.065602	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.243656	95% H-UCL	28.73225
Standard Deviation of log data	0.230845	95% Chebyshev (MVUE) UCL	31.8527
Variance of log data	0.053289	97.5% Chebyshev (MVUE) UCL	34.26052
		99% Chebyshev (MVUE) UCL	38.9902
		95% Non-parametric UCLs	
		CLT UCL	29.09209
		Adj-CLT UCL (Adjusted for skewness)	30.27466
		Mod-t UCL (Adjusted for skewness)	29.39486
		Jackknife UCL	29.2104
		Standard Bootstrap UCL	29.01426
		Bootstrap-t UCL	31.7472
RECOMMENDATION		Hall's Bootstrap UCL	40.91671
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	29.5
		BCA Bootstrap UCL	30.81304
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	33.53409
		97.5% Chebyshev (Mean, Sd) UCL	36.62101
		99% Chebyshev (Mean, Sd) UCL	42.68468

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_67
Vinyl chloride			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.439191
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.914
Minimum	1	Data not normal at 5% significance level	
Maximum	6.5		
Mean	5.521739	95% UCL (Assuming Normal Distribution)	
Median	5.5	Student	5.889734
Standard Deviation	1.027776		
Variance	1.056324	Gamma Distribution Test	
Coefficient of Variation	0.186133	A-D Test Statistic	5.866323
Skewness	-4.156368	A-D 5% Critical Value	0.743583
		K-S Test Statistic	0.488623
Gamma Statistics		K-S 5% Critical Value	0.181423
k hat	12.49902	Data do not follow gamma distribution	
k star (bias corrected)	10.8977	at 5% significance level	
Theta hat	0.441774		
Theta star	0.506689	95% UCLs (Assuming Gamma Distribution)	
nu hat	574.9549	Approximate Gamma UCL	6.146187
nu star	501.2941	Adjusted Gamma UCL	6.194213
Approx.Chi Square Value (.05)	450.363		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	446.8712	Shapiro-Wilk Test Statisitic	0.31838
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0		
Maximum of log data	1.871802	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.668157	95% H-UCL	6.566119
Standard Deviation of log data	0.367043	95% Chebyshev (MVUE) UCL	7.582019
Variance of log data	0.13472	97.5% Chebyshev (MVUE) UCL	8.416145
		99% Chebyshev (MVUE) UCL	10.05462
		95% Non-parametric UCLs	
		CLT UCL	5.874241
		Adj-CLT UCL (Adjusted for skewness)	5.675785
		Mod-t UCL (Adjusted for skewness)	5.858779
		Jackknife UCL	5.889734
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	6.455878
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	6.860081
		99% Chebyshev (Mean, Sd) UCL	7.654059

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_68
Xylenes, total			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.225185
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.914
Minimum	5.5	Data not normal at 5% significance level	
Maximum	370		
Mean	21.95652	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	49.12916
Standard Deviation	75.89076		
Variance	5759.407	Gamma Distribution Test	
Coefficient of Variation	3.456411	A-D Test Statistic	7.971244
Skewness	4.791746	A-D 5% Critical Value	0.799759
		K-S Test Statistic	0.524589
Gamma Statistics		K-S 5% Critical Value	0.191126
k hat	0.557985	Data do not follow gamma distribution	
k star (bias corrected)	0.51419	at 5% significance level	
Theta hat	39.34964		
Theta star	42.70117	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.66733	Approximate Gamma UCL	38.23344
nu star	23.65275	Adjusted Gamma UCL	39.8551
Approx.Chi Square Value (.05)	13.58319		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	13.0305	Shapiro-Wilk Test Statisitic	0.316488
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.704748		
Maximum of log data	5.913503	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.969671	95% H-UCL	16.53043
Standard Deviation of log data	0.880815	95% Chebyshev (MVUE) UCL	19.48535
Variance of log data	0.775835	97.5% Chebyshev (MVUE) UCL	23.44624
		99% Chebyshev (MVUE) UCL	31.22666
		95% Non-parametric UCLs	
		CLT UCL	47.98521
		Adj-CLT UCL (Adjusted for skewness)	64.87932
		Mod-t UCL (Adjusted for skewness)	51.76429
		Jackknife UCL	49.12916
		Standard Bootstrap UCL	47.73434
		Bootstrap-t UCL	4296.465
RECOMMENDATION		Hall's Bootstrap UCL	1042.183
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	53.34783
		BCA Bootstrap UCL	70.1087
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	90.93312
		97.5% Chebyshev (Mean, Sd) UCL	120.7793
		99% Chebyshev (Mean, Sd) UCL	179.4065

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_69
Zinc			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.568295
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	17.5	Data not normal at 5% significance level	
Maximum	1390		
Mean	229.387	95% UCL (Assuming Normal Distribution)	
Median	180	Student's-t UCL	327.3568
Standard Deviation	273.6211		
Variance	74868.5	Gamma Distribution Test	
Coefficient of Variation	1.192836	A-D Test Statistic	0.615484
Skewness	3.73582	A-D 5% Critical Value	0.761872
		K-S Test Statistic	0.160175
Gamma Statistics		K-S 5% Critical Value	0.185273
k hat	1.403682	Data follow gamma distribution	
k star (bias corrected)	1.249578	at 5% significance level	
Theta hat	163.4181		
Theta star	183.5715	95% UCLs (Assuming Gamma Distribution)	
nu hat	64.56936	Approximate Gamma UCL	321.2061
nu star	57.4806	Adjusted Gamma UCL	329.281
Approx.Chi Square Value (.05)	41.04934		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	40.0427	Shapiro-Wilk Test Statisitic	0.960339
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.862201		
Maximum of log data	7.237059	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.038696	95% H-UCL	374.2645
Standard Deviation of log data	0.911606	95% Chebyshev (MVUE) UCL	438.4177
Variance of log data	0.831025	97.5% Chebyshev (MVUE) UCL	529.4193
		99% Chebyshev (MVUE) UCL	708.1743
		95% Non-parametric UCLs	
		CLT UCL	323.2323
		Adj-CLT UCL (Adjusted for skewness)	370.7208
		Mod-t UCL (Adjusted for skewness)	334.764
		Jackknife UCL	327.3568
		Standard Bootstrap UCL	320.6599
		Bootstrap-t UCL	451.0429
RECOMMENDATION		Hall's Bootstrap UCL	725.8552
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	334.4043
		BCA Bootstrap UCL	383.0957
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	478.0793
		97.5% Chebyshev (Mean, Sd) UCL	585.6887
		99% Chebyshev (Mean, Sd) UCL	797.0665

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_70
alpha-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.268094
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	25.75435	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	61.41036
Standard Deviation	99.58407		
Variance	9916.987	Gamma Distribution Test	
Coefficient of Variation	3.86669	A-D Test Statistic	5.04234
Skewness	4.711781	A-D 5% Critical Value	0.852998
		K-S Test Statistic	0.390119
Gamma Statistics		K-S 5% Critical Value	0.197267
k hat	0.290776	Data do not follow gamma distribution	
k star (bias corrected)	0.281834	at 5% significance level	
Theta hat	88.57108		
Theta star	91.38119	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.3757	Approximate Gamma UCL	56.90301
nu star	12.96437	Adjusted Gamma UCL	60.4457
Approx.Chi Square Value (.05)	5.867687		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.523784	Shapiro-Wilk Test Statisitic	0.644403
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.865028	95% H-UCL	31.08565
Standard Deviation of log data	1.642869	95% Chebyshev (MVUE) UCL	23.14974
Variance of log data	2.699018	97.5% Chebyshev (MVUE) UCL	29.6533
		99% Chebyshev (MVUE) UCL	42.42829
		95% Non-parametric UCLs	
		CLT UCL	59.90926
		Adj-CLT UCL (Adjusted for skewness)	81.70781
		Mod-t UCL (Adjusted for skewness)	64.81049
		Jackknife UCL	61.41036
		Standard Bootstrap UCL	59.01208
		Bootstrap-t UCL	541.4319
RECOMMENDATION		Hall's Bootstrap UCL	387.6723
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	66.04783
		BCA Bootstrap UCL	90.11957
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	116.2656
		97.5% Chebyshev (Mean, Sd) UCL	155.4299
		99% Chebyshev (Mean, Sd) UCL	232.3606

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_71
alpha-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.316489
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.48	Data not normal at 5% significance level	
Maximum	480		
Mean	29.80783	95% UCL (Assuming Normal Distribution)	
Median	2.1	Student's-t UCL	65.58489
Standard Deviation	99.92216		
Variance	9984.438	Gamma Distribution Test	
Coefficient of Variation	3.352212	A-D Test Statistic	3.257961
Skewness	4.540878	A-D 5% Critical Value	0.84391
		K-S Test Statistic	0.305436
Gamma Statistics		K-S 5% Critical Value	0.196299
k hat	0.322519	Data do not follow gamma distribution	
k star (bias corrected)	0.309437	at 5% significance level	
Theta hat	92.422		
Theta star	96.32936	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.83586	Approximate Gamma UCL	63.03693
nu star	14.23408	Adjusted Gamma UCL	66.72663
Approx.Chi Square Value (.05)	6.730769		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	6.358587	Shapiro-Wilk Test Statisitic	0.839298
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.281822	95% H-UCL	62.11268
Standard Deviation of log data	1.733798	95% Chebyshev (MVUE) UCL	41.79495
Variance of log data	3.006055	97.5% Chebyshev (MVUE) UCL	53.79159
		99% Chebyshev (MVUE) UCL	77.35666
		95% Non-parametric UCLs	
		CLT UCL	64.0787
		Adj-CLT UCL (Adjusted for skewness)	85.1579
		Mod-t UCL (Adjusted for skewness)	68.87282
		Jackknife UCL	65.58489
		Standard Bootstrap UCL	63.38672
		Bootstrap-t UCL	281.0477
RECOMMENDATION		Hall's Bootstrap UCL	238.9059
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	69.89478
		BCA Bootstrap UCL	109.597
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	120.6264
		97.5% Chebyshev (Mean, Sd) UCL	159.9237
		99% Chebyshev (Mean, Sd) UCL	237.1155

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_72
beta-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.281999
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.9	Data not normal at 5% significance level	
Maximum	480		
Mean	27.63913	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	63.16416
Standard Deviation	99.21825		
Variance	9844.261	Gamma Distribution Test	
Coefficient of Variation	3.589775	A-D Test Statistic	3.278737
Skewness	4.704007	A-D 5% Critical Value	0.838176
		K-S Test Statistic	0.282007
Gamma Statistics		K-S 5% Critical Value	0.195647
k hat	0.348704	Data do not follow gamma distribution	
k star (bias corrected)	0.332207	at 5% significance level	
Theta hat	79.26236		
Theta star	83.1986	95% UCLs (Assuming Gamma Distribution)	
nu hat	16.0404	Approximate Gamma UCL	56.64373
nu star	15.28151	Adjusted Gamma UCL	59.80907
Approx.Chi Square Value (.05)	7.456563		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	7.061932	Shapiro-Wilk Test Statisitic	0.85064
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.38968	95% H-UCL	42.16595
Standard Deviation of log data	1.56652	95% Chebyshev (MVUE) UCL	33.91052
Variance of log data	2.453986	97.5% Chebyshev (MVUE) UCL	43.24912
		99% Chebyshev (MVUE) UCL	61.593
		95% Non-parametric UCLs	
		CLT UCL	61.66858
		Adj-CLT UCL (Adjusted for skewness)	83.35122
		Mod-t UCL (Adjusted for skewness)	66.54621
		Jackknife UCL	63.16416
		Standard Bootstrap UCL	60.92099
		Bootstrap-t UCL	432.244
RECOMMENDATION		Hall's Bootstrap UCL	243.1641
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	67.72391
		BCA Bootstrap UCL	91.86739
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	117.8179
		97.5% Chebyshev (Mean, Sd) UCL	156.8384
		99% Chebyshev (Mean, Sd) UCL	233.4865

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_73
bis(2-ethylhexyl)phthalate			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.456131
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	175	Data not normal at 5% significance level	
Maximum	2300		
Mean	404.7826	95% UCL (Assuming Normal Distribution)	
Median	200	Student's-t UCL	601.4769
Standard Deviation	549.3498		
Variance	301785.2	Gamma Distribution Test	
Coefficient of Variation	1.357148	A-D Test Statistic	4.434276
Skewness	3.000732	A-D 5% Critical Value	0.76139
		K-S Test Statistic	0.399681
Gamma Statistics		K-S 5% Critical Value	0.185179
k hat	1.429918	Data do not follow gamma distribution	
k star (bias corrected)	1.272392	at 5% significance level	
Theta hat	283.081		
Theta star	318.1272	95% UCLs (Assuming Gamma Distribution)	
nu hat	65.77623	Approximate Gamma UCL	564.9296
nu star	58.53005	Adjusted Gamma UCL	578.9864
Approx.Chi Square Value (.05)	41.93787		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	40.9197	Shapiro-Wilk Test Statisitic	0.616677
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.164786		
Maximum of log data	7.740664	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.61459	95% H-UCL	502.0251
Standard Deviation of log data	0.725816	95% Chebyshev (MVUE) UCL	602.3518
Variance of log data	0.52681	97.5% Chebyshev (MVUE) UCL	710.6286
		99% Chebyshev (MVUE) UCL	923.3173
		95% Non-parametric UCLs	
		CLT UCL	593.1962
		Adj-CLT UCL (Adjusted for skewness)	669.7786
		Mod-t UCL (Adjusted for skewness)	613.4222
		Jackknife UCL	601.4769
		Standard Bootstrap UCL	587.8657
		Bootstrap-t UCL	1286.933
RECOMMENDATION		Hall's Bootstrap UCL	1451.576
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	598.2609
		BCA Bootstrap UCL	719.7826
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	904.0829
		97.5% Chebyshev (Mean, Sd) UCL	1120.131
		99% Chebyshev (Mean, Sd) UCL	1544.514

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_74
cis-1,2-Dichloroethene			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.424684
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.914
Minimum	3	Data not normal at 5% significance level	
Maximum	44		
Mean	8.76087	95% UCL (Assuming Normal Distribution)	
Median	6	Student's-t UCL	12.39061
Standard Deviation	10.13754		
Variance	102.7698	Gamma Distribution Test	
Coefficient of Variation	1.157139	A-D Test Statistic	4.77085
Skewness	3.126374	A-D 5% Critical Value	0.755137
		K-S Test Statistic	0.392995
Gamma Statistics		K-S 5% Critical Value	0.183906
k hat	1.961213	Data do not follow gamma distribution	
k star (bias corrected)	1.734388	at 5% significance level	
Theta hat	4.467066		
Theta star	5.051274	95% UCLs (Assuming Gamma Distribution)	
nu hat	90.21581	Approximate Gamma UCL	11.61098
nu star	79.78186	Adjusted Gamma UCL	11.85375
Approx.Chi Square Value (.05)	60.19808		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	58.96519	Shapiro-Wilk Test Statisitic	0.622198
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	3.78419	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.894192	95% H-UCL	10.53613
Standard Deviation of log data	0.613439	95% Chebyshev (MVUE) UCL	12.63289
Variance of log data	0.376307	97.5% Chebyshev (MVUE) UCL	14.66032
		99% Chebyshev (MVUE) UCL	18.64282
		95% Non-parametric UCLs	
		CLT UCL	12.2378
		Adj-CLT UCL (Adjusted for skewness)	13.7102
		Mod-t UCL (Adjusted for skewness)	12.62027
		Jackknife UCL	12.39061
		Standard Bootstrap UCL	12.23154
		Bootstrap-t UCL	38.87736
RECOMMENDATION		Hall's Bootstrap UCL	38.02088
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	12.34783
		BCA Bootstrap UCL	13.52174
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	17.97481
		97.5% Chebyshev (Mean, Sd) UCL	21.96169
		99% Chebyshev (Mean, Sd) UCL	29.79315

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_75
gamma-BHC			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.364247
Number of Unique Samples	13	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.9	Data not normal at 5% significance level	
Maximum	420		
Mean	29.51739	95% UCL (Assuming Normal Distribution)	
Median	1.05	Student's-t UCL	61.61781
Standard Deviation	89.65363		
Variance	8037.774	Gamma Distribution Test	
Coefficient of Variation	3.037316	A-D Test Statistic	3.902788
Skewness	4.157213	A-D 5% Critical Value	0.847588
		K-S Test Statistic	0.361398
Gamma Statistics		K-S 5% Critical Value	0.196718
k hat	0.30572	Data do not follow gamma distribution	
k star (bias corrected)	0.294829	at 5% significance level	
Theta hat	96.5504		
Theta star	100.117	95% UCLs (Assuming Gamma Distribution)	
nu hat	14.06312	Approximate Gamma UCL	63.8306
nu star	13.56213	Adjusted Gamma UCL	67.6876
Approx.Chi Square Value (.05)	6.271582		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	5.914212	Shapiro-Wilk Test Statisitic	0.707437
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.105361		
Maximum of log data	6.040255	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.136376	95% H-UCL	78.29968
Standard Deviation of log data	1.851172	95% Chebyshev (MVUE) UCL	45.50308
Variance of log data	3.426839	97.5% Chebyshev (MVUE) UCL	58.88866
		99% Chebyshev (MVUE) UCL	85.18204
		95% Non-parametric UCLs	
		CLT UCL	60.26641
		Adj-CLT UCL (Adjusted for skewness)	77.58142
		Mod-t UCL (Adjusted for skewness)	64.3186
		Jackknife UCL	61.61781
		Standard Bootstrap UCL	60.02905
		Bootstrap-t UCL	237.3379
RECOMMENDATION		Hall's Bootstrap UCL	193.9377
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	64.57174
		BCA Bootstrap UCL	84.93043
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	111.003
		97.5% Chebyshev (Mean, Sd) UCL	146.2618
		99% Chebyshev (Mean, Sd) UCL	215.5211

Data File	C:\lhilsche\AMCO\EPCs2\all._2EPCs2.txt	Variable:	_76
gamma-Chlordane			
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.320334
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.77	Data not normal at 5% significance level	
Maximum	480		
Mean	30.55087	95% UCL (Assuming Normal Distribution)	
Median	2.3	Student's-t UCL	66.28266
Standard Deviation	99.79574		
Variance	9959.189	Gamma Distribution Test	
Coefficient of Variation	3.266543	A-D Test Statistic	2.868602
Skewness	4.535936	A-D 5% Critical Value	0.838045
		K-S Test Statistic	0.299309
Gamma Statistics		K-S 5% Critical Value	0.195632
k hat	0.349305	Data do not follow gamma distribution	
k star (bias corrected)	0.332729	at 5% significance level	
Theta hat	87.46196		
Theta star	91.81917	95% UCLs (Assuming Gamma Distribution)	
nu hat	16.06801	Approximate Gamma UCL	62.56869
nu star	15.30552	Adjusted Gamma UCL	66.06157
Approx.Chi Square Value (.05)	7.473337		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	7.078199	Shapiro-Wilk Test Statisitic	0.869501
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.261365		
Maximum of log data	6.173786	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.493696	95% H-UCL	62.92412
Standard Deviation of log data	1.66863	95% Chebyshev (MVUE) UCL	45.58303
Variance of log data	2.784327	97.5% Chebyshev (MVUE) UCL	58.47013
		99% Chebyshev (MVUE) UCL	83.78432
		95% Non-parametric UCLs	
		CLT UCL	64.77838
		Adj-CLT UCL (Adjusted for skewness)	85.808
		Mod-t UCL (Adjusted for skewness)	69.56286
		Jackknife UCL	66.28266
		Standard Bootstrap UCL	65.09723
		Bootstrap-t UCL	273.8581
RECOMMENDATION		Hall's Bootstrap UCL	229.6782
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	70.43783
		BCA Bootstrap UCL	94.45304
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	121.2545
		97.5% Chebyshev (Mean, Sd) UCL	160.5021
		99% Chebyshev (Mean, Sd) UCL	237.5963

Table of Contents for Appendix 5b - ProUCL Files - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Chemical Class	Chemical Name
5	Chromium VI	Chromium, hexavalent
6	Cyanide	Cyanide
7	Dioxins/Furans	1,2,3,4,6,7,8-HpCDD
8	Dioxins/Furans	1,2,3,4,6,7,8-HpCDF
9	Dioxins/Furans	1,2,3,4,7,8,9-HpCDF
10	Dioxins/Furans	1,2,3,4,7,8-HxCDD
11	Dioxins/Furans	1,2,3,4,7,8-HxCDF
12	Dioxins/Furans	1,2,3,6,7,8-HxCDD
13	Dioxins/Furans	1,2,3,6,7,8-HxCDF
14	Dioxins/Furans	1,2,3,7,8,9-HxCDD
15	Dioxins/Furans	1,2,3,7,8,9-HxCDF
16	Dioxins/Furans	1,2,3,7,8-PeCDD
17	Dioxins/Furans	1,2,3,7,8-PeCDF
18	Dioxins/Furans	2,3,4,6,7,8-HxCDF
19	Dioxins/Furans	2,3,4,7,8-PeCDF
20	Dioxins/Furans	2,3,7,8-TCDF
21	Dioxins/Furans	OCDD
22	Dioxins/Furans	OCDF
26	Herbicides	Atrazine
27	Metals	Aluminum
28	Metals	Antimony
29	Metals	Arsenic
30	Metals	Barium
31	Metals	Beryllium
32	Metals	Boron
33	Metals	Cadmium
34	Metals	Calcium
35	Metals	Chromium
36	Metals	Cobalt
37	Metals	Copper
38	Metals	Iron
39	Metals	Lead
40	Metals	Magnesium
41	Metals	Manganese
42	Metals	Mercury
43	Metals	Molybdenum
44	Metals	Nickel
45	Metals	Potassium
46	Metals	Selenium
47	Metals	Silicon
48	Metals	Silver
49	Metals	Sodium
50	Metals	Thallium
51	Metals	Vanadium
52	Metals	Zinc

Table of Contents for Appendix 5b - ProUCL Files - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Chemical Class	Chemical Name
78	Organochlorine Pesticides	4,4'-DDD
79	Organochlorine Pesticides	4,4'-DDE
80	Organochlorine Pesticides	4,4'-DDT
81	Organochlorine Pesticides	Aldrin
82	Organochlorine Pesticides	Dieldrin
83	Organochlorine Pesticides	Endosulfan I
84	Organochlorine Pesticides	Endosulfan II
85	Organochlorine Pesticides	Endosulfan sulfate
86	Organochlorine Pesticides	Endrin
87	Organochlorine Pesticides	Endrin aldehyde
88	Organochlorine Pesticides	Endrin ketone
89	Organochlorine Pesticides	Heptachlor
90	Organochlorine Pesticides	Heptachlor epoxide
91	Organochlorine Pesticides	Methoxychlor
92	Organochlorine Pesticides	alpha-BHC
93	Organochlorine Pesticides	alpha-Chlordane
94	Organochlorine Pesticides	beta-BHC
95	Organochlorine Pesticides	delta-BHC
96	Organochlorine Pesticides	gamma-BHC
97	Organochlorine Pesticides	gamma-Chlordane
98	Organophosphorus Pesticides	Diazinon
99	PCBs	Aroclor-1260
100	SVOCs	1,1'-Biphenyl
101	SVOCs	1,4-Dioxane (p-dioxane)
102	SVOCs	2,4,6-Trichlorophenol
103	SVOCs	2,4-Dimethylphenol
104	SVOCs	2-Chlorophenol
105	SVOCs	2-Methylnaphthalene
106	SVOCs	2-Methylphenol
107	SVOCs	2-Nitroaniline
108	SVOCs	4-Chloro-3-methylphenol
109	SVOCs	4-Methylphenol
110	SVOCs	Acenaphthene
111	SVOCs	Acenaphthylene
112	SVOCs	Anthracene
113	SVOCs	Benzo(a)anthracene
114	SVOCs	Benzo(a)pyrene
115	SVOCs	Benzo(b)fluoranthene
116	SVOCs	Benzo(g,h,i)perylene
117	SVOCs	Benzo(k)fluoranthene
118	SVOCs	Caprolactam
119	SVOCs	Carbazole
120	SVOCs	Chrysene
121	SVOCs	Di-n-butyl phthalate
122	SVOCs	Dibenz(a,h)anthracene

Table of Contents for Appendix 5b - ProUCL Files - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Chemical Class	Chemical Name
123	SVOCs	Diethylphthalate
124	SVOCs	Fluoranthene
125	SVOCs	Fluorene
126	SVOCs	Hexachloroethane
127	SVOCs	Indeno(1,2,3-c,d)pyrene
128	SVOCs	N-Nitrosodi-n-propylamine
129	SVOCs	N-Nitrosodiphenylamine
130	SVOCs	Naphthalene
131	SVOCs	Nitrobenzene
132	SVOCs	Pentachlorophenol
133	SVOCs	Phenanthrene
134	SVOCs	Phenol
135	SVOCs	Pyrene
136	SVOCs	bis(2-Chloroethoxy)methane
137	SVOCs	bis(2-Ethylhexyl)phthalate
139	VOCs	1,1,1-Trichloroethane
140	VOCs	1,1,2,2-Tetrachloroethane
141	VOCs	1,1,2-Trichloroethane
142	VOCs	1,1-Dichloroethane
143	VOCs	1,1-Dichloroethene
144	VOCs	1,2,3-Trichlorobenzene
145	VOCs	1,2,4-Trichlorobenzene
146	VOCs	1,2,4-Trimethylbenzene
147	VOCs	1,2-Dibromo-3-chloropropane
148	VOCs	1,2-Dichlorobenzene
149	VOCs	1,2-Dichloroethane
150	VOCs	1,2-Dichloropropane
151	VOCs	1,3,5-Trimethylbenzene
152	VOCs	1,3-Dichlorobenzene
153	VOCs	1,4-Dichlorobenzene
154	VOCs	2,2-Dichloropropane
155	VOCs	2-Chlorotoluene
156	VOCs	2-Hexanone
157	VOCs	Acetone
158	VOCs	Benzene
159	VOCs	Bromoform
160	VOCs	Carbon disulfide
161	VOCs	Carbon tetrachloride
162	VOCs	Chlorobenzene
163	VOCs	Chloroethane
164	VOCs	Chloroform
165	VOCs	Chloromethane
166	VOCs	Cyclohexane
167	VOCs	Ethyl tert-butyl ether
168	VOCs	Ethylbenzene

Table of Contents for Appendix 5b - ProUCL Files - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

ProUCL File #	Chemical Class	Chemical Name
169	VOCs	Isopropyl ether
170	VOCs	Isopropylbenzene (cumene)
171	VOCs	Methyl acetate
172	VOCs	Methyl ethyl ketone
173	VOCs	Methyl isobutyl ketone
174	VOCs	Methyl tert-butyl ether
175	VOCs	Methylcyclohexane
176	VOCs	Methylene chloride
177	VOCs	Styrene
178	VOCs	Tetrachloroethene
179	VOCs	Toluene
180	VOCs	Trichloroethene
181	VOCs	Vinyl chloride
182	VOCs	Xylenes, m & p
183	VOCs	Xylenes, o
184	VOCs	Xylenes, total
185	VOCs	cis-1,2-Dichloroethene
186	VOCs	cis-1,3-Dichloropropene
187	VOCs	n-Propylbenzene
188	VOCs	n-butylbenzene
189	VOCs	p-Cymene (p-isopropyltoluene)
190	VOCs	sec-Butylbenzene
191	VOCs	tert-Butyl alcohol
191	VOCs	tert-Butyl alcohol
192	VOCs	tert-Butylbenzene
193	VOCs	trans-1,2-Dichloroethene
194	VOCs	trans-1,3-Dichloropropene

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_5
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.77061
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.788
Minimum	0.1	Data not normal at 5% significance level	
Maximum	0.5		
Mean	0.275	95% UCL (Assuming Normal Distribution)	
Median	0.225	Student's-t UCL	0.439013
Standard Deviation	0.199374		
Variance	0.03975	Gamma Distribution Test	
Coefficient of Variation	0.724996	A-D Test Statistic	0.807261
Skewness	0.269712	A-D 5% Critical Value	0.704129
		K-S Test Statistic	0.33723
Gamma Statistics		K-S 5% Critical Value	0.335794
k hat	2.028259	Data do not follow gamma distribution	
k star (bias corrected)	1.125241	at 5% significance level	
Theta hat	0.135584		
Theta star	0.244392	95% UCLs (Assuming Gamma Distribution)	
nu hat	24.33911	Approximate Gamma UCL	0.595905
nu star	13.50289	Adjusted Gamma UCL	0.812899
Approx.Chi Square Value (.05)	6.231352		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	4.567967	Shapiro-Wilk Test Statisitic	0.745604
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.302585		
Maximum of log data	-0.693147	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.557312	95% H-UCL	1.163794
Standard Deviation of log data	0.826729	95% Chebyshev (MVUE) UCL	0.681341
Variance of log data	0.683481	97.5% Chebyshev (MVUE) UCL	0.856239
		99% Chebyshev (MVUE) UCL	1.199791
		95% Non-parametric UCLs	
		CLT UCL	0.408881
		Adj-CLT UCL (Adjusted for skewness)	0.418458
		Mod-t UCL (Adjusted for skewness)	0.440507
		Jackknife UCL	0.439013
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.629789
		97.5% Chebyshev (Mean, Sd) UCL	0.783306
		99% Chebyshev (Mean, Sd) UCL	1.084861
Recommended UCL exceeds the maximum observation			

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_6
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.533696
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.788
Minimum	2.8	Data not normal at 5% significance level	
Maximum	62.9		
Mean	14.4	95% UCL (Assuming Normal Distribution)	
Median	5	Student's-t UCL	33.96286
Standard Deviation	23.78058		
Variance	565.516	Gamma Distribution Test	
Coefficient of Variation	1.651429	A-D Test Statistic	1.308689
Skewness	2.439855	A-D 5% Critical Value	0.71908
		K-S Test Statistic	0.467918
Gamma Statistics		K-S 5% Critical Value	0.342607
k hat	0.831087	Data do not follow gamma distribution	
k star (bias corrected)	0.526655	at 5% significance level	
Theta hat	17.32671		
Theta star	27.3424	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.973042	Approximate Gamma UCL	50.42116
nu star	6.319854	Adjusted Gamma UCL	85.30959
Approx.Chi Square Value (.05)	1.804915		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	1.066772	Shapiro-Wilk Test Statisitic	0.68751
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.029619		
Maximum of log data	4.141546	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.956658	95% H-UCL	127.8384
Standard Deviation of log data	1.099233	95% Chebyshev (MVUE) UCL	33.02266
Variance of log data	1.208312	97.5% Chebyshev (MVUE) UCL	42.40399
		99% Chebyshev (MVUE) UCL	60.83181
		95% Non-parametric UCLs	
		CLT UCL	30.36887
		Adj-CLT UCL (Adjusted for skewness)	40.70161
		Mod-t UCL (Adjusted for skewness)	35.57456
		Jackknife UCL	33.96286
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	56.71785
		97.5% Chebyshev (Mean, Sd) UCL	75.02882
		99% Chebyshev (Mean, Sd) UCL	110.9972
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_7
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.458061
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.2465	Data not normal at 5% significance level	
Maximum	634		
Mean	75.81224	95% UCL (Assuming Normal Distribution)	
Median	0.735	Student's-t UCL	142.8845
Standard Deviation	187.3268		
Variance	35091.34	Gamma Distribution Test	
Coefficient of Variation	2.470931	A-D Test Statistic	3.554721
Skewness	2.500942	A-D 5% Critical Value	0.887038
		K-S Test Statistic	0.335793
Gamma Statistics		K-S 5% Critical Value	0.200597
k hat	0.215267	Data do not follow gamma distribution	
k star (bias corrected)	0.216174	at 5% significance level	
Theta hat	352.1777		
Theta star	350.6997	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.902283	Approximate Gamma UCL	193.007
nu star	9.944014	Adjusted Gamma UCL	207.3939
Approx.Chi Square Value (.05)	3.905961		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	3.635005	Shapiro-Wilk Test Statisitic	0.7714
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.400393		
Maximum of log data	6.452049	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.948881	95% H-UCL	1135.276
Standard Deviation of log data	2.573636	95% Chebyshev (MVUE) UCL	177.1732
Variance of log data	6.623601	97.5% Chebyshev (MVUE) UCL	234.5942
		99% Chebyshev (MVUE) UCL	347.3866
		95% Non-parametric UCLs	
		CLT UCL	140.0608
		Adj-CLT UCL (Adjusted for skewness)	161.8257
		Mod-t UCL (Adjusted for skewness)	146.2794
		Jackknife UCL	142.8845
		Standard Bootstrap UCL	138.8906
		Bootstrap-t UCL	204.5859
RECOMMENDATION		Hall's Bootstrap UCL	130.8424
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	143.2097
		BCA Bootstrap UCL	169.5835
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	246.0723
		97.5% Chebyshev (Mean, Sd) UCL	319.744
		99% Chebyshev (Mean, Sd) UCL	464.4577

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_8
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.438153
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.181	Data not normal at 5% significance level	
Maximum	147		
Mean	14.8208	95% UCL (Assuming Normal Distribution)	
Median	0.4175	Student's-t UCL	28.64425
Standard Deviation	38.60766		
Variance	1490.552	Gamma Distribution Test	
Coefficient of Variation	2.604964	A-D Test Statistic	3.812905
Skewness	2.871782	A-D 5% Critical Value	0.865754
		K-S Test Statistic	0.375483
Gamma Statistics		K-S 5% Critical Value	0.198515
k hat	0.26248	Data do not follow gamma distribution	
k star (bias corrected)	0.257229	at 5% significance level	
Theta hat	56.4646		
Theta star	57.61724	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.07406	Approximate Gamma UCL	34.27872
nu star	11.83252	Adjusted Gamma UCL	36.5475
Approx.Chi Square Value (.05)	5.115928		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	4.798342	Shapiro-Wilk Test Statisitic	0.750318
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.709258		
Maximum of log data	4.990433	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.01118	95% H-UCL	64.61849
Standard Deviation of log data	2.113981	95% Chebyshev (MVUE) UCL	25.30346
Variance of log data	4.468917	97.5% Chebyshev (MVUE) UCL	33.08458
		99% Chebyshev (MVUE) UCL	48.36909
		95% Non-parametric UCLs	
		CLT UCL	28.06229
		Adj-CLT UCL (Adjusted for skewness)	33.21313
		Mod-t UCL (Adjusted for skewness)	29.44768
		Jackknife UCL	28.64425
		Standard Bootstrap UCL	27.74861
		Bootstrap-t UCL	55.48692
RECOMMENDATION		Hall's Bootstrap UCL	35.43216
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	28.92196
		BCA Bootstrap UCL	36.10693
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	49.91105
		97.5% Chebyshev (Mean, Sd) UCL	65.09462
		99% Chebyshev (Mean, Sd) UCL	94.91982

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_9
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.503644
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.2435	Data not normal at 5% significance level	
Maximum	14.1		
Mean	1.978891	95% UCL (Assuming Normal Distribution)	
Median	0.51	Student's-t UCL	3.326915
Standard Deviation	3.764911		
Variance	14.17456	Gamma Distribution Test	
Coefficient of Variation	1.902536	A-D Test Statistic	3.22157
Skewness	2.5697	A-D 5% Critical Value	0.793178
		K-S Test Statistic	0.344786
Gamma Statistics		K-S 5% Critical Value	0.190188
k hat	0.630121	Data do not follow gamma distribution	
k star (bias corrected)	0.576917	at 5% significance level	
Theta hat	3.140495		
Theta star	3.430117	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.98556	Approximate Gamma UCL	3.325374
nu star	26.53817	Adjusted Gamma UCL	3.456844
Approx.Chi Square Value (.05)	15.79255		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	15.19194	Shapiro-Wilk Test Statisitic	0.790627
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.412638		
Maximum of log data	2.646175	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.291027	95% H-UCL	3.131776
Standard Deviation of log data	1.196814	95% Chebyshev (MVUE) UCL	3.306199
Variance of log data	1.432364	97.5% Chebyshev (MVUE) UCL	4.106763
		99% Chebyshev (MVUE) UCL	5.679318
		95% Non-parametric UCLs	
		CLT UCL	3.270164
		Adj-CLT UCL (Adjusted for skewness)	3.719623
		Mod-t UCL (Adjusted for skewness)	3.397022
		Jackknife UCL	3.326915
		Standard Bootstrap UCL	3.221547
		Bootstrap-t UCL	4.65499
RECOMMENDATION		Hall's Bootstrap UCL	3.265102
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.344957
		BCA Bootstrap UCL	3.813109
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.400794
		97.5% Chebyshev (Mean, Sd) UCL	6.881454
		99% Chebyshev (Mean, Sd) UCL	9.789924

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_10
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.603949
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.427	Data not normal at 5% significance level	
Maximum	5.35		
Mean	1.351761	95% UCL (Assuming Normal Distribution)	
Median	0.8	Student's-t UCL	1.852784
Standard Deviation	1.399313		
Variance	1.958076	Gamma Distribution Test	
Coefficient of Variation	1.035178	A-D Test Statistic	2.358484
Skewness	2.305154	A-D 5% Critical Value	0.757108
		K-S Test Statistic	0.314444
Gamma Statistics		K-S 5% Critical Value	0.184313
k hat	1.778112	Data do not follow gamma distribution	
k star (bias corrected)	1.57517	at 5% significance level	
Theta hat	0.760223		
Theta star	0.858168	95% UCLs (Assuming Gamma Distribution)	
nu hat	81.79314	Approximate Gamma UCL	1.818732
nu star	72.4578	Adjusted Gamma UCL	1.858859
Approx.Chi Square Value (.05)	53.85378		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	52.69125	Shapiro-Wilk Test Statisitic	0.831668
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.850971		
Maximum of log data	1.677097	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.00541	95% H-UCL	1.774954
Standard Deviation of log data	0.707407	95% Chebyshev (MVUE) UCL	2.131022
Variance of log data	0.500425	97.5% Chebyshev (MVUE) UCL	2.507651
		99% Chebyshev (MVUE) UCL	3.247465
		95% Non-parametric UCLs	
		CLT UCL	1.831691
		Adj-CLT UCL (Adjusted for skewness)	1.981545
		Mod-t UCL (Adjusted for skewness)	1.876158
		Jackknife UCL	1.852784
		Standard Bootstrap UCL	1.834896
		Bootstrap-t UCL	2.312951
RECOMMENDATION		Hall's Bootstrap UCL	2.06516
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.856391
		BCA Bootstrap UCL	2.048717
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.623587
		97.5% Chebyshev (Mean, Sd) UCL	3.173907
		99% Chebyshev (Mean, Sd) UCL	4.254904

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_11
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.412416
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.1225	Data not normal at 5% significance level	
Maximum	15.7		
Mean	1.413152	95% UCL (Assuming Normal Distribution)	
Median	0.261	Student's-t UCL	2.63498
Standard Deviation	3.412458		
Variance	11.64487	Gamma Distribution Test	
Coefficient of Variation	2.414785	A-D Test Statistic	3.228421
Skewness	3.803828	A-D 5% Critical Value	0.801581
		K-S Test Statistic	0.337678
Gamma Statistics		K-S 5% Critical Value	0.191386
k hat	0.538016	Data do not follow gamma distribution	
k star (bias corrected)	0.496826	at 5% significance level	
Theta hat	2.626598		
Theta star	2.844362	95% UCLs (Assuming Gamma Distribution)	
nu hat	24.74874	Approximate Gamma UCL	2.48836
nu star	22.85398	Adjusted Gamma UCL	2.59616
Approx.Chi Square Value (.05)	12.97889		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	12.43997	Shapiro-Wilk Test Statisitic	0.803241
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.099644		
Maximum of log data	2.753661	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.821549	95% H-UCL	2.139463
Standard Deviation of log data	1.264029	95% Chebyshev (MVUE) UCL	2.175114
Variance of log data	1.597769	97.5% Chebyshev (MVUE) UCL	2.716854
		99% Chebyshev (MVUE) UCL	3.780997
		95% Non-parametric UCLs	
		CLT UCL	2.583542
		Adj-CLT UCL (Adjusted for skewness)	3.186575
		Mod-t UCL (Adjusted for skewness)	2.729041
		Jackknife UCL	2.63498
		Standard Bootstrap UCL	2.544945
		Bootstrap-t UCL	7.816275
RECOMMENDATION		Hall's Bootstrap UCL	7.332576
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.685696
		BCA Bootstrap UCL	3.48537
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.514712
		97.5% Chebyshev (Mean, Sd) UCL	5.85676
		99% Chebyshev (Mean, Sd) UCL	8.492952

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_12
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.481994
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.4395	Data not normal at 5% significance level	
Maximum	20		
Mean	2.745304	95% UCL (Assuming Normal Distribution)	
Median	0.89	Student's-t UCL	4.56574
Standard Deviation	5.084315		
Variance	25.85026	Gamma Distribution Test	
Coefficient of Variation	1.852004	A-D Test Statistic	3.443881
Skewness	2.889324	A-D 5% Critical Value	0.782559
		K-S Test Statistic	0.384111
Gamma Statistics		K-S 5% Critical Value	0.188675
k hat	0.746509	Data do not follow gamma distribution	
k star (bias corrected)	0.678124	at 5% significance level	
Theta hat	3.677524		
Theta star	4.048383	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.33941	Approximate Gamma UCL	4.407044
nu star	31.19369	Adjusted Gamma UCL	4.565125
Approx.Chi Square Value (.05)	19.43166		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	18.75878	Shapiro-Wilk Test Statisitic	0.765801
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.822118		
Maximum of log data	2.995732	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.207472	95% H-UCL	3.919615
Standard Deviation of log data	1.062872	95% Chebyshev (MVUE) UCL	4.392538
Variance of log data	1.129697	97.5% Chebyshev (MVUE) UCL	5.389694
		99% Chebyshev (MVUE) UCL	7.348415
		95% Non-parametric UCLs	
		CLT UCL	4.489101
		Adj-CLT UCL (Adjusted for skewness)	5.171567
		Mod-t UCL (Adjusted for skewness)	4.672191
		Jackknife UCL	4.56574
		Standard Bootstrap UCL	4.424209
		Bootstrap-t UCL	8.777442
RECOMMENDATION		Hall's Bootstrap UCL	11.70232
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.513326
		BCA Bootstrap UCL	5.192043
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.366404
		97.5% Chebyshev (Mean, Sd) UCL	9.365958
		99% Chebyshev (Mean, Sd) UCL	13.29369

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_13
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.580856
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.129	Data not normal at 5% significance level	
Maximum	4.5631		
Mean	0.702961	95% UCL (Assuming Normal Distribution)	
Median	0.2685	Student's-t UCL	1.062963
Standard Deviation	1.005454		
Variance	1.010938	Gamma Distribution Test	
Coefficient of Variation	1.430313	A-D Test Statistic	2.196605
Skewness	2.932976	A-D 5% Critical Value	0.768813
		K-S Test Statistic	0.295115
Gamma Statistics		K-S 5% Critical Value	0.186616
k hat	1.026489	Data do not follow gamma distribution	
k star (bias corrected)	0.921585	at 5% significance level	
Theta hat	0.68482		
Theta star	0.762774	95% UCLs (Assuming Gamma Distribution)	
nu hat	47.21851	Approximate Gamma UCL	1.046964
nu star	42.3929	Adjusted Gamma UCL	1.078312
Approx.Chi Square Value (.05)	28.46379		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	27.63629	Shapiro-Wilk Test Statisitic	0.855886
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.047943		
Maximum of log data	1.518002	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.913065	95% H-UCL	1.054677
Standard Deviation of log data	0.958372	95% Chebyshev (MVUE) UCL	1.221687
Variance of log data	0.918477	97.5% Chebyshev (MVUE) UCL	1.482963
		99% Chebyshev (MVUE) UCL	1.996188
		95% Non-parametric UCLs	
		CLT UCL	1.047807
		Adj-CLT UCL (Adjusted for skewness)	1.184808
		Mod-t UCL (Adjusted for skewness)	1.084332
		Jackknife UCL	1.062963
		Standard Bootstrap UCL	1.05054
		Bootstrap-t UCL	1.406449
RECOMMENDATION		Hall's Bootstrap UCL	2.042459
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.078139
		BCA Bootstrap UCL	1.166383
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1.616811
		97.5% Chebyshev (Mean, Sd) UCL	2.012235
		99% Chebyshev (Mean, Sd) UCL	2.788969

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_14
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.506707
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.525	Data not normal at 5% significance level	
Maximum	13		
Mean	1.912391	95% UCL (Assuming Normal Distribution)	
Median	0.95	Student's-t UCL	2.893408
Standard Deviation	2.739893		
Variance	7.507013	Gamma Distribution Test	
Coefficient of Variation	1.432705	A-D Test Statistic	2.784248
Skewness	3.409816	A-D 5% Critical Value	0.764446
		K-S Test Statistic	0.338275
Gamma Statistics		K-S 5% Critical Value	0.185771
k hat	1.263814	Data do not follow gamma distribution	
k star (bias corrected)	1.127954	at 5% significance level	
Theta hat	1.513191		
Theta star	1.695452	95% UCLs (Assuming Gamma Distribution)	
nu hat	58.13543	Approximate Gamma UCL	2.730595
nu star	51.88588	Adjusted Gamma UCL	2.803365
Approx.Chi Square Value (.05)	36.33865		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	35.39536	Shapiro-Wilk Test Statisitic	0.801988
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.644357		
Maximum of log data	2.564949	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.203181	95% H-UCL	2.507337
Standard Deviation of log data	0.804118	95% Chebyshev (MVUE) UCL	2.989977
Variance of log data	0.646606	97.5% Chebyshev (MVUE) UCL	3.564203
		99% Chebyshev (MVUE) UCL	4.69216
		95% Non-parametric UCLs	
		CLT UCL	2.852108
		Adj-CLT UCL (Adjusted for skewness)	3.286135
		Mod-t UCL (Adjusted for skewness)	2.961108
		Jackknife UCL	2.893408
		Standard Bootstrap UCL	2.825349
		Bootstrap-t UCL	4.526229
RECOMMENDATION		Hall's Bootstrap UCL	5.628857
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.937609
		BCA Bootstrap UCL	3.346087
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.402662
		97.5% Chebyshev (Mean, Sd) UCL	5.480203
		99% Chebyshev (Mean, Sd) UCL	7.596826

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_15
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.51146
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.1395	Data not normal at 5% significance level	
Maximum	6.5		
Mean	0.844	95% UCL (Assuming Normal Distribution)	
Median	0.291	Student's-t UCL	1.365375
Standard Deviation	1.456155		
Variance	2.120386	Gamma Distribution Test	
Coefficient of Variation	1.725302	A-D Test Statistic	2.290156
Skewness	3.235834	A-D 5% Critical Value	0.776674
		K-S Test Statistic	0.239071
Gamma Statistics		K-S 5% Critical Value	0.187804
k hat	0.857534	Data do not follow gamma distribution	
k star (bias corrected)	0.774667	at 5% significance level	
Theta hat	0.984218		
Theta star	1.089501	95% UCLs (Assuming Gamma Distribution)	
nu hat	39.44654	Approximate Gamma UCL	1.309199
nu star	35.63467	Adjusted Gamma UCL	1.352594
Approx.Chi Square Value (.05)	22.97256		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	22.23554	Shapiro-Wilk Test Statisitic	0.857526
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.969691		
Maximum of log data	1.871802	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.855496	95% H-UCL	1.241252
Standard Deviation of log data	1.016879	95% Chebyshev (MVUE) UCL	1.4134
Variance of log data	1.034042	97.5% Chebyshev (MVUE) UCL	1.726296
		99% Chebyshev (MVUE) UCL	2.340918
		95% Non-parametric UCLs	
		CLT UCL	1.343426
		Adj-CLT UCL (Adjusted for skewness)	1.562326
		Mod-t UCL (Adjusted for skewness)	1.399519
		Jackknife UCL	1.365375
		Standard Bootstrap UCL	1.332787
		Bootstrap-t UCL	2.58223
RECOMMENDATION		Hall's Bootstrap UCL	3.272464
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.38487
		BCA Bootstrap UCL	1.656391
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.167489
		97.5% Chebyshev (Mean, Sd) UCL	2.740164
		99% Chebyshev (Mean, Sd) UCL	3.865073

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_16
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.611631
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.196	Data not normal at 5% significance level	
Maximum	4.3		
Mean	0.768587	95% UCL (Assuming Normal Distribution)	
Median	0.505	Student's-t UCL	1.089537
Standard Deviation	0.896385		
Variance	0.803507	Gamma Distribution Test	
Coefficient of Variation	1.166277	A-D Test Statistic	1.132423
Skewness	3.12463	A-D 5% Critical Value	0.760069
		K-S Test Statistic	0.21536
Gamma Statistics		K-S 5% Critical Value	0.184924
k hat	1.502892	Data do not follow gamma distribution	
k star (bias corrected)	1.335848	at 5% significance level	
Theta hat	0.511405		
Theta star	0.575355	95% UCLs (Assuming Gamma Distribution)	
nu hat	69.13303	Approximate Gamma UCL	1.063313
nu star	61.44901	Adjusted Gamma UCL	1.089052
Approx.Chi Square Value (.05)	44.41674		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	43.36701	Shapiro-Wilk Test Statisitic	0.923215
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.629641		
Maximum of log data	1.458615	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.631403	95% H-l	1.079031
Standard Deviation of log data	0.798362	95% Chebyshev (MVUE) UCL	1.287563
Variance of log data	0.637382	97.5% Chebyshev (MVUE) UCL	1.533715
		99% Chebyshev (MVUE) UCL	2.017232
		95% Non-parametric UCLs	
		CLT UCL	1.076025
		Adj-CLT UCL (Adjusted for skewness)	1.206146
		Mod-t UCL (Adjusted for skewness)	1.109833
		Jackknife UCL	1.089537
		Standard Bootstrap UCL	1.066099
		Bootstrap-t UCL	1.455127
RECOMMENDATION		Hall's Bootstrap UCL	2.209131
Data are lognormal (0.05)		Percentile Bootstrap UCL	1.086174
		BCA Bootstrap UCL	1.238957
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	1.583306
		97.5% Chebyshev (Mean, Sd) UCL	1.935835
		99% Chebyshev (Mean, Sd) UCL	2.628311

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_17
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.512546
Number of Unique Samples	21	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.397	Data not normal at 5% significance level	
Maximum	5.8		
Mean	1.08387	95% UCL (Assuming Normal Distribution)	
Median	0.61	Student's-t UCL	1.554857
Standard Deviation	1.315425		
Variance	1.730343	Gamma Distribution Test	
Coefficient of Variation	1.213638	A-D Test Statistic	3.172982
Skewness	2.977597	A-D 5% Critical Value	0.758483
		K-S Test Statistic	0.291842
Gamma Statistics		K-S 5% Critical Value	0.184596
k hat	1.650295	Data do not follow gamma distribution	
k star (bias corrected)	1.464025	at 5% significance level	
Theta hat	0.656773		
Theta star	0.740335	95% UCLs (Assuming Gamma Distribution)	
nu hat	75.91359	Approximate Gamma UCL	1.475957
nu star	67.34515	Adjusted Gamma UCL	1.509885
Approx.Chi Square Value (.05)	49.45493		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	48.34364	Shapiro-Wilk Test Statisitic	0.744302
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.923819		
Maximum of log data	1.757858	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.252061	95% H-UCL	1.357168
Standard Deviation of log data	0.690992	95% Chebyshev (MVUE) UCL	1.629941
Variance of log data	0.477471	97.5% Chebyshev (MVUE) UCL	1.91355
		99% Chebyshev (MVUE) UCL	2.470645
		95% Non-parametric UCLs	
		CLT UCL	1.535028
		Adj-CLT UCL (Adjusted for skewness)	1.716992
		Mod-t UCL (Adjusted for skewness)	1.583239
		Jackknife UCL	1.554857
		Standard Bootstrap UCL	1.520783
		Bootstrap-t UCL	2.817852
RECOMMENDATION		Hall's Bootstrap UCL	3.449735
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.578087
		BCA Bootstrap UCL	1.694413
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.27945
		97.5% Chebyshev (Mean, Sd) UCL	2.796779
		99% Chebyshev (Mean, Sd) UCL	3.812971

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_18
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.532292
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.133	Data not normal at 5% significance level	
Maximum	6.6		
Mean	0.87513	95% UCL (Assuming Normal Distribution)	
Median	0.292	Student's-t UCL	1.40472
Standard Deviation	1.479096		
Variance	2.187726	Gamma Distribution Test	
Coefficient of Variation	1.690144	A-D Test Statistic	2.591999
Skewness	3.082622	A-D 5% Critical Value	0.77834
		K-S Test Statistic	0.283764
Gamma Statistics		K-S 5% Critical Value	0.188051
k hat	0.82534	Data do not follow gamma distribution	
k star (bias corrected)	0.746673	at 5% significance level	
Theta hat	1.060327		
Theta star	1.17204	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.96565	Approximate Gamma UCL	1.370032
nu star	34.34694	Adjusted Gamma UCL	1.416441
Approx.Chi Square Value (.05)	21.93967		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	21.22082	Shapiro-Wilk Test Statisitic	0.835871
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.017406		
Maximum of log data	1.88707	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.849544	95% H-UCL	1.323717
Standard Deviation of log data	1.047982	95% Chebyshev (MVUE) UCL	1.491484
Variance of log data	1.098267	97.5% Chebyshev (MVUE) UCL	1.827386
		99% Chebyshev (MVUE) UCL	2.4872
		95% Non-parametric UCLs	
		CLT UCL	1.382425
		Adj-CLT UCL (Adjusted for skewness)	1.594246
		Mod-t UCL (Adjusted for skewness)	1.43776
		Jackknife UCL	1.40472
		Standard Bootstrap UCL	1.366975
		Bootstrap-t UCL	2.01463
RECOMMENDATION		Hall's Bootstrap UCL	2.803099
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.373717
		BCA Bootstrap UCL	1.624804
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.219471
		97.5% Chebyshev (Mean, Sd) UCL	2.801169
		99% Chebyshev (Mean, Sd) UCL	3.9438

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_19
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.576131
Number of Unique Samples	19	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.4155	Data not normal at 5% significance level	
Maximum	5.5		
Mean	1.274804	95% UCL (Assuming Normal Distribution)	
Median	0.605	Student's-t UCL	1.810997
Standard Deviation	1.49754		
Variance	2.242625	Gamma Distribution Test	
Coefficient of Variation	1.174721	A-D Test Statistic	3.31464
Skewness	2.162795	A-D 5% Critical Value	0.761607
		K-S Test Statistic	0.322562
Gamma Statistics		K-S 5% Critical Value	0.185222
k hat	1.418105	Data do not follow gamma distribution	
k star (bias corrected)	1.26212	at 5% significance level	
Theta hat	0.898949		
Theta star	1.01005	95% UCLs (Assuming Gamma Distribution)	
nu hat	65.23284	Approximate Gamma UCL	1.781806
nu star	58.05754	Adjusted Gamma UCL	1.826346
Approx.Chi Square Value (.05)	41.53763		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	40.52464	Shapiro-Wilk Test Statisitic	0.735615
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.878273		
Maximum of log data	1.704748	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.14951	95% H-UCL	1.710146
Standard Deviation of log data	0.783851	95% Chebyshev (MVUE) UCL	2.043693
Variance of log data	0.614422	97.5% Chebyshev (MVUE) UCL	2.429853
		99% Chebyshev (MVUE) UCL	3.188388
		95% Non-parametric UCLs	
		CLT UCL	1.788424
		Adj-CLT UCL (Adjusted for skewness)	1.938893
		Mod-t UCL (Adjusted for skewness)	1.834467
		Jackknife UCL	1.810997
		Standard Bootstrap UCL	1.759637
		Bootstrap-t UCL	2.139996
RECOMMENDATION		Hall's Bootstrap UCL	1.74044
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.824739
		BCA Bootstrap UCL	1.926543
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.635908
		97.5% Chebyshev (Mean, Sd) UCL	3.224859
		99% Chebyshev (Mean, Sd) UCL	4.381738

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_20
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.653834
Number of Unique Samples	23	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.1765	Data not normal at 5% significance level	
Maximum	4.2531		
Mean	0.795222	95% UCL (Assuming Normal Distribution)	
Median	0.305	Student's-t UCL	1.143639
Standard Deviation	0.973099		
Variance	0.946922	Gamma Distribution Test	
Coefficient of Variation	1.223683	A-D Test Statistic	2.305355
Skewness	2.379551	A-D 5% Critical Value	0.766784
		K-S Test Statistic	0.309554
Gamma Statistics		K-S 5% Critical Value	0.186223
k hat	1.136741	Data do not follow gamma distribution	
k star (bias corrected)	1.017456	at 5% significance level	
Theta hat	0.699563		
Theta star	0.781578	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.29009	Approximate Gamma UCL	1.159405
nu star	46.80298	Adjusted Gamma UCL	1.192188
Approx.Chi Square Value (.05)	32.10159		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	31.21885	Shapiro-Wilk Test Statisitic	0.817055
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.734434		
Maximum of log data	1.447648	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.729614	95% H-UCL	1.233007
Standard Deviation of log data	0.942699	95% Chebyshev (MVUE) UCL	1.433977
Variance of log data	0.888682	97.5% Chebyshev (MVUE) UCL	1.737671
		99% Chebyshev (MVUE) UCL	2.334218
		95% Non-parametric UCLs	
		CLT UCL	1.128971
		Adj-CLT UCL (Adjusted for skewness)	1.236544
		Mod-t UCL (Adjusted for skewness)	1.160418
		Jackknife UCL	1.143639
		Standard Bootstrap UCL	1.122559
		Bootstrap-t UCL	1.386981
RECOMMENDATION		Hall's Bootstrap UCL	1.56096
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.19273
		BCA Bootstrap UCL	1.228013
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1.679665
		97.5% Chebyshev (Mean, Sd) UCL	2.062364
		99% Chebyshev (Mean, Sd) UCL	2.814103

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_21
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.436111
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.655	Data not normal at 5% significance level	
Maximum	10500		
Mean	1371.743	95% UCL (Assuming Normal Distribution)	
Median	5.25	Student's-t UCL	2603.804
Standard Deviation	3441.039		
Variance	11840751	Gamma Distribution Test	
Coefficient of Variation	2.508517	A-D Test Statistic	3.293902
Skewness	2.359262	A-D 5% Critical Value	0.908083
		K-S Test Statistic	0.334863
Gamma Statistics		K-S 5% Critical Value	0.20245
k hat	0.164469	Data do not follow gamma distribution	
k star (bias corrected)	0.172002	at 5% significance level	
Theta hat	8340.444		
Theta star	7975.163	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.565564	Approximate Gamma UCL	4044.411
nu star	7.912084	Adjusted Gamma UCL	4398.655
Approx.Chi Square Value (.05)	2.683541		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	2.467423	Shapiro-Wilk Test Statisitic	0.805423
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.42312		
Maximum of log data	9.259131	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.613661	95% H-UCL	235374.1
Standard Deviation of log data	3.275046	95% Chebyshev (MVUE) UCL	5026.219
Variance of log data	10.72592	97.5% Chebyshev (MVUE) UCL	6728.503
		99% Chebyshev (MVUE) UCL	10072.31
		95% Non-parametric UCLs	
		CLT UCL	2551.935
		Adj-CLT UCL (Adjusted for skewness)	2929.089
		Mod-t UCL (Adjusted for skewness)	2662.633
		Jackknife UCL	2603.804
		Standard Bootstrap UCL	2561.757
		Bootstrap-t UCL	3119.858
RECOMMENDATION		Hall's B	2179.54
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2556.435
		BCA Bootstrap UCL	2763.946
Use Hall's Bootstrap UCL		95% Chebyshev (Mean, Sd) UCL	4499.28
		97.5% Chebyshev (Mean, Sd) UCL	5852.568
In case Hall's Bootstrap method yields		99% Chebyshev (Mean, Sd) UCL	8510.84
an erratic, unreasonably large UCL value,			
use 99% Chebyshev (Mean, Sd) UCL			

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_22
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	23	Shapiro-Wilk Test Statisitic	0.423723
Number of Unique Samples	22	Shapiro-Wilk 5% Critical Value	0.914
Minimum	0.765	Data not normal at 5% significance level	
Maximum	1050		
Mean	115.0165	95% UCL (Assuming Normal Distribution)	
Median	1.86	Student's-t UCL	223.4874
Standard Deviation	302.9495		
Variance	91778.39	Gamma Distribution Test	
Coefficient of Variation	2.633965	A-D Test Statistic	3.851911
Skewness	2.892787	A-D 5% Critical Value	0.87881
		K-S Test Statistic	0.384494
Gamma Statistics		K-S 5% Critical Value	0.199792
k hat	0.233519	Data do not follow gamma distribution	
k star (bias corrected)	0.232045	at 5% significance level	
Theta hat	492.5365		
Theta star	495.6641	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.74186	Approximate Gamma UCL	281.1663
nu star	10.67408	Adjusted Gamma UCL	301.1259
Approx.Chi Square Value (.05)	4.36644		
Adjusted Level of Significance	0.0389	Lognormal Distribution Test	
Adjusted Chi Square Value	4.077019	Shapiro-Wilk Test Statisitic	0.73955
		Shapiro-Wilk 5% Critical Value	0.914
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.267879		
Maximum of log data	6.956545	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.669888	95% H-UCL	840.7813
Standard Deviation of log data	2.341493	95% Chebyshev (MVUE) UCL	216.7566
Variance of log data	5.482591	97.5% Chebyshev (MVUE) UCL	285.3891
		99% Chebyshev (MVUE) UCL	420.2046
		95% Non-parametric UCLs	
		CLT UCL	218.9208
		Adj-CLT UCL (Adjusted for skewness)	259.6344
		Mod-t UCL (Adjusted for skewness)	229.8379
		Jackknife UCL	223.4874
		Standard Bootstrap UCL	214.874
		Bootstrap-t UCL	576.2493
RECOMMENDATION		Hall's Bootstrap UCL	643.7952
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	233.4815
		BCA Bootstrap UCL	270.7561
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	390.3653
		97.5% Chebyshev (Mean, Sd) UCL	509.5089
		99% Chebyshev (Mean, Sd) UCL	743.5435

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_26
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.430661
Number of Unique Samples	7	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	25		
Mean	2.779403	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	3.902827
Standard Deviation	5.512067		
Variance	30.38289	Gamma Distribution Test	
Coefficient of Variation	1.983184	A-D Test Statistic	6.587978
Skewness	3.265893	A-D 5% Critical Value	0.847104
		K-S Test Statistic	0.274623
Gamma Statistics		K-S 5% Critical Value	0.11716
k hat	0.373733	Data do not follow gamma distribution	
k star (bias corrected)	0.366949	at 5% significance level	
Theta hat	7.436866		
Theta star	7.574357	95% UCLs (Assuming Gamma Distribution)	
nu hat	50.08024	Approximate Gamma UCL	4.011319
nu star	49.17117	Adjusted Gamma UCL	4.044121
Approx.Chi Square Value (.05)	34.07021		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	33.79387	Lilliefors Test Statisitic	0.294845
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.757921	95% H-UCL	13.68012
Standard Deviation of log data	2.18535	95% Chebyshev (MVUE) UCL	12.89708
Variance of log data	4.775755	97.5% Chebyshev (MVUE) UCL	16.50033
		99% Chebyshev (MVUE) UCL	23.57822
		95% Non-parametric UCLs	
		CLT UCL	3.887058
		Adj-CLT UCL (Adjusted for skewness)	4.17415
		Mod-t UCL (Adjusted for skewness)	3.947607
		Jackknife UCL	3.902827
		Standard Bootstrap UCL	3.870997
		Bootstrap-t UCL	4.489709
RECOMMENDATION		Hall's Bootstrap UCL	4.016773
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.972836
		BCA Bootstrap UCL	4.236119
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.714713
		97.5% Chebyshev (Mean, Sd) UCL	6.984823
		99% Chebyshev (Mean, Sd) UCL	9.47971

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_27
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.375916
Number of Unique Samples	55	Lilliefors 5% Critical Value	0.107443
Minimum	100	Data not normal at 5% significance level	
Maximum	62700		
Mean	2893.456	95% UCL (Assuming Normal Distribution)	
Median	496	Student's-t UCL	4630.559
Standard Deviation	8588.277		
Variance	73758500	Gamma Distribution Test	
Coefficient of Variation	2.968173	A-D Test Statistic	6.738904
Skewness	5.673388	A-D 5% Critical Value	0.832263
		K-S Test Statistic	0.299591
Gamma Statistics		K-S 5% Critical Value	0.11533
k hat	0.435526	Data do not follow gamma distribution	
k star (bias corrected)	0.426116	at 5% significance level	
Theta hat	6643.584		
Theta star	6790.303	95% UCLs (Assuming Gamma Distribution)	
nu hat	59.23158	Approximate Gamma UCL	4045.565
nu star	57.95176	Adjusted Gamma UCL	4075.258
Approx.Chi Square Value (.05)	41.44807		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	41.14607	Lilliefors Test Statisitic	0.153234
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	4.60517		
Maximum of log data	11.04612	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.479766	95% H-UCL	3355.589
Standard Deviation of log data	1.500236	95% Chebyshev (MVUE) UCL	4032.297
Variance of log data	2.250709	97.5% Chebyshev (MVUE) UCL	4936.785
		99% Chebyshev (MVUE) UCL	6713.477
		95% Non-parametric UCLs	
		CLT UCL	4606.541
		Adj-CLT UCL (Adjusted for skewness)	5372.173
		Mod-t UCL (Adjusted for skewness)	4749.982
		Jackknife UCL	4630.559
		Standard Bootstrap UCL	4594.949
		Bootstrap-t UCL	7218.556
RECOMMENDATION		Hall's Bootstrap UCL	11301.1
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4744
		BCA Bootstrap UCL	5551.471
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7433.169
		97.5% Chebyshev (Mean, Sd) UCL	9397.506
		99% Chebyshev (Mean, Sd) UCL	13256.07

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_28
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.398766
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.107443
Minimum	0.5	Data not normal at 5% significance level	
Maximum	4.7		
Mean	1.373676	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	1.512014
Standard Deviation	0.683941		
Variance	0.467776	Gamma Distribution Test	
Coefficient of Variation	0.497891	A-D Test Statistic	10.0501
Skewness	2.249604	A-D 5% Critical Value	0.753538
		K-S Test Statistic	0.410121
Gamma Statistics		K-S 5% Critical Value	0.1083
k hat	5.744029	Data do not follow gamma distribution	
k star (bias corrected)	5.50042	at 5% significance level	
Theta hat	0.239149		
Theta star	0.24974	95% UCLs (Assuming Gamma Distribution)	
nu hat	781.188	Approximate Gamma UCL	1.498862
nu star	748.0571	Adjusted Gamma UCL	1.501677
Approx.Chi Square Value (.05)	685.5789		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	684.2937	Lilliefors Test Statisitic	0.406539
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	1.547563	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.227926	95% H-UCL	1.485908
Standard Deviation of log data	0.400487	95% Chebyshev (MVUE) UCL	1.656788
Variance of log data	0.16039	97.5% Chebyshev (MVUE) UCL	1.785581
		99% Chebyshev (MVUE) UCL	2.03857
		95% Non-parametric UCLs	
		CLT UCL	1.510101
		Adj-CLT UCL (Adjusted for skewness)	1.534277
		Mod-t U	1.515785
		Jackknife UCL	1.512014
		Standard Bootstrap UCL	1.510475
		Bootstrap-t UCL	1.539393
RECOMMENDATION		Hall's Bootstrap UCL	1.561357
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.523676
		BCA Bootstrap UCL	1.516176
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1.735204
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	1.891637
		99% Chebyshev (Mean, Sd) UCL	2.19892

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_29
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.337825
Number of Unique Samples	65	Lilliefors 5% Critical Value	0.107443
Minimum	0.66	Data not normal at 5% significance level	
Maximum	2020		
Mean	136.1082	95% UCL (Assuming Normal Distribution)	
Median	20.85	Student's-t UCL	201.5862
Standard Deviation	323.7245		
Variance	104797.5	Gamma Distribution Test	
Coefficient of Variation	2.378434	A-D Test Statistic	3.329368
Skewness	4.198581	A-D 5% Critical Value	0.838664
		K-S Test Statistic	0.16638
Gamma Statistics		K-S 5% Critical Value	0.115735
k hat	0.409196	Data do not follow gamma distribution	
k star (bias corrected)	0.400947	at 5% significance level	
Theta hat	332.6236		
Theta star	339.4668	95% UCLs (Assuming Gamma Distribution)	
nu hat	55.65064	Approximate Gamma UCL	192.4832
nu star	54.5288	Adjusted Gamma UCL	193.9452
Approx.Chi Square Value (.05)	38.55827		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	38.26761	Lilliefors Test Statisitic	0.099487
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.415515		
Maximum of log data	7.610853	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.311197	95% H-I	286.8125
Standard Deviation of log data	1.812787	95% Chebyshev (MVUE) UCL	320.4327
Variance of log data	3.286196	97.5% Chebyshev (MVUE) UCL	401.3082
		99% Chebyshev (MVUE) UCL	560.1725
		95% Non-parametric UCLs	
		CLT UCL	200.6808
		Adj-CLT UCL (Adjusted for skewness)	222.0383
		Mod-t UCL (Adjusted for skewness)	204.9175
		Jackknife UCL	201.5862
		Standard Bootstrap UCL	198.2578
		Bootstrap-t UCL	254.7021
RECOMMENDATION		Hall's Bootstrap UCL	459.7855
Data are lognormal (0.05)		Percentile Bootstrap UCL	203.5118
		BCA Bootstrap UCL	230.2024
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	307.2271
		97.5% Chebyshev (Mean, Sd) UCL	381.2704
		99% Chebyshev (Mean, Sd) UCL	526.714

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_30
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.28278
Number of Unique Samples	64	Lilliefors 5% Critical Value	0.107443
Minimum	15.2	Data not normal at 5% significance level	
Maximum	828		
Mean	136.7676	95% UCL (Assuming Normal Distribution)	
Median	103.1	Student's-t UCL	171.4341
Standard Deviation	171.3917		
Variance	29375.11	Gamma Distribution Test	
Coefficient of Variation	1.25316	A-D Test Statistic	2.344668
Skewness	2.971165	A-D 5% Critical Value	0.774841
		K-S Test Statistic	0.151012
Gamma Statistics		K-S 5% Critical Value	0.110688
k hat	1.237049	Data do not follow gamma distribution	
k star (bias corrected)	1.192278	at 5% significance level	
Theta hat	110.5596		
Theta star	114.7112	95% UCLs (Assuming Gamma Distribution)	
nu hat	168.2387	Approximate Gamma UCL	165.8666
nu star	162.1498	Adjusted Gamma UCL	166.5603
Approx.Chi Square Value (.05)	133.7029		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	133.146	Lilliefors Test Statisitic	0.09672
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.721295		
Maximum of log data	6.719013	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.462482	95% H-l	167.6493
Standard Deviation of log data	0.912984	95% Chebyshev (MVUE) UCL	203.4683
Variance of log data	0.83354	97.5% Chebyshev (MVUE) UCL	235.0788
		99% Chebyshev (MVUE) UCL	297.1716
		95% Non-parametric UCLs	
		CLT UCL	170.9548
		Adj-CLT UCL (Adjusted for skewness)	178.9566
		Mod-t UCL (Adjusted for skewness)	172.6822
		Jackknife UCL	171.4341
		Standard Bootstrap UCL	170.0737
		Bootstrap-t UCL	187.4857
RECOMMENDATION		Hall's Bootstrap UCL	175.5103
Data are lognormal (0.05)		Percentile Bootstrap UCL	171.1809
		BCA Bootstrap UCL	178.5191
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	227.3643
		97.5% Chebyshev (Mean, Sd) UCL	266.5655
		99% Chebyshev (Mean, Sd) UCL	343.5688

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_31
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.364134
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.108242
Minimum	0.09	Data not normal at 5% significance level	
Maximum	1.5		
Mean	0.609851	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	0.668899
Standard Deviation	0.28972		
Variance	0.083938	Gamma Distribution Test	
Coefficient of Variation	0.475068	A-D Test Statistic	6.197582
Skewness	0.671518	A-D 5% Critical Value	0.754959
		K-S Test Statistic	0.302805
Gamma Statistics		K-S 5% Critical Value	0.109324
k hat	4.056234	Data do not follow gamma distribution	
k star (bias corrected)	3.884562	at 5% significance level	
Theta hat	0.150349		
Theta star	0.156993	95% UCLs (Assuming Gamma Distribution)	
nu hat	543.5354	Approximate Gamma UCL	0.677422
nu star	520.5313	Adjusted Gamma UCL	0.67898
Approx.Chi Square Value (.05)	468.6096		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	467.5342	Lilliefors Test Statisitic	0.315037
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.407946		
Maximum of log data	0.405465	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.622843	95% H-UCL	0.710468
Standard Deviation of log data	0.552424	95% Chebyshev (MVUE) UCL	0.818265
Variance of log data	0.305172	97.5% Chebyshev (MVUE) UCL	0.902664
		99% Chebyshev (MVUE) UCL	1.068448
		95% Non-parametric UCLs	
		CLT UCL	0.66807
		Adj-CLT UCL (Adjusted for skewness)	0.671173
		Mod-t UCL (Adjusted for skewness)	0.669383
		Jackknife UCL	0.668899
		Standard Bootstrap UCL	0.668223
		Bootstrap-t UCL	0.675303
RECOMMENDATION		Hall's Bootstrap UCL	0.672492
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.66806
		BCA Bootstrap UCL	0.672537
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.764134
		97.5% Chebyshev (Mean, Sd) UCL	0.830892
		99% Chebyshev (Mean, Sd) UCL	0.962026

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_32
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statisitic	0.781129
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.897
Minimum	359	Data not normal at 5% significance level	
Maximum	9560		
Mean	3014.333	95% UCL (Assuming Normal Distribution)	
Median	2210	Student's-t UCL	4096.762
Standard Deviation	2639.881		
Variance	6968971	Gamma Distribution Test	
Coefficient of Variation	0.875776	A-D Test Statistic	0.559697
Skewness	1.613718	A-D 5% Critical Value	0.754962
		K-S Test Statistic	0.174737
Gamma Statistics		K-S 5% Critical Value	0.206906
k hat	1.677937	Data follow gamma distribution	
k star (bias corrected)	1.435318	at 5% significance level	
Theta hat	1796.452		
Theta star	2100.116	95% UCLs (Assuming Gamma Distribution)	
nu hat	60.40573	Approxi	4307.499
nu star	51.67144	Adjusted Gamma UCL	4461.056
Approx.Chi Square Value (.05)	36.15902		
Adjusted Level of Significance	0.03574	Lognormal Distribution Test	
Adjusted Chi Square Value	34.91437	Shapiro-Wilk Test Statisitic	0.957186
		Shapiro-Wilk 5% Critical Value	0.897
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.883322		
Maximum of log data	9.165343	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.684467	95% H-UCL	5192.356
Standard Deviation of log data	0.853405	95% Chebyshev (MVUE) UCL	5952.732
Variance of log data	0.7283	97.5% Chebyshev (MVUE) UCL	7209.378
		99% Chebyshev (MVUE) UCL	9677.816
		95% Non-parametric UCLs	
		CLT UCL	4037.804
		Adj-CLT UCL (Adjusted for skewness)	4290.687
		Mod-t UCL (Adjusted for skewness)	4136.206
		Jackknife UCL	4096.762
		Standard Bootstrap UCL	4005.715
		Bootstrap-t UCL	4625.321
RECOMMENDATION		Hall's Bootstrap UCL	4394.242
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	4108.278
		BCA Bootstrap UCL	4254.889
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5726.553
		97.5% Chebyshev (Mean, Sd) UCL	6900.133
		99% Chebyshev (Mean, Sd) UCL	9205.403

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_33
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.328753
Number of Unique Samples	23	Lilliefors 5% Critical Value	0.108242
Minimum	0.03	Data not normal at 5% significance level	
Maximum	5.8		
Mean	0.763731	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	0.952062
Standard Deviation	0.924041		
Variance	0.853851	Gamma Distribution Test	
Coefficient of Variation	1.209903	A-D Test Statistic	5.081323
Skewness	3.806328	A-D 5% Critical Value	0.769336
		K-S Test Statistic	0.294293
Gamma Statistics		K-S 5% Critical Value	0.110992
k hat	1.479878	Data do not follow gamma distribution	
k star (bias corrected)	1.423565	at 5% significance level	
Theta hat	0.516077		
Theta star	0.536492	95% UCLs (Assuming Gamma Distribution)	
nu hat	198.3036	Approximate Gamma UCL	0.911687
nu star	190.7577	Adjusted Gamma UCL	0.915238
Approx.Chi Square Value (.05)	159.8		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	159.1801	Lilliefors Test Statisitic	0.253006
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.506558		
Maximum of log data	1.757858	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.643989	95% H-UCL	0.938709
Standard Deviation of log data	0.848025	95% Chebyshev (MVUE) UCL	1.131932
Variance of log data	0.719147	97.5% Chebyshev (MVUE) UCL	1.298464
		99% Chebyshev (MVUE) UCL	1.625583
		95% Non-parametric UCLs	
		CLT UCL	0.949418
		Adj-CLT UCL (Adjusted for skewness)	1.00551
		Mod-t UCL (Adjusted for skewness)	0.960811
		Jackknife UCL	0.952062
		Standard Bootstrap UCL	0.94419
		Bootstrap-t UCL	1.114861
RECOMMENDATION		Hall's Bootstrap UCL	1.198601
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.960448
		BCA Bootstrap UCL	1.027612
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1.255805
		97.5% Chebyshev (Mean, Sd) UCL	1.468726
		99% Chebyshev (Mean, Sd) UCL	1.886968

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_34
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.22056
Number of Unique Samples	66	Lilliefors 5% Critical Value	0.107443
Minimum	17300	Data not normal at 5% significance level	
Maximum	569000		
Mean	206292.7	95% UCL (Assuming Normal Distribution)	
Median	118500.5	Student's-t UCL	238909.7
Standard Deviation	161259.2		
Variance	2.6E+10	Gamma Distribution Test	
Coefficient of Variation	0.781701	A-D Test Statistic	1.542744
Skewness	0.788862	A-D 5% Critical Value	0.767447
		K-S Test Statistic	0.158881
Gamma Statistics		K-S 5% Critical Value	0.109939
k hat	1.628388	Data do not follow gamma distribution	
k star (bias corrected)	1.566351	at 5% significance level	
Theta hat	126685.2		
Theta star	131702.7	95% UCLs (Assuming Gamma Distribution)	
nu hat	221.4607	Approximate Gamma UCL	243814.7
nu star	213.0237	Adjusted Gamma UCL	244696.6
Approx.Chi Square Value (.05)	180.2403		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	179.5907	Lilliefors Test Statisitic	0.116917
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	9.758462		
Maximum of log data	13.25164	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.8996	95% H-UCL	269138.4
Standard Deviation of log data	0.868265	95% Chebyshev (MVUE) UCL	325136.7
Variance of log data	0.753883	97.5% Chebyshev (MVUE) UCL	373660.4
		99% Chebyshev (MVUE) UCL	468975.9
		95% Non-parametric UCLs	
		CLT UCL	238458.7
		Adj-CLT UCL (Adjusted for skewness)	240457.6
		Mod-t UCL (Adjusted for skewness)	239221.5
		Jackknife UCL	238909.7
		Standard Bootstrap UCL	238803.9
		Bootstrap-t UCL	241813.4
RECOMMENDATION		Hall's Bootstrap UCL	239382.7
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	238166.1
		BCA Bootstrap UCL	238535.4
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	291533.3
		97.5% Chebyshev (Mean, Sd) UCL	328417
		99% Chebyshev (Mean, Sd) UCL	400867.9

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_35
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.334677
Number of Unique Samples	46	Lilliefors 5% Critical Value	0.107443
Minimum	1	Data not normal at 5% significance level	
Maximum	187		
Mean	13.50956	95% UCL (Assuming Normal Distribution)	
Median	4	Student's-t UCL	19.4347
Standard Deviation	29.29401		
Variance	858.1392	Gamma Distribution Test	
Coefficient of Variation	2.168392	A-D Test Statistic	4.276173
Skewness	4.474448	A-D 5% Critical Value	0.804687
		K-S Test Statistic	0.209095
Gamma Statistics		K-S 5% Critical Value	0.113365
k hat	0.623431	Data do not follow gamma distribution	
k star (bias corrected)	0.605731	at 5% significance level	
Theta hat	21.66969		
Theta star	22.30292	95% UCLs (Assuming Gamma Distribution)	
nu hat	84.78661	Approximate Gamma UCL	17.81822
nu star	82.37936	Adjusted Gamma UCL	17.92578
Approx.Chi Square Value (.05)	62.45905		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	62.08426	Lilliefors Test Statisitic	0.116646
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0		
Maximum of log data	5.231109	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.617858	95% H-UCL	16.62292
Standard Deviation of log data	1.26581	95% Chebyshev (MVUE) UCL	20.40863
Variance of log data	1.602275	97.5% Chebyshev (MVUE) UCL	24.47716
		99% Chebyshev (MVUE) UCL	32.46898
		95% Non-parametric UCLs	
		CLT UCL	19.35277
		Adj-CLT UCL (Adjusted for skewness)	21.4124
		Mod-t UCL (Adjusted for skewness)	19.75596
		Jackknife UCL	19.4347
		Standard Bootstrap UCL	19.39233
		Bootstrap-t UCL	24.98613
RECOMMENDATION		Hall's Bootstrap UCL	45.21191
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	19.90588
		BCA Bootstrap UCL	22.26471
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	28.9942
		97.5% Chebyshev (Mean, Sd) UCL	35.69442
		99% Chebyshev (Mean, Sd) UCL	48.8557

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_36
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.236847
Number of Unique Samples	52	Lilliefors 5% Critical Value	0.107443
Minimum	0.35	Data not normal at 5% significance level	
Maximum	40.8		
Mean	7.105294	95% UCL (Assuming Normal Distribution)	
Median	4.35	Student's-t UCL	8.798224
Standard Deviation	8.369881		
Variance	70.0549	Gamma Distribution Test	
Coefficient of Variation	1.177978	A-D Test Statistic	0.834576
Skewness	2.127884	A-D 5% Critical Value	0.783713
		K-S Test Statistic	0.100789
Gamma Statistics		K-S 5% Critical Value	0.111541
k hat	0.928682	Data follow approximate gamma distibution	
k star (bias corrected)	0.897514	at 5% significance level	
Theta hat	7.650946		
Theta star	7.916635	95% UCLs (Assuming Gamma Distribution)	
nu hat	126.3007	Approxi	8.891286
nu star	122.062	Adjusted Gamma UCL	8.934605
Approx.Chi Square Value (.05)	97.5434		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	97.07046	Lilliefors Test Statisitic	0.07599
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.049822		
Maximum of log data	3.708682	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.333764	95% H-UCL	11.15173
Standard Deviation of log data	1.198097	95% Chebyshev (MVUE) UCL	13.7125
Variance of log data	1.435437	97.5% Chebyshev (MVUE) UCL	16.33852
		99% Chebyshev (MVUE) UCL	21.49684
		95% Non-parametric UCLs	
		CLT UCL	8.774816
		Adj-CLT UCL (Adjusted for skewness)	9.054674
		Mod-t UCL (Adjusted for skewness)	8.841876
		Jackknife UCL	8.798224
		Standard Bootstrap UCL	8.785544
		Bootstrap-t UCL	9.190816
RECOMMENDATION		Hall's Bootstrap UCL	9.189288
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	8.734853
		BCA Bootstrap UCL	9.091765
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	11.52956
		97.5% Chebyshev (Mean, Sd) UCL	13.44395
		99% Chebyshev (Mean, Sd) UCL	17.20439

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_37
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.409471
Number of Unique Samples	60	Lilliefors 5% Critical Value	0.107443
Minimum	0.8	Data not normal at 5% significance level	
Maximum	1650		
Mean	46.975	95% UCL (Assuming Normal Distribution)	
Median	9.2	Student's-t UCL	87.77595
Standard Deviation	201.7208		
Variance	40691.28	Gamma Distribution Test	
Coefficient of Variation	4.294216	A-D Test Statistic	6.035449
Skewness	7.740594	A-D 5% Critical Value	0.834951
		K-S Test Statistic	0.252518
Gamma Statistics		K-S 5% Critical Value	0.1155
k hat	0.42447	Data do not follow gamma distribution	
k star (bias corrected)	0.415547	at 5% significance level	
Theta hat	110.6674		
Theta star	113.0437	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.72793	Approximate Gamma UCL	65.98537
nu star	56.51444	Adjusted Gamma UCL	66.47657
Approx.Chi Square Value (.05)	40.23264		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	39.93536	Lilliefors Test Statisitic	0.103834
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.223144		
Maximum of log data	7.408531	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.314065	95% H-l	46.58192
Standard Deviation of log data	1.445117	95% Chebyshev (MVUE) UCL	56.39676
Variance of log data	2.088362	97.5% Chebyshev (MVUE) UCL	68.73353
		99% Chebyshev (MVUE) UCL	92.96672
		95% Non-parametric UCLs	
		CLT UCL	87.2118
		Adj-CLT UCL (Adjusted for skewness)	111.7474
		Mod-t UCL (Adjusted for skewness)	91.60301
		Jackknife UCL	87.77595
		Standard Bootstrap UCL	87.81993
		Bootstrap-t UCL	283.4485
RECOMMENDATION		Hall's Bootstrap UCL	238.0545
Data are lognormal (0.05)		Percentile Bootstrap UCL	90.73529
		BCA Bootstrap UCL	140.1588
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	153.6034
		97.5% Chebyshev (Mean, Sd) UCL	199.7416
		99% Chebyshev (Mean, Sd) UCL	290.3712

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_38
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.279361
Number of Unique Samples	66	Lilliefors 5% Critical Value	0.107443
Minimum	50	Data not normal at 5% significance level	
Maximum	105000		
Mean	12723.75	95% UCL (Assuming Normal Distribution)	
Median	2680	Student's-t UCL	17107.65
Standard Deviation	21674.11		
Variance	4.7E+08	Gamma Distribution Test	
Coefficient of Variation	1.703437	A-D Test Statistic	1.336849
Skewness	2.468188	A-D 5% Critical Value	0.836638
		K-S Test Statistic	0.129297
Gamma Statistics		K-S 5% Critical Value	0.115607
k hat	0.417532	Data do not follow gamma distribution	
k star (bias corrected)	0.408915	at 5% significance level	
Theta hat	30473.73		
Theta star	31115.87	95% UCLs (Assuming Gamma Distribution)	
nu hat	56.78432	Approximate Gamma UCL	17926.9
nu star	55.61246	Adjusted Gamma UCL	18061.56
Approx.Chi Square Value (.05)	39.47136		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	39.17708	Lilliefors Test Statisitic	0.07115
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.912023		
Maximum of log data	11.56172	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.886034	95% H-UCL	52690.9
Standard Deviation of log data	2.054475	95% Ch	53503.76
Variance of log data	4.220868	97.5% Chebyshev (MVUE) UCL	67968.73
		99% Chebyshev (MVUE) UCL	96382.36
		95% Non-parametric UCLs	
		CLT UCL	17047.04
		Adj-CLT UCL (Adjusted for skewness)	17887.64
		Mod-t UCL (Adjusted for skewness)	17238.77
		Jackknife UCL	17107.65
		Standard Bootstrap UCL	17075.58
		Bootstrap-t UCL	18498.57
RECOMMENDATION		Hall's Bootstrap UCL	17500.26
Data are lognormal (0.05)		Percentile Bootstrap UCL	17154.28
		BCA Bootstrap UCL	17973.97
Use 95% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	24180.56
		97.5% Chebyshev (Mean, Sd) UCL	29137.93
		99% Chebyshev (Mean, Sd) UCL	38875.72

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_39
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.437259
Number of Unique Samples	54	Lilliefors 5% Critical Value	0.107443
Minimum	0.18	Data not normal at 5% significance level	
Maximum	1050		
Mean	32.17147	95% UCL (Assuming Normal Distribution)	
Median	3.1	Student's-t UCL	59.28311
Standard Deviation	134.0405		
Variance	17966.86	Gamma Distribution Test	
Coefficient of Variation	4.166441	A-D Test Statistic	6.815898
Skewness	6.911317	A-D 5% Critical Value	0.861412
		K-S Test Statistic	0.252876
Gamma Statistics		K-S 5% Critical Value	0.117177
k hat	0.315629	Data do not follow gamma distribution	
k star (bias corrected)	0.311508	at 5% significance level	
Theta hat	101.9281		
Theta star	103.2765	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.92557	Approximate Gamma UCL	47.92196
nu star	42.36512	Adjusted Gamma UCL	48.34208
Approx.Chi Square Value (.05)	28.441		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	28.19383	Lilliefors Test Statisitic	0.073036
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.714798		
Maximum of log data	6.956545	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.304384	95% H-I	39.98834
Standard Deviation of log data	1.827485	95% Chebyshev (MVUE) UCL	44.46261
Variance of log data	3.3397	97.5% Chebyshev (MVUE) UCL	55.73728
		99% Chebyshev (MVUE) UCL	77.88419
		95% Non-parametric UCLs	
		CLT UCL	58.90824
		Adj-CLT UCL (Adjusted for skewness)	73.46512
		Mod-t UCL (Adjusted for skewness)	61.55369
		Jackknife UCL	59.28311
		Standard Bootstrap UCL	60.21172
		Bootstrap-t UCL	141.8911
RECOMMENDATION		Hall's Bootstrap UCL	149.8458
Data are lognormal (0.05)		Percentile Bootstrap UCL	62.79265
		BCA Bootstrap UCL	79.94838
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	103.0245
		97.5% Chebyshev (Mean, Sd) UCL	133.6827
		99% Chebyshev (Mean, Sd) UCL	193.9047

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_40
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.420972
Number of Unique Samples	66	Lilliefors 5% Critical Value	0.107443
Minimum	5310	Data not normal at 5% significance level	
Maximum	2200000		
Mean	191436.8	95% UCL (Assuming Normal Distribution)	
Median	75300	Student's-t UCL	273705.9
Standard Deviation	406740.4		
Variance	1.65E+11	Gamma Distribution Test	
Coefficient of Variation	2.124672	A-D Test Statistic	7.87283
Skewness	3.707314	A-D 5% Critical Value	0.796991
		K-S Test Statistic	0.313189
Gamma Statistics		K-S 5% Critical Value	0.112738
k hat	0.703253	Data do not follow gamma distribution	
k star (bias corrected)	0.682031	at 5% significance level	
Theta hat	272216.3		
Theta star	280686.5	95% UCLs (Assuming Gamma Distribution)	
nu hat	95.64235	Approximate Gamma UCL	248203.3
nu star	92.75617	Adjusted Gamma UCL	249607.2
Approx.Chi Square Value (.05)	71.54193		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	71.13954	Lilliefors Test Statisitic	0.197997
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	8.577347		
Maximum of log data	14.60397	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.30351	95% H-UCL	209642.3
Standard Deviation of log data	1.118073	95% Chebyshev (MVUE) UCL	257618.7
Variance of log data	1.250088	97.5% Chebyshev (MVUE) UCL	304470.3
		99% Chebyshev (MVUE) UCL	396501.2
		95% Non-parametric UCLs	
		CLT UCL	272568.4
		Adj-CLT UCL (Adjusted for skewness)	296262.9
		Mod-t UCL (Adjusted for skewness)	277401.8
		Jackknife UCL	273705.9
		Standard Bootstrap UCL	271545.3
		Bootstrap-t UCL	329007.4
RECOMMENDATION		Hall's Bootstrap UCL	276250.3
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	277866.4
		BCA Bootstrap UCL	302872.1
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	406437.4
		97.5% Chebyshev (Mean, Sd) UCL	499468.3
		99% Chebyshev (Mean, Sd) UCL	682209.6

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_41
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.183388
Number of Unique Samples	68	Lilliefors 5% Critical Value	0.107443
Minimum	19.5	Data not normal at 5% significance level	
Maximum	14900		
Mean	3391.606	95% UCL (Assuming Normal Distribution)	
Median	2005	Student's-t UCL	4130.066
Standard Deviation	3650.961		
Variance	13329519	Gamma Distribution Test	
Coefficient of Variation	1.07647	A-D Test Statistic	0.319758
Skewness	1.399416	A-D 5% Critical Value	0.79061
		K-S Test Statistic	0.055263
Gamma Statistics		K-S 5% Critical Value	0.112193
k hat	0.788184	Data follow gamma distribution	
k star (bias corrected)	0.763215	at 5% significance level	
Theta hat	4303.063		
Theta star	4443.84	95% UCLs (Assuming Gamma Distribution)	
nu hat	107.193	Approxi	4330.988
nu star	103.7973	Adjusted Gamma UCL	4354.028
Approx.Chi Square Value (.05)	81.28385		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	80.85373	Lilliefors Test Statisitic	0.099211
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.970414		
Maximum of log data	9.609116	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.37459	95% H-UCL	7617.257
Standard Deviation of log data	1.463359	95% Chebyshev (MVUE) UCL	9200.996
Variance of log data	2.14142	97.5% Chebyshev (MVUE) UCL	11230.84
		99% Chebyshev (MVUE) UCL	15218.06
		95% Non-parametric UCLs	
		CLT UCL	4119.855
		Adj-CLT UCL (Adjusted for skewness)	4200.138
		Mod-t UCL (Adjusted for skewness)	4142.588
		Jackknife UCL	4130.066
		Standard Bootstrap UCL	4139.031
		Bootstrap-t UCL	4190.26
RECOMMENDATION		Hall's Bootstrap UCL	4206.988
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	4144.724
		BCA Bootstrap UCL	4147.103
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5321.483
		97.5% Chebyshev (Mean, Sd) UCL	6156.542
		99% Chebyshev (Mean, Sd) UCL	7796.854

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_42
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.463079
Number of Unique Samples	16	Lilliefors 5% Critical Value	0.108242
Minimum	0.015	Data not normal at 5% significance level	
Maximum	0.83		
Mean	0.101851	95% UCL (Assuming Normal Distribution)	
Median	0.1	Student's-t UCL	0.121006
Standard Deviation	0.093985		
Variance	0.008833	Gamma Distribution Test	
Coefficient of Variation	0.922769	A-D Test Statistic	11.14214
Skewness	7.221134	A-D 5% Critical Value	0.755848
		K-S Test Statistic	0.399624
Gamma Statistics		K-S 5% Critical Value	0.109434
k hat	3.68378	Data do not follow gamma distribution	
k star (bias corrected)	3.528785	at 5% significance level	
Theta hat	0.027648		
Theta star	0.028863	95% UCLs (Assuming Gamma Distribution)	
nu hat	493.6265	Approximate Gamma UCL	0.113741
nu star	472.8572	Adjusted Gamma UCL	0.114016
Approx.Chi Square Value (.05)	423.4259		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	422.4047	Lilliefors Test Statisitic	0.361763
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-4.199705		
Maximum of log data	-0.18633	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.426074	95% H-UCL	0.110963
Standard Deviation of log data	0.484614	95% Chebyshev (MVUE) UCL	0.126077
Variance of log data	0.234851	97.5% Chebyshev (MVUE) UCL	0.137706
		99% Chebyshev (MVUE) UCL	0.160548
		95% Non-parametric UCLs	
		CLT UCL	0.120737
		Adj-CLT UCL (Adjusted for skewness)	0.131561
		Mod-t U	0.122694
		Jackknife UCL	0.121006
		Standard Bootstrap UCL	0.120523
		Bootstrap-t UCL	0.155078
RECOMMENDATION		Hall's Bootstrap UCL	0.205824
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.123224
		BCA Bootstrap UCL	0.137373
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.1519
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.173556
		99% Chebyshev (Mean, Sd) UCL	0.216096

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_43
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	18	Shapiro-Wilk Test Statisitic	0.6539
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.897
Minimum	0.78	Data not normal at 5% significance level	
Maximum	8.6		
Mean	3.421111	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	4.305216
Standard Deviation	2.1562		
Variance	4.649199	Gamma Distribution Test	
Coefficient of Variation	0.630263	A-D Test Statistic	2.937505
Skewness	1.620708	A-D 5% Critical Value	0.744328
		K-S Test Statistic	0.421707
Gamma Statistics		K-S 5% Critical Value	0.204831
k hat	3.450471	Data do not follow gamma distribution	
k star (bias corrected)	2.91243	at 5% significance level	
Theta hat	0.991491		
Theta star	1.174659	95% UCLs (Assuming Gamma Distribution)	
nu hat	124.217	Approximate Gamma UCL	4.362932
nu star	104.8475	Adjusted Gamma UCL	4.467426
Approx.Chi Square Value (.05)	82.21418		
Adjusted Level of Significance	0.03574	Lognormal Distribution Test	
Adjusted Chi Square Value	80.29117	Shapiro-Wilk Test Statisitic	0.723886
		Shapiro-Wilk 5% Critical Value	0.897
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.248461		
Maximum of log data	2.151762	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.078115	95% H-UCL	4.53335
Standard Deviation of log data	0.553963	95% Chebyshev (MVUE) UCL	5.405375
Variance of log data	0.306875	97.5% Chebyshev (MVUE) UCL	6.275796
		99% Chebyshev (MVUE) UCL	7.985569
		95% Non-parametric UCLs	
		CLT UCL	4.257061
		Adj-CLT UCL (Adjusted for skewness)	4.464505
		Mod-t UCL (Adjusted for skewness)	4.337573
		Jackknife UCL	4.305216
		Standard Bootstrap UCL	4.239365
		Bootstrap-t UCL	4.968415
RECOMMENDATION		Hall's Bootstrap UCL	4.232655
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.304444
		BCA Bootstrap UCL	4.427778
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.636396
		97.5% Chebyshev (Mean, Sd) UCL	6.594952
		99% Chebyshev (Mean, Sd) UCL	8.477848

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_44
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.295248
Number of Unique Samples	62	Lilliefors 5% Critical Value	0.107443
Minimum	3.1	Data not normal at 5% significance level	
Maximum	376		
Mean	42.50294	95% UCL (Assuming Normal Distribution)	
Median	20.3	Student's-t UCL	55.32294
Standard Deviation	63.38236		
Variance	4017.323	Gamma Distribution Test	
Coefficient of Variation	1.491246	A-D Test Statistic	2.547111
Skewness	3.337967	A-D 5% Critical Value	0.783003
		K-S Test Statistic	0.155048
Gamma Statistics		K-S 5% Critical Value	0.111474
k hat	0.943143	Data do not follow gamma distribution	
k star (bias corrected)	0.911338	at 5% significance level	
Theta hat	45.06519		
Theta star	46.63795	95% UCLs (Assuming Gamma Distribution)	
nu hat	128.2675	Approximate Gamma UCL	53.08999
nu star	123.942	Adjusted Gamma UCL	53.34652
Approx.Chi Square Value (.05)	99.22584		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	98.74869	Lilliefors Test Statisitic	0.078416
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.131402		
Maximum of log data	5.929589	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.133273	95% H-I	54.5917
Standard Deviation of log data	1.063189	95% Chebyshev (MVUE) UCL	66.9588
Variance of log data	1.13037	97.5% Chebyshev (MVUE) UCL	78.67809
		99% Chebyshev (MVUE) UCL	101.6984
		95% Non-parametric UCLs	
		CLT UCL	55.14568
		Adj-CLT UCL (Adjusted for skewness)	58.47015
		Mod-t UCL (Adjusted for skewness)	55.84149
		Jackknife UCL	55.32294
		Standard Bootstrap UCL	55.04068
		Bootstrap-t UCL	62.53692
RECOMMENDATION		Hall's Bootstrap UCL	61.21884
Data are lognormal (0.05)		Percentile Bootstrap UCL	55.95294
		BCA Bootstrap UCL	59.60294
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	76.00648
		97.5% Chebyshev (Mean, Sd) UCL	90.50349
		99% Chebyshev (Mean, Sd) UCL	118.9801

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_45
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.399983
Number of Unique Samples	65	Lilliefors 5% Critical Value	0.107443
Minimum	2500	Data not normal at 5% significance level	
Maximum	629000		
Mean	75137.07	95% UCL (Assuming Normal Distribution)	
Median	34500	Student's-t UCL	102150.7
Standard Deviation	133555.8		
Variance	1.78E+10	Gamma Distribution Test	
Coefficient of Variation	1.777495	A-D Test Statistic	5.047969
Skewness	2.913261	A-D 5% Critical Value	0.796523
		K-S Test Statistic	0.258516
Gamma Statistics		K-S 5% Critical Value	0.112699
k hat	0.708106	Data do not follow gamma distribution	
k star (bias corrected)	0.68667	at 5% significance level	
Theta hat	106109.9		
Theta star	109422.4	95% UCLs (Assuming Gamma Distribution)	
nu hat	96.30242	Approximate Gamma UCL	97325.45
nu star	93.38711	Adjusted Gamma UCL	97873.92
Approx.Chi Square Value (.05)	72.09661		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	71.69259	Lilliefors Test Statisitic	0.149405
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	7.824046		
Maximum of log data	13.35189	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	10.37497	95% H-UCL	95332.78
Standard Deviation of log data	1.205525	95% Chebyshev (MVUE) UCL	117215.3
Variance of log data	1.45329	97.5% Chebyshev (MVUE) UCL	139765.3
		99% Chebyshev (MVUE) UCL	184060.3
		95% Non-parametric UCLs	
		CLT UCL	101777.2
		Adj-CLT UCL (Adjusted for skewness)	107891
		Mod-t UCL (Adjusted for skewness)	103104.3
		Jackknife UCL	102150.7
		Standard Bootstrap UCL	101572.5
		Bootstrap-t UCL	111735.9
RECOMMENDATION		Hall's Bootstrap UCL	104907.6
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	103264
		BCA Bootstrap UCL	109530.9
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	145733.9
		97.5% Chebyshev (Mean, Sd) UCL	176281.2
		99% Chebyshev (Mean, Sd) UCL	236285.4

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_46
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.394015
Number of Unique Samples	26	Lilliefors 5% Critical Value	0.107443
Minimum	0.59	Data not normal at 5% significance level	
Maximum	174		
Mean	7.434118	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	11.82114
Standard Deviation	21.68954		
Variance	470.4359	Gamma Distribution Test	
Coefficient of Variation	2.917567	A-D Test Statistic	8.99179
Skewness	7.142612	A-D 5% Critical Value	0.787094
		K-S Test Statistic	0.282987
Gamma Statistics		K-S 5% Critical Value	0.111861
k hat	0.859803	Data do not follow gamma distribution	
k star (bias corrected)	0.831674	at 5% significance level	
Theta hat	8.646305		
Theta star	8.938737	95% UCLs (Assuming Gamma Distribution)	
nu hat	116.9332	Approximate Gamma UCL	9.389603
nu star	113.1077	Adjusted Gamma UCL	9.437276
Approx.Chi Square Value (.05)	89.55181		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	89.09943	Lilliefors Test Statisitic	0.214186
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.527633		
Maximum of log data	5.159055	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.322228	95% H-UCL	6.735561
Standard Deviation of log data	0.853264	95% Chebyshev (MVUE) UCL	8.123271
Variance of log data	0.728059	97.5% Chebyshev (MVUE) UCL	9.318709
		99% Chebyshev (MVUE) UCL	11.66692
		95% Non-parametric UCLs	
		CLT UCL	11.76048
		Adj-CLT UCL (Adjusted for skewness)	14.19481
		Mod-t UCL (Adjusted for skewness)	12.20085
		Jackknife UCL	11.82114
		Standard Bootstrap UCL	11.6955
		Bootstrap-t UCL	34.43884
RECOMMENDATION		Hall's Bootstrap UCL	28.95923
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	12.31309
		BCA Bootstrap UCL	16.00882
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	18.89908
		97.5% Chebyshev (Mean, Sd) UCL	23.85998
		99% Chebyshev (Mean, Sd) UCL	33.6047

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_47
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	17	Shapiro-Wilk Test Statisitic	0.764398
Number of Unique Samples	17	Shapiro-Wilk 5% Critical Value	0.892
Minimum	8280	Data not normal at 5% significance level	
Maximum	63700		
Mean	21550.59	95% UCL (Assuming Normal Distribution)	
Median	17700	Student's-t UCL	27073.31
Standard Deviation	13042.54		
Variance	1.7E+08	Gamma Distribution Test	
Coefficient of Variation	0.605206	A-D Test Statistic	0.54013
Skewness	2.324622	A-D 5% Critical Value	0.742664
		K-S Test Statistic	0.160817
Gamma Statistics		K-S 5% Critical Value	0.210004
k hat	4.116212	Data follow gamma distribution	
k star (bias corrected)	3.429037	at 5% significance level	
Theta hat	5235.539		
Theta star	6284.734	95% UCLs (Assuming Gamma Distribution)	
nu hat	139.9512	Approxi	27117.6
nu star	116.5873	Adjusted Gamma UCL	27787.87
Approx.Chi Square Value (.05)	92.65289		
Adjusted Level of Significance	0.03461	Lognormal Distribution Test	
Adjusted Chi Square Value	90.41802	Shapiro-Wilk Test Statisitic	0.956065
		Shapiro-Wilk 5% Critical Value	0.892
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.021598		
Maximum of log data	11.06194	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.851797	95% H-UCL	27561.22
Standard Deviation of log data	0.493069	95% Chebyshev (MVUE) UCL	32728.75
Variance of log data	0.243117	97.5% Chebyshev (MVUE) UCL	37682.95
		99% Chebyshev (MVUE) UCL	47414.5
		95% Non-parametric UCLs	
		CLT UCL	26753.72
		Adj-CLT UCL (Adjusted for skewness)	28659.39
		Mod-t UCL (Adjusted for skewness)	27370.55
		Jackknife UCL	27073.31
		Standard Bootstrap UCL	26609.13
		Bootstrap-t UCL	31388.23
RECOMMENDATION		Hall's Bootstrap UCL	51571.59
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	27097.65
		BCA Bootstrap UCL	28680
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	35339.01
		97.5% Chebyshev (Mean, Sd) UCL	41305.28
		99% Chebyshev (Mean, Sd) UCL	53024.84

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_48
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.442543
Number of Unique Samples	4	Lilliefors 5% Critical Value	0.107443
Minimum	0.12	Data not normal at 5% significance level	
Maximum	1		
Mean	0.615735	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	0.662268
Standard Deviation	0.230057		
Variance	0.052926	Gamma Distribution Test	
Coefficient of Variation	0.37363	A-D Test Statistic	12.52527
Skewness	0.90663	A-D 5% Critical Value	0.752253
		K-S Test Statistic	0.41899
Gamma Statistics		K-S 5% Critical Value	0.108172
k hat	7.72688	Data do not follow gamma distribution	
k star (bias corrected)	7.395793	at 5% significance level	
Theta hat	0.079687		
Theta star	0.083255	95% UCLs (Assuming Gamma Distribution)	
nu hat	1050.856	Approximate Gamma UCL	0.663661
nu star	1005.828	Adjusted Gamma UCL	0.664731
Approx.Chi Square Value (.05)	933.1928		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	931.6902	Lilliefors Test Statisitic	0.398468
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.120264		
Maximum of log data	0	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.551041	95% H-UCL	0.670059
Standard Deviation of log data	0.372799	95% Chebyshev (MVUE) UCL	0.742416
Variance of log data	0.138979	97.5% Chebyshev (MVUE) UCL	0.796618
		99% Chebyshev (MVUE) UCL	0.903088
		95% Non-parametric UCLs	
		CLT UCL	0.661624
		Adj-CLT UCL (Adjusted for skewness)	0.664902
		Mod-t U	0.662779
		Jackknife UCL	0.662268
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.737342
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.789962
		99% Chebyshev (Mean, Sd) UCL	0.893322

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_49
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.357696
Number of Unique Samples	67	Lilliefors 5% Critical Value	0.107443
Minimum	57800	Data not normal at 5% significance level	
Maximum	11900000		
Mean	1334460	95% UCL (Assuming Normal Distribution)	
Median	338500	Student's-t UCL	1875867
Standard Deviation	2676725		
Variance	7.16E+12	Gamma Distribution Test	
Coefficient of Variation	2.005849	A-D Test Statistic	4.926411
Skewness	3.091994	A-D 5% Critical Value	0.809166
		K-S Test Statistic	0.217618
Gamma Statistics		K-S 5% Critical Value	0.113731
k hat	0.576979	Data do not follow gamma distribution	
k star (bias corrected)	0.561328	at 5% significance level	
Theta hat	2312839		
Theta star	2377326	95% UCLs (Assuming Gamma Distribution)	
nu hat	78.46919	Approximate Gamma UCL	1780654
nu star	76.34065	Adjusted Gamma UCL	1791864
Approx.Chi Square Value (.05)	57.21131		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	56.85338	Lilliefors Test Statisitic	0.145147
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	10.96474		
Maximum of log data	16.29205	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	13.02692	95% H-UCL	1720906
Standard Deviation of log data	1.342962	95% Chebyshev (MVUE) UCL	2104076
Variance of log data	1.803548	97.5% Chebyshev (MVUE) UCL	2541608
		99% Chebyshev (MVUE) UCL	3401054
		95% Non-parametric UCLs	
		CLT UCL	1868381
		Adj-CLT UCL (Adjusted for skewness)	1998432
		Mod-t UCL (Adjusted for skewness)	1896152
		Jackknife UCL	1875867
		Standard Bootstrap UCL	1859480
		Bootstrap-t UCL	2169478
RECOMMENDATION		Hall's Bootstrap UCL	1896088
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1920999
		BCA Bootstrap UCL	1999331
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2749362
		97.5% Chebyshev (Mean, Sd) UCL	3361590
		99% Chebyshev (Mean, Sd) UCL	4564196

Data File	C:\lhilsche\AMCO\EPCs15\all._1EPCs15.txt	Variable:	_50
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.445728
Number of Unique Samples	3	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	1		
Mean	0.620149	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	0.666985
Standard Deviation	0.229799		
Variance	0.052808	Gamma Distribution Test	
Coefficient of Variation	0.370554	A-D Test Statistic	12.36769
Skewness	0.85121	A-D 5% Critical Value	0.752734
		K-S Test Statistic	0.408392
Gamma Statistics		K-S 5% Critical Value	0.109057
k hat	6.933287	Data do not follow gamma distribution	
k star (bias corrected)	6.632792	at 5% significance level	
Theta hat	0.089445		
Theta star	0.093497	95% UCLs (Assuming Gamma Distribution)	
nu hat	929.0605	Approximate Gamma UCL	0.671697
nu star	888.7941	Adjusted Gamma UCL	0.672869
Approx.Chi Square Value (.05)	820.5859		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	819.1564	Lilliefors Test Statisitic	0.375609
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	0	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.551641	95% H-UCL	0.69482
Standard Deviation of log data	0.428669	95% Chebyshev (MVUE) UCL	0.780074
Variance of log data	0.183757	97.5% Chebyshev (MVUE) UCL	0.844798
		99% Chebyshev (MVUE) UCL	0.971935
		95% Non-parametric UCLs	
		CLT UCL	0.666328
		Adj-CLT UCL (Adjusted for skewness)	0.669447
		Mod-t U	0.667472
		Jackknife UCL	0.666985
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.742523
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.795474
		99% Chebyshev (Mean, Sd) UCL	0.899486

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_51
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.319146
Number of Unique Samples	50	Lilliefors 5% Critical Value	0.107443
Minimum	0.5	Data not normal at 5% significance level	
Maximum	186		
Mean	12.54265	95% UCL (Assuming Normal Distribution)	
Median	4.1	Student's-t UCL	17.72423
Standard Deviation	25.61785		
Variance	656.2744	Gamma Distribution Test	
Coefficient of Variation	2.04246	A-D Test Statistic	3.318705
Skewness	5.138687	A-D 5% Critical Value	0.797535
		K-S Test Statistic	0.214264
Gamma Statistics		K-S 5% Critical Value	0.112782
k hat	0.697617	Data do not follow gamma distribution	
k star (bias corrected)	0.676644	at 5% significance level	
Theta hat	17.97927		
Theta star	18.53656	95% UCLs (Assuming Gamma Distribution)	
nu hat	94.87591	Approximate Gamma UCL	16.27995
nu star	92.02354	Adjusted Gamma UCL	16.37243
Approx.Chi Square Value (.05)	70.89819		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	70.4977	Lilliefors Test Statisitic	0.146799
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	5.225747	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.662424	95% H-UCL	16.26788
Standard Deviation of log data	1.227326	95% Chebyshev (MVUE) UCL	19.99491
Variance of log data	1.506329	97.5% Chebyshev (MVUE) UCL	23.89248
		99% Chebyshev (MVUE) UCL	31.54851
		95% Non-parametric UCLs	
		CLT UCL	17.65258
		Adj-CLT UCL (Adjusted for skewness)	19.72114
		Mod-t UCL (Adjusted for skewness)	18.04688
		Jackknife UCL	17.72423
		Standard Bootstrap UCL	17.59632
		Bootstrap-t UCL	22.95026
RECOMMENDATION		Hall's Bootstrap UCL	37.72677
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	18.10588
		BCA Bootstrap UCL	20.55294
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	26.08409
		97.5% Chebyshev (Mean, Sd) UCL	31.94349
		99% Chebyshev (Mean, Sd) UCL	43.45314

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_52
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	65	Lilliefors Test Statisitic	0.45765
Number of Unique Samples	63	Lilliefors 5% Critical Value	0.109895
Minimum	1.3	Data not normal at 5% significance level	
Maximum	6870		
Mean	338.0738	95% UCL (Assuming Normal Distribution)	
Median	20.6	Student's-t UCL	583.522
Standard Deviation	1185.651		
Variance	1405767	Gamma Distribution Test	
Coefficient of Variation	3.507076	A-D Test Statistic	9.730871
Skewness	4.25695	A-D 5% Critical Value	0.873023
		K-S Test Statistic	0.299615
Gamma Statistics		K-S 5% Critical Value	0.120525
k hat	0.281144	Data do not follow gamma distribution	
k star (bias corrected)	0.278425	at 5% significance level	
Theta hat	1202.492		
Theta star	1214.237	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.54876	Approximate Gamma UCL	522.4064
nu star	36.19523	Adjusted Gamma UCL	527.6618
Approx.Chi Square Value (.05)	23.42364		
Adjusted Level of Significance	0.046308	Lognormal Distribution Test	
Adjusted Chi Square Value	23.19035	Lilliefors Test Statisitic	0.109103
		Lilliefors 5% Critical Value	0.109895
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.262364		
Maximum of log data	8.834919	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.344466	95% H-I	302.9673
Standard Deviation of log data	1.81354	95% Chebyshev (MVUE) UCL	334.5101
Variance of log data	3.288927	97.5% Chebyshev (MVUE) UCL	419.6012
		99% Chebyshev (MVUE) UCL	586.7464
		95% Non-parametric UCLs	
		CLT UCL	579.9691
		Adj-CLT UCL (Adjusted for skewness)	662.9393
		Mod-t UCL (Adjusted for skewness)	596.4636
		Jackknife UCL	583.522
		Standard Bootstrap UCL	580.5183
		Bootstrap-t UCL	778.7548
RECOMMENDATION		Hall's Bootstrap UCL	582.4851
Data are lognormal (0.05)		Percentile Bootstrap UCL	597.1108
		BCA Bootstrap UCL	669.6123
Use H-UCL		95% Chebyshev (Mean, Sd) UCL	979.1016
		97.5% Chebyshev (Mean, Sd) UCL	1256.475
		99% Chebyshev (Mean, Sd) UCL	1801.321

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_78
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.371823
Number of Unique Samples	25	Lilliefors 5% Critical Value	0.114382
Minimum	0.007	Data not normal at 5% significance level	
Maximum	17		
Mean	1.019487	95% UCL (Assuming Normal Distribution)	
Median	0.0215	Student's-t UCL	1.687412
Standard Deviation	3.096014		
Variance	9.585304	Gamma Distribution Test	
Coefficient of Variation	3.036836	A-D Test Statistic	7.792364
Skewness	4.234315	A-D 5% Critical Value	0.886665
		K-S Test Statistic	0.3336
Gamma Statistics		K-S 5% Critical Value	0.125809
k hat	0.24985	Data do not follow gamma distribution	
k star (bias corrected)	0.248469	at 5% significance level	
Theta hat	4.080388		
Theta star	4.103074	95% UCLs (Assuming Gamma Distribution)	
nu hat	29.98205	Approximate Gamma UCL	1.656849
nu star	29.81628	Adjusted Gamma UCL	1.677142
Approx.Chi Square Value (.05)	18.34645		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	18.12446	Lilliefors Test Statisitic	0.237642
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-4.961845		
Maximum of log data	2.833213	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.823835	95% H-UCL	2.433165
Standard Deviation of log data	2.272081	95% Chebyshev (MVUE) UCL	2.04635
Variance of log data	5.162354	97.5% Chebyshev (MVUE) UCL	2.636305
		99% Chebyshev (MVUE) UCL	3.795158
		95% Non-parametric UCLs	
		CLT UCL	1.676924
		Adj-CLT UCL (Adjusted for skewness)	1.910386
		Mod-t UCL (Adjusted for skewness)	1.723827
		Jackknife UCL	1.687412
		Standard Bootstrap UCL	1.667206
		Bootstrap-t UCL	2.631679
RECOMMENDATION		Hall's Bootstrap UCL	2.379143
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.733437
		BCA Bootstrap UCL	2.014333
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.761711
		97.5% Chebyshev (Mean, Sd) UCL	3.515573
		99% Chebyshev (Mean, Sd) UCL	4.996389

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_79
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.40605
Number of Unique Samples	24	Lilliefors 5% Critical Value	0.114382
Minimum	0.00022	Data not normal at 5% significance level	
Maximum	5		
Mean	0.200598	95% UCL (Assuming Normal Distribution)	
Median	0.012	Student's-t UCL	0.354628
Standard Deviation	0.713972		
Variance	0.509755	Gamma Distribution Test	
Coefficient of Variation	3.559225	A-D Test Statistic	8.05118
Skewness	5.714717	A-D 5% Critical Value	0.853269
		K-S Test Statistic	0.294111
Gamma Statistics		K-S 5% Critical Value	0.123797
k hat	0.342265	Data do not follow gamma distribution	
k star (bias corrected)	0.336263	at 5% significance level	
Theta hat	0.586089		
Theta star	0.59655	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.07177	Approximate Gamma UCL	0.302102
nu star	40.35151	Adjusted Gamma UCL	0.305204
Approx.Chi Square Value (.05)	26.7936		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	26.52131	Lilliefors Test Statisitic	0.2254
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-8.421883		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.578292	95% H-UCL	0.246392
Standard Deviation of log data	1.721331	95% Chebyshev (MVUE) UCL	0.275033
Variance of log data	2.962981	97.5% Chebyshev (MVUE) UCL	0.343854
		99% Chebyshev (MVUE) UCL	0.479038
		95% Non-parametric UCLs	
		CLT UCL	0.352209
		Adj-CLT UCL (Adjusted for skewness)	0.424871
		Mod-t UCL (Adjusted for skewness)	0.365961
		Jackknife UCL	0.354628
		Standard Bootstrap UCL	0.350713
		Bootstrap-t UCL	0.665787
RECOMMENDATION		Hall's Bootstrap UCL	0.829035
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.357154
		BCA Bootstrap UCL	0.465067
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.602372
		97.5% Chebyshev (Mean, Sd) UCL	0.77622
		99% Chebyshev (Mean, Sd) UCL	1.117711

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_80
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	58	Lilliefors Test Statisitic	0.473091
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.116337
Minimum	0.0015	Data not normal at 5% significance level	
Maximum	5		
Mean	0.112412	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.255945
Standard Deviation	0.653763		
Variance	0.427406	Gamma Distribution Test	
Coefficient of Variation	5.815773	A-D Test Statistic	12.54266
Skewness	7.589585	A-D 5% Critical Value	0.846989
		K-S Test Statistic	0.355648
Gamma Statistics		K-S 5% Critical Value	0.125685
k hat	0.367857	Data do not follow gamma distribution	
k star (bias corrected)	0.360324	at 5% significance level	
Theta hat	0.305586		
Theta star	0.311975	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.67143	Approximate Gamma UCL	0.167951
nu star	41.79762	Adjusted Gamma UCL	0.169701
Approx.Chi Square Value (.05)	27.9758		
Adjusted Level of Significance	0.045862	Lognormal Distribution Test	
Adjusted Chi Square Value	27.68722	Lilliefors Test Statisitic	0.367491
		Lilliefors 5% Critical Value	0.116337
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.50229		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.998834	95% H-UCL	0.054897
Standard Deviation of log data	1.188214	95% Chebyshev (MVUE) UCL	0.067153
Variance of log data	1.411852	97.5% Chebyshev (MVUE) UCL	0.080457
		99% Chebyshev (MVUE) UCL	0.106591
		95% Non-parametric UCLs	
		CLT UCL	0.253612
		Adj-CLT UCL (Adjusted for skewness)	0.345021
		Mod-t UCL (Adjusted for skewness)	0.270203
		Jackknife UCL	0.255945
		Standard Bootstrap UCL	0.251173
		Bootstrap-t UCL	2.701902
RECOMMENDATION		Hall's Bootstrap UCL	1.077016
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.282936
		BCA Bootstrap UCL	0.375333
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.486594
		97.5% Chebyshev (Mean, Sd) UCL	0.648503
		99% Chebyshev (Mean, Sd) UCL	0.966542

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_81
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.395862
Number of Unique Samples	16	Lilliefors 5% Critical Value	0.114382
Minimum	0.005	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.1036	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.184136
Standard Deviation	0.373308		
Variance	0.139359	Gamma Distribution Test	
Coefficient of Variation	3.603355	A-D Test Statistic	10.72504
Skewness	5.416785	A-D 5% Critical Value	0.854745
		K-S Test Statistic	0.327988
Gamma Statistics		K-S 5% Critical Value	0.123894
k hat	0.336019	Data do not follow gamma distribution	
k star (bias corrected)	0.330329	at 5% significance level	
Theta hat	0.308316		
Theta star	0.313627	95% UCLs (Assuming Gamma Distribution)	
nu hat	40.32225	Approximate Gamma UCL	0.156663
nu star	39.63947	Adjusted Gamma UCL	0.158288
Approx.Chi Square Value (.05)	26.21326		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	25.94414	Lilliefors Test Statisitic	0.339405
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.28175	95% H-UCL	0.088848
Standard Deviation of log data	1.584646	95% Chebyshev (MVUE) UCL	0.103166
Variance of log data	2.511104	97.5% Chebyshev (MVUE) UCL	0.127737
		99% Chebyshev (MVUE) UCL	0.176003
		95% Non-parametric UCLs	
		CLT UCL	0.182872
		Adj-CLT UCL (Adjusted for skewness)	0.218883
		Mod-t UCL (Adjusted for skewness)	0.189753
		Jackknife UCL	0.184136
		Standard Bootstrap UCL	0.180485
		Bootstrap-t UCL	0.383558
RECOMMENDATION		Hall's Bootstrap UCL	0.46267
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.1952
		BCA Bootstrap UCL	0.230417
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.313672
		97.5% Chebyshev (Mean, Sd) UCL	0.40457
		99% Chebyshev (Mean, Sd) UCL	0.583122

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_82
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.375832
Number of Unique Samples	22	Lilliefors 5% Critical Value	0.115347
Minimum	0.0014	Data not normal at 5% significance level	
Maximum	5		
Mean	0.272922	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.447072
Standard Deviation	0.800256		
Variance	0.64041	Gamma Distribution Test	
Coefficient of Variation	2.93218	A-D Test Statistic	7.381547
Skewness	4.521804	A-D 5% Critical Value	0.857401
		K-S Test Statistic	0.288182
Gamma Statistics		K-S 5% Critical Value	0.125227
k hat	0.324376	Data do not follow gamma distribution	
k star (bias corrected)	0.319182	at 5% significance level	
Theta hat	0.841376		
Theta star	0.855068	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.27637	Approximate Gamma UCL	0.417698
nu star	37.66345	Adjusted Gamma UCL	0.42224
Approx.Chi Square Value (.05)	24.60911		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	24.34443	Lilliefors Test Statisitic	0.283646
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.571283		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.397452	95% H-UCL	0.429447
Standard Deviation of log data	1.867284	95% Chebyshev (MVUE) UCL	0.451173
Variance of log data	3.486748	97.5% Chebyshev (MVUE) UCL	0.569631
		99% Chebyshev (MVUE) UCL	0.802319
		95% Non-parametric UCLs	
		CLT UCL	0.44429
		Adj-CLT UCL (Adjusted for skewness)	0.509825
		Mod-t UCL (Adjusted for skewness)	0.457294
		Jackknife UCL	0.447072
		Standard Bootstrap UCL	0.447207
		Bootstrap-t UCL	0.669726
RECOMMENDATION		Hall's Bootstrap UCL	0.702428
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.465871
		BCA Bootstrap UCL	0.570119
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.727052
		97.5% Chebyshev (Mean, Sd) UCL	0.923554
		99% Chebyshev (Mean, Sd) UCL	1.309545

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_83
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.449937
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.115347
Minimum	0.005	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.064576	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.135912
Standard Deviation	0.327803		
Variance	0.107455	Gamma Distribution Test	
Coefficient of Variation	5.076222	A-D Test Statistic	13.06178
Skewness	7.337137	A-D 5% Critical Value	0.848135
		K-S Test Statistic	0.367221
Gamma Statistics		K-S 5% Critical Value	0.124612
k hat	0.363503	Data do not follow gamma distribution	
k star (bias corrected)	0.356319	at 5% significance level	
Theta hat	0.17765		
Theta star	0.181231	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.89336	Approximate Gamma UCL	0.096354
nu star	42.04567	Adjusted Gamma UCL	0.097337
Approx.Chi Square Value (.05)	28.17905		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	27.89441	Lilliefors Test Statisitic	0.376803
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.57843	95% H-UCL	0.034816
Standard Deviation of log data	1.262143	95% Chebyshev (MVUE) UCL	0.042443
Variance of log data	1.593005	97.5% Chebyshev (MVUE) UCL	0.051179
		99% Chebyshev (MVUE) UCL	0.068341
		95% Non-parametric UCLs	
		CLT UCL	0.134773
		Adj-CLT UCL (Adjusted for skewness)	0.178331
		Mod-t UCL (Adjusted for skewness)	0.142706
		Jackknife UCL	0.135912
		Standard Bootstrap UCL	0.13411
		Bootstrap-t UCL	0.763235
RECOMMENDATION		Hall's Bootstrap UCL	0.513976
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.146186
		BCA Bootstrap UCL	0.210085
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.250598
		97.5% Chebyshev (Mean, Sd) UCL	0.33109
		99% Chebyshev (Mean, Sd) UCL	0.489201

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_84
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	58	Lilliefors Test Statisitic	0.474038
Number of Unique Samples	7	Lilliefors 5% Critical Value	0.116337
Minimum	0.01	Data not normal at 5% significance level	
Maximum	5		
Mean	0.113966	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.257515
Standard Deviation	0.653841		
Variance	0.427509	Gamma Distribution Test	
Coefficient of Variation	5.737186	A-D Test Statistic	13.28585
Skewness	7.579587	A-D 5% Critical Value	0.845165
		K-S Test Statistic	0.362904
Gamma Statistics		K-S 5% Critical Value	0.125562
k hat	0.375545	Data do not follow gamma distribution	
k star (bias corrected)	0.367614	at 5% significance level	
Theta hat	0.303467		
Theta star	0.310014	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.56318	Approximate Gamma UCL	0.169515
nu star	42.64324	Adjusted Gamma UCL	0.171261
Approx.Chi Square Value (.05)	28.66923		
Adjusted Level of Significance	0.045862	Lognormal Distribution Test	
Adjusted Chi Square Value	28.37685	Lilliefors Test Statisitic	0.391661
		Lilliefors 5% Critical Value	0.116337
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-4.60517		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.942041	95% H-UCL	0.053831
Standard Deviation of log data	1.14213	95% Chebyshev (MVUE) UCL	0.065949
Variance of log data	1.304461	97.5% Chebyshev (MVUE) UCL	0.07865
		99% Chebyshev (MVUE) UCL	0.103599
		95% Non-parametric UCLs	
		CLT UCL	0.255182
		Adj-CLT UCL (Adjusted for skewness)	0.346482
		Mod-t UCL (Adjusted for skewness)	0.271756
		Jackknife UCL	0.257515
		Standard Bootstrap UCL	0.257916
		Bootstrap-t UCL	2.574768
RECOMMENDATION		Hall's Bootstrap UCL	1.115467
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.286897
		BCA Bootstrap UCL	0.377069
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.488193
		97.5% Chebyshev (Mean, Sd) UCL	0.650121
		99% Chebyshev (Mean, Sd) UCL	0.968198

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_85
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.488177
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.115347
Minimum	0.0011	Data not normal at 5% significance level	
Maximum	5		
Mean	0.108331	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.249409
Standard Deviation	0.648288		
Variance	0.420277	Gamma Distribution Test	
Coefficient of Variation	5.984352	A-D Test Statistic	13.00696
Skewness	7.664072	A-D 5% Critical Value	0.848661
		K-S Test Statistic	0.351883
Gamma Statistics		K-S 5% Critical Value	0.124647
k hat	0.361281	Data do not follow gamma distribution	
k star (bias corrected)	0.35421	at 5% significance level	
Theta hat	0.299851		
Theta star	0.305837	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.63116	Approximate Gamma UCL	0.161853
nu star	41.79681	Adjusted Gamma UCL	0.163511
Approx.Chi Square Value (.05)	27.97513		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	27.6916	Lilliefors Test Statisitic	0.331914
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.812445		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.074243	95% H-UCL	0.05174
Standard Deviation of log data	1.200132	95% Chebyshev (MVUE) UCL	0.063308
Variance of log data	1.440316	97.5% Chebyshev (MVUE) UCL	0.075887
		99% Chebyshev (MVUE) UCL	0.100595
		95% Non-parametric UCLs	
		CLT UCL	0.247156
		Adj-CLT UCL (Adjusted for skewness)	0.337138
		Mod-t UCL (Adjusted for skewness)	0.263445
		Jackknife UCL	0.249409
		Standard Bootstrap UCL	0.24806
		Bootstrap-t UCL	2.746358
RECOMMENDATION		Hall's Bootstrap UCL	1.067505
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.2755
		BCA Bootstrap UCL	0.366192
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.476221
		97.5% Chebyshev (Mean, Sd) UCL	0.635408
		99% Chebyshev (Mean, Sd) UCL	0.948099

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_86
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.448298
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.114382
Minimum	0.0013	Data not normal at 5% significance level	
Maximum	5		
Mean	0.124288	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.263943
Standard Deviation	0.647337		
Variance	0.419045	Gamma Distribution Test	
Coefficient of Variation	5.208349	A-D Test Statistic	12.20456
Skewness	7.500125	A-D 5% Critical Value	0.847404
		K-S Test Statistic	0.347459
Gamma Statistics		K-S 5% Critical Value	0.123414
k hat	0.367072	Data do not follow gamma distribution	
k star (bias corrected)	0.35983	at 5% significance level	
Theta hat	0.338594		
Theta star	0.345409	95% UCLs (Assuming Gamma Distribution)	
nu hat	44.04865	Approximate Gamma UCL	0.184361
nu star	43.17955	Adjusted Gamma UCL	0.186182
Approx.Chi Square Value (.05)	29.10981		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	28.82516	Lilliefors Test Statisitic	0.35691
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.645391		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.902909	95% H-UCL	0.07162
Standard Deviation of log data	1.290023	95% Chebyshev (MVUE) UCL	0.087222
Variance of log data	1.66416	97.5% Chebyshev (MVUE) UCL	0.105378
		99% Chebyshev (MVUE) UCL	0.141043
		95% Non-parametric UCLs	
		CLT UCL	0.26175
		Adj-CLT UCL (Adjusted for skewness)	0.348213
		Mod-t UCL (Adjusted for skewness)	0.277429
		Jackknife UCL	0.263943
		Standard Bootstrap UCL	0.259901
		Bootstrap-t UCL	1.674234
RECOMMENDATION		Hall's Bootstrap UCL	0.929557
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.287
		BCA Bootstrap UCL	0.449517
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.488565
		97.5% Chebyshev (Mean, Sd) UCL	0.646188
		99% Chebyshev (Mean, Sd) UCL	0.955808

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_87
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	58	Lilliefors Test Statisitic	0.471862
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.116337
Minimum	0.0037	Data not normal at 5% significance level	
Maximum	5		
Mean	0.1104	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.253953
Standard Deviation	0.653859		
Variance	0.427531	Gamma Distribution Test	
Coefficient of Variation	5.922634	A-D Test Statistic	13.60825
Skewness	7.595713	A-D 5% Critical Value	0.847318
		K-S Test Statistic	0.369789
Gamma Statistics		K-S 5% Critical Value	0.125707
k hat	0.366472	Data do not follow gamma distribution	
k star (bias corrected)	0.35901	at 5% significance level	
Theta hat	0.301251		
Theta star	0.307512	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.5107	Approximate Gamma UCL	0.16508
nu star	41.64521	Adjusted Gamma UCL	0.166804
Approx.Chi Square Value (.05)	27.85098		
Adjusted Level of Significance	0.045862	Lognormal Distribution Test	
Adjusted Chi Square Value	27.56309	Lilliefors Test Statisitic	0.386214
		Lilliefors 5% Critical Value	0.116337
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.599422		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.024866	95% H-UCL	0.04842
Standard Deviation of log data	1.127836	95% Chebyshev (MVUE) UCL	0.059335
Variance of log data	1.272015	97.5% Chebyshev (MVUE) UCL	0.070659
		99% Chebyshev (MVUE) UCL	0.092903
		95% Non-parametric UCLs	
		CLT UCL	0.25162
		Adj-CLT UCL (Adjusted for skewness)	0.343117
		Mod-t UCL (Adjusted for skewness)	0.268225
		Jackknife UCL	0.253953
		Standard Bootstrap UCL	0.249751
		Bootstrap-t UCL	2.892371
RECOMMENDATION		Hall's Bootstrap UCL	1.167176
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.28031
		BCA Bootstrap UCL	0.369543
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.484637
		97.5% Chebyshev (Mean, Sd) UCL	0.64657
		99% Chebyshev (Mean, Sd) UCL	0.964655

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_88
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	58	Lilliefors Test Statisitic	0.473422
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.116337
Minimum	0.00042	Data not normal at 5% significance level	
Maximum	5		
Mean	0.112953	95% UCL (Assuming Normal Distribution)	
Median	0.01	Student's-t UCL	0.25647
Standard Deviation	0.653692		
Variance	0.427314	Gamma Distribution Test	
Coefficient of Variation	5.7873	A-D Test Statistic	11.70011
Skewness	7.589495	A-D 5% Critical Value	0.84801
		K-S Test Statistic	0.359077
Gamma Statistics		K-S 5% Critical Value	0.125754
k hat	0.363555	Data do not follow gamma distribution	
k star (bias corrected)	0.356245	at 5% significance level	
Theta hat	0.31069		
Theta star	0.317066	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.17237	Approximate Gamma UCL	0.169191
nu star	41.32437	Adjusted Gamma UCL	0.170966
Approx.Chi Square Value (.05)	27.5884		
Adjusted Level of Significance	0.045862	Lognormal Distribution Test	
Adjusted Chi Square Value	27.30197	Lilliefors Test Statisitic	0.312664
		Lilliefors 5% Critical Value	0.116337
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-7.775256		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.019001	95% H-UCL	0.06481
Standard Deviation of log data	1.29391	95% Chebyshev (MVUE) UCL	0.078697
Variance of log data	1.674203	97.5% Chebyshev (MVUE) UCL	0.095242
		99% Chebyshev (MVUE) UCL	0.12774
		95% Non-parametric UCLs	
		CLT UCL	0.254137
		Adj-CLT UCL (Adjusted for skewness)	0.345536
		Mod-t UCL (Adjusted for skewness)	0.270726
		Jackknife UCL	0.25647
		Standard Bootstrap UCL	0.253487
		Bootstrap-t UCL	2.600749
RECOMMENDATION		Hall's Bootstrap UCL	1.056774
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.283369
		BCA Bootstrap UCL	0.373039
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.487095
		97.5% Chebyshev (Mean, Sd) UCL	0.648986
		99% Chebyshev (Mean, Sd) UCL	0.966991

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_89
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.413975
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.115347
Minimum	0.0016	Data not normal at 5% significance level	
Maximum	0.76		
Mean	0.028951	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.050834
Standard Deviation	0.10056		
Variance	0.010112	Gamma Distribution Test	
Coefficient of Variation	3.473472	A-D Test Statistic	9.568772
Skewness	6.922568	A-D 5% Critical Value	0.809045
		K-S Test Statistic	0.372545
Gamma Statistics		K-S 5% Critical Value	0.121862
k hat	0.57159	Data do not follow gamma distribution	
k star (bias corrected)	0.553826	at 5% significance level	
Theta hat	0.05065		
Theta star	0.052274	95% UCLs (Assuming Gamma Distribution)	
nu hat	67.44762	Approximate Gamma UCL	0.039625
nu star	65.35141	Adjusted Gamma UCL	0.03994
Approx.Chi Square Value (.05)	47.74691		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	47.37024	Lilliefors Test Statisitic	0.386424
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.437752		
Maximum of log data	-0.274437	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.630957	95% H-UCL	0.025749
Standard Deviation of log data	1.114163	95% Chebyshev (MVUE) UCL	0.031572
Variance of log data	1.241358	97.5% Chebyshev (MVUE) UCL	0.037518
		99% Chebyshev (MVUE) UCL	0.049198
		95% Non-parametric UCLs	
		CLT UCL	0.050485
		Adj-CLT UCL (Adjusted for skewness)	0.063092
		Mod-t UCL (Adjusted for skewness)	0.052801
		Jackknife UCL	0.050834
		Standard Bootstrap UCL	0.050512
		Bootstrap-t UCL	0.147194
RECOMMENDATION		Hall's Bootstrap UCL	0.131291
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.053586
		BCA Bootstrap UCL	0.070137
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.086017
		97.5% Chebyshev (Mean, Sd) UCL	0.110709
		99% Chebyshev (Mean, Sd) UCL	0.159213

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_90
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.451746
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.114382
Minimum	0.00011	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.057407	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.126765
Standard Deviation	0.321492		
Variance	0.103357	Gamma Distribution Test	
Coefficient of Variation	5.600234	A-D Test Statistic	11.64662
Skewness	7.686686	A-D 5% Critical Value	0.847238
		K-S Test Statistic	0.335568
Gamma Statistics		K-S 5% Critical Value	0.123403
k hat	0.367773	Data do not follow gamma distribution	
k star (bias corrected)	0.360496	at 5% significance level	
Theta hat	0.156093		
Theta star	0.159244	95% UCLs (Assuming Gamma Distribution)	
nu hat	44.13279	Approximate Gamma UCL	0.085119
nu star	43.25949	Adjusted Gamma UCL	0.085959
Approx.Chi Square Value (.05)	29.17553		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	28.89053	Lilliefors Test Statisitic	0.331341
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-9.11503		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.671322	95% H-UCL	0.035748
Standard Deviation of log data	1.329926	95% Chebyshev (MVUE) UCL	0.043374
Variance of log data	1.768702	97.5% Chebyshev (MVUE) UCL	0.052594
		99% Chebyshev (MVUE) UCL	0.070705
		95% Non-parametric UCLs	
		CLT UCL	0.125675
		Adj-CLT UCL (Adjusted for skewness)	0.169684
		Mod-t UCL (Adjusted for skewness)	0.133629
		Jackknife UCL	0.126765
		Standard Bootstrap UCL	0.125615
		Bootstrap-t UCL	0.877052
RECOMMENDATION		Hall's Bootstrap UCL	0.468922
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.139667
		BCA Bootstrap UCL	0.220235
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.23832
		97.5% Chebyshev (Mean, Sd) UCL	0.316602
		99% Chebyshev (Mean, Sd) UCL	0.47037

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_91
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.487953
Number of Unique Samples	8	Lilliefors 5% Critical Value	0.115347
Minimum	0.014	Data not normal at 5% significance level	
Maximum	25		
Mean	0.539831	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	1.245252
Standard Deviation	3.241567		
Variance	10.50776	Gamma Distribution Test	
Coefficient of Variation	6.004786	A-D Test Statistic	14.22902
Skewness	7.664912	A-D 5% Critical Value	0.846962
		K-S Test Statistic	0.371804
Gamma Statistics		K-S 5% Critical Value	0.124534
k hat	0.368455	Data do not follow gamma distribution	
k star (bias corrected)	0.36102	at 5% significance level	
Theta hat	1.465118		
Theta star	1.495294	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.47772	Approximate Gamma UCL	0.803135
nu star	42.60032	Adjusted Gamma UCL	0.811268
Approx.Chi Square Value (.05)	28.634		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	28.34691	Lilliefors Test Statisitic	0.38507
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-4.268698		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.426329	95% H-UCL	0.230987
Standard Deviation of log data	1.107422	95% Chebyshev (MVUE) UCL	0.283237
Variance of log data	1.226383	97.5% Chebyshev (MVUE) UCL	0.336344
		99% Chebyshev (MVUE) UCL	0.440661
		95% Non-parametric UCLs	
		CLT UCL	1.233985
		Adj-CLT UCL (Adjusted for skewness)	1.683962
		Mod-t UCL (Adjusted for skewness)	1.31544
		Jackknife UCL	1.245252
		Standard Bootstrap UCL	1.210926
		Bootstrap-t UCL	14.88669
RECOMMENDATION		Hall's Bootstrap UCL	5.528674
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.381085
		BCA Bootstrap UCL	1.824559
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.379356
		97.5% Chebyshev (Mean, Sd) UCL	3.17532
		99% Chebyshev (Mean, Sd) UCL	4.738837

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_92
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.473626
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.114382
Minimum	0.0049	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.059632	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.129275
Standard Deviation	0.322815		
Variance	0.10421	Gamma Distribution Test	
Coefficient of Variation	5.413485	A-D Test Statistic	12.82825
Skewness	7.578451	A-D 5% Critical Value	0.844667
		K-S Test Statistic	0.331207
Gamma Statistics		K-S 5% Critical Value	0.123235
k hat	0.37865	Data do not follow gamma distribution	
k star (bias corrected)	0.370828	at 5% significance level	
Theta hat	0.157485		
Theta star	0.160807	95% UCLs (Assuming Gamma Distribution)	
nu hat	45.43796	Approximate Gamma UCL	0.087877
nu star	44.4994	Adjusted Gamma UCL	0.08873
Approx.Chi Square Value (.05)	30.19658		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	29.9063	Lilliefors Test Statisitic	0.361814
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.31852		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.572893	95% H-UCL	0.030909
Standard Deviation of log data	1.192692	95% Chebyshev (MVUE) UCL	0.037861
Variance of log data	1.422513	97.5% Chebyshev (MVUE) UCL	0.045319
		99% Chebyshev (MVUE) UCL	0.059969
		95% Non-parametric UCLs	
		CLT UCL	0.128181
		Adj-CLT UCL (Adjusted for skewness)	0.171749
		Mod-t UCL (Adjusted for skewness)	0.136071
		Jackknife UCL	0.129275
		Standard Bootstrap UCL	0.128122
		Bootstrap-t UCL	1.225024
RECOMMENDATION		Hall's Bootstrap UCL	0.462052
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.140473
		BCA Bootstrap UCL	0.191658
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.24129
		97.5% Chebyshev (Mean, Sd) UCL	0.319894
		99% Chebyshev (Mean, Sd) UCL	0.474295

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_93
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.468079
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.115347
Minimum	0.0035	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.065653	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.137426
Standard Deviation	0.329816		
Variance	0.108779	Gamma Distribution Test	
Coefficient of Variation	5.023661	A-D Test Statistic	13.23884
Skewness	7.213655	A-D 5% Critical Value	0.849285
		K-S Test Statistic	0.350434
Gamma Statistics		K-S 5% Critical Value	0.124688
k hat	0.358645	Data do not follow gamma distribution	
k star (bias corrected)	0.351708	at 5% significance level	
Theta hat	0.183057		
Theta star	0.186668	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.32013	Approximate Gamma UCL	0.098246
nu star	41.50159	Adjusted Gamma UCL	0.099256
Approx.Chi Square Value (.05)	27.73341		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	27.4512	Lilliefors Test Statisitic	0.352895
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.654992		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.590884	95% H-UCL	0.034131
Standard Deviation of log data	1.257971	95% Chebyshev (MVUE) UCL	0.04162
Variance of log data	1.582491	97.5% Chebyshev (MVUE) UCL	0.050168
		99% Chebyshev (MVUE) UCL	0.066957
		95% Non-parametric UCLs	
		CLT UCL	0.13628
		Adj-CLT UCL (Adjusted for skewness)	0.179368
		Mod-t UCL (Adjusted for skewness)	0.144147
		Jackknife UCL	0.137426
		Standard Bootstrap UCL	0.135539
		Bootstrap-t UCL	0.671385
RECOMMENDATION		Hall's Bootstrap UCL	0.563298
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.147673
		BCA Bootstrap UCL	0.195822
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.252817
		97.5% Chebyshev (Mean, Sd) UCL	0.333803
		99% Chebyshev (Mean, Sd) UCL	0.492884

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_94
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.431939
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.114382
Minimum	0.005	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.08545	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.161227
Standard Deviation	0.351248		
Variance	0.123375	Gamma Distribution Test	
Coefficient of Variation	4.110567	A-D Test Statistic	11.81268
Skewness	6.121813	A-D 5% Critical Value	0.852045
		K-S Test Statistic	0.355976
Gamma Statistics		K-S 5% Critical Value	0.123717
k hat	0.34744	Data do not follow gamma distribution	
k star (bias corrected)	0.341179	at 5% significance level	
Theta hat	0.245942		
Theta star	0.250455	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.69279	Approximate Gamma UCL	0.128264
nu star	40.94148	Adjusted Gamma UCL	0.12957
Approx.Chi Square Value (.05)	27.27534		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	27.00043	Lilliefors Test Statisitic	0.351496
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.397545	95% H-UCL	0.057706
Standard Deviation of log data	1.435527	95% Chebyshev (MVUE) UCL	0.069057
Variance of log data	2.060737	97.5% Chebyshev (MVUE) UCL	0.084504
		99% Chebyshev (MVUE) UCL	0.114847
		95% Non-parametric UCLs	
		CLT UCL	0.160037
		Adj-CLT UCL (Adjusted for skewness)	0.198331
		Mod-t UCL (Adjusted for skewness)	0.1672
		Jackknife UCL	0.161227
		Standard Bootstrap UCL	0.159253
		Bootstrap-t UCL	0.455456
RECOMMENDATION		Hall's Bootstrap UCL	0.452134
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.167467
		BCA Bootstrap UCL	0.224667
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.283108
		97.5% Chebyshev (Mean, Sd) UCL	0.368635
		99% Chebyshev (Mean, Sd) UCL	0.536636

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_95
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	59	Lilliefors Test Statisitic	0.455573
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.115347
Minimum	0.005	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.05922	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.129807
Standard Deviation	0.324359		
Variance	0.105209	Gamma Distribution Test	
Coefficient of Variation	5.477158	A-D Test Statistic	12.48538
Skewness	7.601356	A-D 5% Critical Value	0.844364
		K-S Test Statistic	0.34173
Gamma Statistics		K-S 5% Critical Value	0.124361
k hat	0.379425	Data do not follow gamma distribution	
k star (bias corrected)	0.371431	at 5% significance level	
Theta hat	0.156079		
Theta star	0.159438	95% UCLs (Assuming Gamma Distribution)	
nu hat	44.77213	Approximate Gamma UCL	0.087558
nu star	43.82891	Adjusted Gamma UCL	0.08843
Approx.Chi Square Value (.05)	29.64406		
Adjusted Level of Significance	0.045932	Lognormal Distribution Test	
Adjusted Chi Square Value	29.3516	Lilliefors Test Statisitic	0.370326
		Lilliefors 5% Critical Value	0.115347
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.575653	95% H-UCL	0.031403
Standard Deviation of log data	1.201367	95% Chebyshev (MVUE) UCL	0.038423
Variance of log data	1.443283	97.5% Chebyshev (MVUE) UCL	0.046063
		99% Chebyshev (MVUE) UCL	0.061069
		95% Non-parametric UCLs	
		CLT UCL	0.128679
		Adj-CLT UCL (Adjusted for skewness)	0.173332
		Mod-t UCL (Adjusted for skewness)	0.136771
		Jackknife UCL	0.129807
		Standard Bootstrap UCL	0.12857
		Bootstrap-t UCL	0.922267
RECOMMENDATION		Hall's Bootstrap UCL	0.490768
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.142983
		BCA Bootstrap UCL	0.189373
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.243288
		97.5% Chebyshev (Mean, Sd) UCL	0.322934
		99% Chebyshev (Mean, Sd) UCL	0.479383

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_96
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.436794
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.114382
Minimum	0.005	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.06635	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.136234
Standard Deviation	0.32393		
Variance	0.104931	Gamma Distribution Test	
Coefficient of Variation	4.882138	A-D Test Statistic	11.17409
Skewness	7.444059	A-D 5% Critical Value	0.84405
		K-S Test Statistic	0.328152
Gamma Statistics		K-S 5% Critical Value	0.123195
k hat	0.381262	Data do not follow gamma distribution	
k star (bias corrected)	0.37331	at 5% significance level	
Theta hat	0.174027		
Theta star	0.177734	95% UCLs (Assuming Gamma Distribution)	
nu hat	45.75144	Approximate Gamma UCL	0.097637
nu star	44.7972	Adjusted Gamma UCL	0.098581
Approx.Chi Square Value (.05)	30.44228		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	30.15074	Lilliefors Test Statisitic	0.357142
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.452185	95% H-UCL	0.043065
Standard Deviation of log data	1.312215	95% Chebyshev (MVUE) UCL	0.052344
Variance of log data	1.721908	97.5% Chebyshev (MVUE) UCL	0.063369
		99% Chebyshev (MVUE) UCL	0.085026
		95% Non-parametric UCLs	
		CLT UCL	0.135136
		Adj-CLT UCL (Adjusted for skewness)	0.178079
		Mod-t UCL (Adjusted for skewness)	0.142932
		Jackknife UCL	0.136234
		Standard Bootstrap UCL	0.135944
		Bootstrap-t UCL	0.609533
RECOMMENDATION		Hall's Bootstrap UCL	0.401343
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.143933
		BCA Bootstrap UCL	0.1963
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.248636
		97.5% Chebyshev (Mean, Sd) UCL	0.327511
		99% Chebyshev (Mean, Sd) UCL	0.482445

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_97
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	60	Lilliefors Test Statisitic	0.445831
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.114382
Minimum	0.0013	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.060102	95% UCL (Assuming Normal Distribution)	
Median	0.005	Student's-t UCL	0.129657
Standard Deviation	0.322408		
Variance	0.103947	Gamma Distribution Test	
Coefficient of Variation	5.36437	A-D Test Statistic	12.36844
Skewness	7.599106	A-D 5% Critical Value	0.846082
		K-S Test Statistic	0.344467
Gamma Statistics		K-S 5% Critical Value	0.123327
k hat	0.372667	Data do not follow gamma distribution	
k star (bias corrected)	0.365145	at 5% significance level	
Theta hat	0.161274		
Theta star	0.164597	95% UCLs (Assuming Gamma Distribution)	
nu hat	44.72004	Approximate Gamma UCL	0.088866
nu star	43.81737	Adjusted Gamma UCL	0.089736
Approx.Chi Square Value (.05)	29.63456		
Adjusted Level of Significance	0.046	Lognormal Distribution Test	
Adjusted Chi Square Value	29.34717	Lilliefors Test Statisitic	0.330125
		Lilliefors 5% Critical Value	0.114382
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.645391		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.597795	95% H-UCL	0.032879
Standard Deviation of log data	1.243126	95% Chebyshev (MVUE) UCL	0.040175
Variance of log data	1.545363	97.5% Chebyshev (MVUE) UCL	0.048325
		99% Chebyshev (MVUE) UCL	0.064334
		95% Non-parametric UCLs	
		CLT UCL	0.128565
		Adj-CLT UCL (Adjusted for skewness)	0.172196
		Mod-t UCL (Adjusted for skewness)	0.136463
		Jackknife UCL	0.129657
		Standard Bootstrap UCL	0.12831
		Bootstrap-t UCL	0.909493
RECOMMENDATION		Hall's Bootstrap UCL	0.482414
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.142663
		BCA Bootstrap UCL	0.192012
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.241531
		97.5% Chebyshev (Mean, Sd) UCL	0.320035
		99% Chebyshev (Mean, Sd) UCL	0.474242

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_98
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	17	Shapiro-Wilk Test Statisitic	0.414191
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.892
Minimum	0.025	Data not normal at 5% significance level	
Maximum	0.69		
Mean	0.083235	95% UCL (Assuming Normal Distribution)	
Median	0.025	Student's-t UCL	0.153868
Standard Deviation	0.166808		
Variance	0.027825	Gamma Distribution Test	
Coefficient of Variation	2.00405	A-D Test Statistic	4.400429
Skewness	3.438876	A-D 5% Critical Value	0.775679
		K-S Test Statistic	0.505011
Gamma Statistics		K-S 5% Critical Value	0.217108
k hat	0.767539	Data do not follow gamma distribution	
k star (bias corrected)	0.671307	at 5% significance level	
Theta hat	0.108444		
Theta star	0.12399	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.09633	Approximate Gamma UCL	0.146628
nu star	22.82443	Adjusted Gamma UCL	0.15596
Approx.Chi Square Value (.05)	12.9566		
Adjusted Level of Significance	0.03461	Lognormal Distribution Test	
Adjusted Chi Square Value	12.18134	Shapiro-Wilk Test Statisitic	0.49921
		Shapiro-Wilk 5% Critical Value	0.892
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.688879		
Maximum of log data	-0.371064	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.263595	95% H-UCL	0.121994
Standard Deviation of log data	0.994527	95% Chebyshev (MVUE) UCL	0.130141
Variance of log data	0.989084	97.5% Chebyshev (MVUE) UCL	0.160389
		99% Chebyshev (MVUE) UCL	0.219805
		95% Non-parametric UCLs	
		CLT UCL	0.149781
		Adj-CLT UCL (Adjusted for skewness)	0.185836
		Mod-t UCL (Adjusted for skewness)	0.159492
		Jackknife UCL	0.153868
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.259582
		97.5% Chebyshev (Mean, Sd) UCL	0.335888
		99% Chebyshev (Mean, Sd) UCL	0.485776

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_99
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	58	Lilliefors Test Statisitic	0.409487
Number of Unique Samples	5	Lilliefors 5% Critical Value	0.116337
Minimum	0.1	Data not normal at 5% significance level	
Maximum	6.3		
Mean	0.405172	95% UCL (Assuming Normal Distribution)	
Median	0.1	Student's-t UCL	0.618961
Standard Deviation	0.973765		
Variance	0.948218	Gamma Distribution Test	
Coefficient of Variation	2.403335	A-D Test Statistic	9.789912
Skewness	5.176325	A-D 5% Critical Value	0.79148
		K-S Test Statistic	0.393295
Gamma Statistics		K-S 5% Critical Value	0.121393
k hat	0.766091	Data do not follow gamma distribution	
k star (bias corrected)	0.73796	at 5% significance level	
Theta hat	0.528883		
Theta star	0.549044	95% UCLs (Assuming Gamma Distribution)	
nu hat	88.86655	Approximate Gamma UCL	0.531373
nu star	85.60334	Adjusted Gamma UCL	0.535077
Approx.Chi Square Value (.05)	65.27267		
Adjusted Level of Significance	0.045862	Lognormal Distribution Test	
Adjusted Chi Square Value	64.82082	Lilliefors Test Statisitic	0.407014
		Lilliefors 5% Critical Value	0.116337
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.302585		
Maximum of log data	1.84055	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.682621	95% H-UCL	0.408357
Standard Deviation of log data	0.989117	95% Chebyshev (MVUE) UCL	0.499365
Variance of log data	0.978353	97.5% Chebyshev (MVUE) UCL	0.585856
		99% Chebyshev (MVUE) UCL	0.755751
		95% Non-parametric UCLs	
		CLT UCL	0.615486
		Adj-CLT UCL (Adjusted for skewness)	0.708346
		Mod-t UCL (Adjusted for skewness)	0.633445
		Jackknife UCL	0.618961
		Standard Bootstrap UCL	0.612651
		Bootstrap-t UCL	1.290832
RECOMMENDATION		Hall's Bootstrap UCL	1.726348
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.639655
		BCA Bootstrap UCL	0.715517
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.962508
		97.5% Chebyshev (Mean, Sd) UCL	1.203668
		99% Chebyshev (Mean, Sd) UCL	1.677379

Data File	C:\lhilsche\AMCO\EPCs15\all._2EPCs15.txt	Variable:	_100
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	65	Lilliefors Test Statisitic	0.396163
Number of Unique Samples	7	Lilliefors 5% Critical Value	0.109895
Minimum	1.3	Data not normal at 5% significance level	
Maximum	50		
Mean	5.366154	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	6.937254
Standard Deviation	7.589287		
Variance	57.59727	Gamma Distribution Test	
Coefficient of Variation	1.414288	A-D Test Statistic	10.81478
Skewness	4.121565	A-D 5% Critical Value	0.7695
		K-S Test Statistic	0.364005
Gamma Statistics		K-S 5% Critical Value	0.112688
k hat	1.47207	Data do not follow gamma distribution	
k star (bias corrected)	1.414385	at 5% significance level	
Theta hat	3.645312		
Theta star	3.793985	95% UCLs (Assuming Gamma Distribution)	
nu hat	191.3691	Approximate Gamma UCL	6.427908
nu star	183.87	Adjusted Gamma UCL	6.454249
Approx.Chi Square Value (.05)	153.4986		
Adjusted Level of Significance	0.046308	Lognormal Distribution Test	
Adjusted Chi Square Value	152.8721	Lilliefors Test Statisitic	0.369606
		Lilliefors 5% Critical Value	0.109895
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.262364		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.303494	95% H-UCL	5.643092
Standard Deviation of log data	0.706903	95% Chebyshev (MVUE) UCL	6.684306
Variance of log data	0.499711	97.5% Chebyshev (MVUE) UCL	7.540811
		99% Chebyshev (MVUE) UCL	9.223248
		95% Non-parametric UCLs	
		CLT UCL	6.914512
		Adj-CLT UCL (Adjusted for skewness)	7.42871
		Mod-t UCL (Adjusted for skewness)	7.017459
		Jackknife UCL	6.937254
		Standard Bootstrap UCL	6.901759
		Bootstrap-t UCL	8.11387
RECOMMENDATION		Hall's Bootstrap UCL	7.849411
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	7
		BCA Bootstrap UCL	7.461538
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.469339
		97.5% Chebyshev (Mean, Sd) UCL	11.24479
		99% Chebyshev (Mean, Sd) UCL	14.73232

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_101
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	95	Lilliefors Test Statisitic	0.395675
Number of Unique Samples	51	Lilliefors 5% Critical Value	0.090902
Minimum	0.05	Data not normal at 5% significance level	
Maximum	10000		
Mean	308.5642	95% UCL (Assuming Normal Distribution)	
Median	29	Student's-t UCL	507.321
Standard Deviation	1166.152		
Variance	1359910	Gamma Distribution Test	
Coefficient of Variation	3.779284	A-D Test Statistic	3.959699
Skewness	7.00934	A-D 5% Critical Value	0.887317
		K-S Test Statistic	0.162234
Gamma Statistics		K-S 5% Critical Value	0.10058
k hat	0.255616	Data do not follow gamma distribution	
k star (bias corrected)	0.254562	at 5% significance level	
Theta hat	1207.139		
Theta star	1212.14	95% UCLs (Assuming Gamma Distribution)	
nu hat	48.56706	Approximate Gamma UCL	446.8285
nu star	48.3667	Adjusted Gamma UCL	449.4024
Approx.Chi Square Value (.05)	33.40036		
Adjusted Level of Significance	0.047474	Lognormal Distribution Test	
Adjusted Chi Square Value	33.20906	Lilliefors Test Statisitic	0.134006
		Lilliefors 5% Critical Value	0.090902
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	9.21034	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.963142	95% H-UCL	2743.082
Standard Deviation of log data	2.739173	95% Chebyshev (MVUE) UCL	2217.565
Variance of log data	7.503066	97.5% Chebyshev (MVUE) UCL	2876.231
		99% Chebyshev (MVUE) UCL	4170.053
		95% Non-parametric UCLs	
		CLT UCL	505.3622
		Adj-CLT UCL (Adjusted for skewness)	597.2989
		Mod-t UCL (Adjusted for skewness)	521.6612
		Jackknife UCL	507.321
		Standard Bootstrap UCL	506.8181
		Bootstrap-t UCL	956.7479
RECOMMENDATION		Hall's Bootstrap UCL	1220.912
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	518.75
		BCA Bootstrap UCL	618.0947
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	830.0832
		97.5% Chebyshev (Mean, Sd) UCL	1055.745
		99% Chebyshev (Mean, Sd) UCL	1499.013

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_102
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.431029
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.107443
Minimum	0.02	Data not normal at 5% significance level	
Maximum	25		
Mean	2.969338	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	4.082834
Standard Deviation	5.505148		
Variance	30.30666	Gamma Distribution Test	
Coefficient of Variation	1.853998	A-D Test Statistic	4.039949
Skewness	3.163906	A-D 5% Critical Value	0.824918
		K-S Test Statistic	0.248216
Gamma Statistics		K-S 5% Critical Value	0.114864
k hat	0.465735	Data do not follow gamma distribution	
k star (bias corrected)	0.454992	at 5% significance level	
Theta hat	6.375591		
Theta star	6.526131	95% UCLs (Assuming Gamma Distribution)	
nu hat	63.34001	Approximate Gamma UCL	4.102908
nu star	61.87893	Adjusted Gamma UCL	4.131936
Approx.Chi Square Value (.05)	44.78274		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	44.46813	Lilliefors Test Statisitic	0.26755
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.912023		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.290702	95% H-UCL	9.583348
Standard Deviation of log data	1.89298	95% Chebyshev (MVUE) UCL	10.41441
Variance of log data	3.583373	97.5% Chebyshev (MVUE) UCL	13.10859
		99% Chebyshev (MVUE) UCL	18.40079
		95% Non-parametric UCLs	
		CLT UCL	4.067438
		Adj-CLT UCL (Adjusted for skewness)	4.341131
		Mod-t UCL (Adjusted for skewness)	4.125525
		Jackknife UCL	4.082834
		Standard Bootstrap UCL	4.052437
		Bootstrap-t UCL	4.638419
RECOMMENDATION		Hall's Bootstrap UCL	4.179008
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.130956
		BCA Bootstrap UCL	4.340294
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.879327
		97.5% Chebyshev (Mean, Sd) UCL	7.138482
		99% Chebyshev (Mean, Sd) UCL	9.611847

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_103
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.478987
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.108242
Minimum	2.5	Data not normal at 5% significance level	
Maximum	300		
Mean	24.71194	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	39.12744
Standard Deviation	70.72952		
Variance	5002.666	Gamma Distribution Test	
Coefficient of Variation	2.86216	A-D Test Statistic	17.25171
Skewness	3.297452	A-D 5% Critical Value	0.840821
		K-S Test Statistic	0.447565
Gamma Statistics		K-S 5% Critical Value	0.116761
k hat	0.399665	Data do not follow gamma distribution	
k star (bias corrected)	0.39172	at 5% significance level	
Theta hat	61.83166		
Theta star	63.08578	95% UCLs (Assuming Gamma Distribution)	
nu hat	53.55509	Approximate Gamma UCL	35.20492
nu star	52.49043	Adjusted Gamma UCL	35.48235
Approx.Chi Square Value (.05)	36.84543		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	36.55735	Lilliefors Test Statisitic	0.335722
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	5.703782	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.560591	95% H-UCL	16.63755
Standard Deviation of log data	1.296733	95% Chebyshev (MVUE) UCL	20.38376
Variance of log data	1.681515	97.5% Chebyshev (MVUE) UCL	24.53312
		99% Chebyshev (MVUE) UCL	32.68375
		95% Non-parametric UCLs	
		CLT UCL	38.9251
		Adj-CLT UCL (Adjusted for skewness)	42.6446
		Mod-t UCL (Adjusted for skewness)	39.70761
		Jackknife UCL	39.12744
		Standard Bootstrap UCL	39.02361
		Bootstrap-t UCL	46.01325
RECOMMENDATION		Hall's Bootstrap UCL	38.11007
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	39.07761
		BCA Bootstrap UCL	43.47015
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	62.37713
		97.5% Chebyshev (Mean, Sd) UCL	78.67488
		99% Chebyshev (Mean, Sd) UCL	110.6887

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_104
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.396647
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.107443
Minimum	2.5	Data not normal at 5% significance level	
Maximum	50		
Mean	5.266176	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	6.768511
Standard Deviation	7.427573		
Variance	55.16884	Gamma Distribution Test	
Coefficient of Variation	1.41043	A-D Test Statistic	11.93906
Skewness	4.235425	A-D 5% Critical Value	0.768532
		K-S Test Statistic	0.350898
Gamma Statistics		K-S 5% Critical Value	0.110066
k hat	1.531442	Data do not follow gamma distribution	
k star (bias corrected)	1.473682	at 5% significance level	
Theta hat	3.438704		
Theta star	3.573481	95% UCLs (Assuming Gamma Distribution)	
nu hat	208.2761	Approximate Gamma UCL	6.257925
nu star	200.4208	Adjusted Gamma UCL	6.281304
Approx.Chi Square Value (.05)	168.6584		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	168.0306	Lilliefors Test Statisitic	0.360445
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.300574	95% H-UCL	5.464626
Standard Deviation of log data	0.682197	95% Chebyshev (MVUE) UCL	6.436031
Variance of log data	0.465392	97.5% Chebyshev (MVUE) UCL	7.22443
		99% Chebyshev (MVUE) UCL	8.773085
		95% Non-parametric UCLs	
		CLT UCL	6.747738
		Adj-CLT UCL (Adjusted for skewness)	7.242066
		Mod-t UCL (Adjusted for skewness)	6.845616
		Jackknife UCL	6.768511
		Standard Bootstrap UCL	6.734537
		Bootstrap-t UCL	8.070166
RECOMMENDATION		Hall's Bootstrap UCL	7.768493
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.845588
		BCA Bootstrap UCL	7.372059
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.192348
		97.5% Chebyshev (Mean, Sd) UCL	10.89121
		99% Chebyshev (Mean, Sd) UCL	14.22828

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_105
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.458856
Number of Unique Samples	18	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	860		
Mean	45.00493	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	75.26814
Standard Deviation	148.4862		
Variance	22048.14	Gamma Distribution Test	
Coefficient of Variation	3.299332	A-D Test Statistic	9.284308
Skewness	4.400429	A-D 5% Critical Value	0.887852
		K-S Test Statistic	0.401624
Gamma Statistics		K-S 5% Critical Value	0.119525
k hat	0.248873	Data do not follow gamma distribution	
k star (bias corrected)	0.24768	at 5% significance level	
Theta hat	180.8349		
Theta star	181.7061	95% UCLs (Assuming Gamma Distribution)	
nu hat	33.34899	Approximate Gamma UCL	71.0761
nu star	33.18909	Adjusted Gamma UCL	71.80489
Approx.Chi Square Value (.05)	21.01511		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	20.80182	Lilliefors Test Statisitic	0.263525
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	6.756932	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.950668	95% H-UCL	139.5179
Standard Deviation of log data	2.381696	95% Chebyshev (MVUE) UCL	116.058
Variance of log data	5.672475	97.5% Chebyshev (MVUE) UCL	149.7863
		99% Chebyshev (MVUE) UCL	216.0389
		95% Non-parametric UCLs	
		CLT UCL	74.84335
		Adj-CLT UCL (Adjusted for skewness)	85.2638
		Mod-t UCL (Adjusted for skewness)	76.89352
		Jackknife UCL	75.26814
		Standard Bootstrap UCL	74.73769
		Bootstrap-t UCL	114.3747
RECOMMENDATION		Hall's Bootstrap UCL	114.5212
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	75.54746
		BCA Bootstrap UCL	85.15836
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	124.0774
		97.5% Chebyshev (Mean, Sd) UCL	158.2921
		99% Chebyshev (Mean, Sd) UCL	225.5003

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_106
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.488646
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.108242
Minimum	2.5	Data not normal at 5% significance level	
Maximum	540		
Mean	38.54478	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	61.07662
Standard Deviation	110.5523		
Variance	12221.81	Gamma Distribution Test	
Coefficient of Variation	2.868152	A-D Test Statistic	17.17656
Skewness	3.214066	A-D 5% Critical Value	0.855568
		K-S Test Statistic	0.451317
Gamma Statistics		K-S 5% Critical Value	0.117699
k hat	0.338798	Data do not follow gamma distribution	
k star (bias corrected)	0.333578	at 5% significance level	
Theta hat	113.7693		
Theta star	115.5495	95% UCLs (Assuming Gamma Distribution)	
nu hat	45.3989	Approximate Gamma UCL	56.74699
nu star	44.69945	Adjusted Gamma UCL	57.2369
Approx.Chi Square Value (.05)	30.36162		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	30.10174	Lilliefors Test Statisitic	0.34856
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	6.291569	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.656496	95% H-UCL	25.6571
Standard Deviation of log data	1.473437	95% Chebyshev (MVUE) UCL	30.90187
Variance of log data	2.171015	97.5% Chebyshev (MVUE) UCL	37.77233
		99% Chebyshev (MVUE) UCL	51.268
		95% Non-parametric UCLs	
		CLT UCL	60.76035
		Adj-CLT UCL (Adjusted for skewness)	66.42703
		Mod-t UCL (Adjusted for skewness)	61.96051
		Jackknife UCL	61.07662
		Standard Bootstrap UCL	60.75119
		Bootstrap-t UCL	73.52853
RECOMMENDATION		Hall's Bootstrap UCL	61.43744
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	61.15672
		BCA Bootstrap UCL	65.33582
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	97.41655
		97.5% Chebyshev (Mean, Sd) UCL	122.8904
		99% Chebyshev (Mean, Sd) UCL	172.9289

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_107
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	65	Lilliefors Test Statisitic	0.42661
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.109895
Minimum	0.05	Data not normal at 5% significance level	
Maximum	100		
Mean	10.84308	95% UCL (Assuming Normal Distribution)	
Median	10	Student's-t UCL	14.52226
Standard Deviation	17.7725		
Variance	315.8617	Gamma Distribution Test	
Coefficient of Variation	1.639064	A-D Test Statistic	5.540329
Skewness	4.206598	A-D 5% Critical Value	0.813766
		K-S Test Statistic	0.249498
Gamma Statistics		K-S 5% Critical Value	0.116752
k hat	0.526982	Data do not follow gamma distribution	
k star (bias corrected)	0.512916	at 5% significance level	
Theta hat	20.57579		
Theta star	21.14005	95% UCLs (Assuming Gamma Distribution)	
nu hat	68.50769	Approximate Gamma UCL	14.7903
nu star	66.67913	Adjusted Gamma UCL	14.89546
Approx.Chi Square Value (.05)	48.88388		
Adjusted Level of Significance	0.046308	Lognormal Distribution Test	
Adjusted Chi Square Value	48.53873	Lilliefors Test Statisitic	0.330341
		Lilliefors 5% Critical Value	0.109895
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	4.60517	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.187934	95% H-UCL	97.35324
Standard Deviation of log data	2.184698	95% Chebyshev (MVUE) UCL	90.49578
Variance of log data	4.772904	97.5% Chebyshev (MVUE) UCL	115.8741
		99% Chebyshev (MVUE) UCL	165.725
		95% Non-parametric UCLs	
		CLT UCL	14.469
		Adj-CLT UCL (Adjusted for skewness)	15.69799
		Mod-t UCL (Adjusted for skewness)	14.71396
		Jackknife UCL	14.52226
		Standard Bootstrap UCL	14.39619
		Bootstrap-t UCL	18.53887
RECOMMENDATION		Hall's Bootstrap UCL	31.08543
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	14.73
		BCA Bootstrap UCL	15.93385
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	20.45186
		97.5% Chebyshev (Mean, Sd) UCL	24.6096
		99% Chebyshev (Mean, Sd) UCL	32.77665

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_108
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.427541
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.107443
Minimum	2.5	Data not normal at 5% significance level	
Maximum	180		
Mean	9.933824	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	15.23926
Standard Deviation	26.23017		
Variance	688.0217	Gamma Distribution Test	
Coefficient of Variation	2.640491	A-D Test Statistic	14.08426
Skewness	5.183476	A-D 5% Critical Value	0.79769
		K-S Test Statistic	0.39073
Gamma Statistics		K-S 5% Critical Value	0.112795
k hat	0.696005	Data do not follow gamma distribution	
k star (bias corrected)	0.675103	at 5% significance level	
Theta hat	14.27264		
Theta star	14.71454	95% UCLs (Assuming Gamma Distribution)	
nu hat	94.65664	Approximate Gamma UCL	12.8979
nu star	91.81395	Adjusted Gamma UCL	12.97127
Approx.Chi Square Value (.05)	70.71409		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	70.31414	Lilliefors Test Statisitic	0.35116
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.426946	95% H-UCL	8.48024
Standard Deviation of log data	0.9523	95% Chebyshev (MVUE) UCL	10.32823
Variance of log data	0.906874	97.5% Chebyshev (MVUE) UCL	11.98734
		99% Chebyshev (MVUE) UCL	15.24632
		95% Non-parametric UCLs	
		CLT UCL	15.1659
		Adj-CLT UCL (Adjusted for skewness)	17.30235
		Mod-t UCL (Adjusted for skewness)	15.5725
		Jackknife UCL	15.23926
		Standard Bootstrap UCL	15.21167
		Bootstrap-t UCL	25.44685
RECOMMENDATION		Hall's Bootstrap UCL	33.08916
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.57353
		BCA Bootstrap UCL	17.77206
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	23.79894
		97.5% Chebyshev (Mean, Sd) UCL	29.79838
		99% Chebyshev (Mean, Sd) UCL	41.58313

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_109
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	66	Lilliefors Test Statisitic	0.496686
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.109059
Minimum	2.5	Data not normal at 5% significance level	
Maximum	960		
Mean	56.49242	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	93.13589
Standard Deviation	178.405		
Variance	31828.33	Gamma Distribution Test	
Coefficient of Variation	3.158034	A-D Test Statistic	18.52753
Skewness	3.5344	A-D 5% Critical Value	0.869565
		K-S Test Statistic	0.480579
Gamma Statistics		K-S 5% Critical Value	0.119439
k hat	0.28925	Data do not follow gamma distribution	
k star (bias corrected)	0.286204	at 5% significance level	
Theta hat	195.3063		
Theta star	197.3854	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.18106	Approximate Gamma UCL	86.39674
nu star	37.77889	Adjusted Gamma UCL	87.23126
Approx.Chi Square Value (.05)	24.70256		
Adjusted Level of Significance	0.046364	Lognormal Distribution Test	
Adjusted Chi Square Value	24.46624	Lilliefors Test Statisitic	0.370437
		Lilliefors 5% Critical Value	0.109059
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	6.866933	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.635904	95% H-UCL	29.77259
Standard Deviation of log data	1.552462	95% Chebyshev (MVUE) UCL	35.33356
Variance of log data	2.410138	97.5% Chebyshev (MVUE) UCL	43.4883
		99% Chebyshev (MVUE) UCL	59.50668
		95% Non-parametric UCLs	
		CLT UCL	92.61363
		Adj-CLT UCL (Adjusted for skewness)	102.8221
		Mod-t UCL (Adjusted for skewness)	94.7282
		Jackknife UCL	93.13589
		Standard Bootstrap UCL	92.44146
		Bootstrap-t UCL	115.6023
RECOMMENDATION		Hall's Bootstrap UCL	95.57144
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	93.31818
		BCA Bootstrap UCL	104.7348
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	152.2144
		97.5% Chebyshev (Mean, Sd) UCL	193.6334
		99% Chebyshev (Mean, Sd) UCL	274.993

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_110
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	66	Lilliefors Test Statisitic	0.37957
Number of Unique Samples	15	Lilliefors 5% Critical Value	0.109059
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	3.916364	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.39504
Standard Deviation	7.19919		
Variance	51.82833	Gamma Distribution Test	
Coefficient of Variation	1.838233	A-D Test Statistic	4.120579
Skewness	4.927066	A-D 5% Critical Value	0.804504
		K-S Test Statistic	0.239732
Gamma Statistics		K-S 5% Critical Value	0.115099
k hat	0.623993	Data do not follow gamma distribution	
k star (bias corrected)	0.605731	at 5% significance level	
Theta hat	6.27629		
Theta star	6.465515	95% UCLs (Assuming Gamma Distribution)	
nu hat	82.36713	Approximate Gamma UCL	5.188718
nu star	79.9565	Adjusted Gamma UCL	5.221559
Approx.Chi Square Value (.05)	60.34993		
Adjusted Level of Significance	0.046364	Lognormal Distribution Test	
Adjusted Chi Square Value	59.97035	Lilliefors Test Statisitic	0.318286
		Lilliefors 5% Critical Value	0.109059
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.380642	95% H-UCL	12.79042
Standard Deviation of log data	1.733824	95% Chebyshev (MVUE) UCL	14.53676
Variance of log data	3.006144	97.5% Chebyshev (MVUE) UCL	18.1295
		99% Chebyshev (MVUE) UCL	25.18674
		95% Non-parametric UCLs	
		CLT UCL	5.373965
		Adj-CLT UCL (Adjusted for skewness)	5.948225
		Mod-t UCL (Adjusted for skewness)	5.484613
		Jackknife UCL	5.39504
		Standard Bootstrap UCL	5.387197
		Bootstrap-t UCL	7.791379
RECOMMENDATION		Hall's Bootstrap UCL	7.313043
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.537121
		BCA Bootstrap UCL	6.266061
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.779041
		97.5% Chebyshev (Mean, Sd) UCL	9.450425
		99% Chebyshev (Mean, Sd) UCL	12.73353

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_111
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.372585
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	4.044791	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.511784
Standard Deviation	7.197788		
Variance	51.80815	Gamma Distribution Test	
Coefficient of Variation	1.77952	A-D Test Statistic	4.399124
Skewness	4.811765	A-D 5% Critical Value	0.805848
		K-S Test Statistic	0.283883
Gamma Statistics		K-S 5% Critical Value	0.114335
k hat	0.610706	Data do not follow gamma distribution	
k star (bias corrected)	0.593311	at 5% significance level	
Theta hat	6.62314		
Theta star	6.817318	95% UCLs (Assuming Gamma Distribution)	
nu hat	81.8346	Approximate Gamma UCL	5.363505
nu star	79.5037	Adjusted Gamma UCL	5.397034
Approx.Chi Square Value (.05)	59.95629		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	59.58382	Lilliefors Test Statisitic	0.363555
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.388318	95% H-UCL	13.96079
Standard Deviation of log data	1.769574	95% Chebyshev (MVUE) UCL	15.75247
Variance of log data	3.131393	97.5% Chebyshev (MVUE) UCL	19.68261
		99% Chebyshev (MVUE) UCL	27.40261
		95% Non-parametric UCLs	
		CLT UCL	5.491193
		Adj-CLT UCL (Adjusted for skewness)	6.043536
		Mod-t UCL (Adjusted for skewness)	5.597938
		Jackknife UCL	5.511784
		Standard Bootstrap UCL	5.453792
		Bootstrap-t UCL	6.870312
RECOMMENDATION		Hall's Bootstrap UCL	12.47382
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.50897
		BCA Bootstrap UCL	6.523149
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.877788
		97.5% Chebyshev (Mean, Sd) UCL	9.536328
		99% Chebyshev (Mean, Sd) UCL	12.79421

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_112
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.380339
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.107443
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	3.914265	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.348727
Standard Deviation	7.092012		
Variance	50.29663	Gamma Distribution Test	
Coefficient of Variation	1.811837	A-D Test Statistic	4.965878
Skewness	4.995808	A-D 5% Critical Value	0.80444
		K-S Test Statistic	0.292427
Gamma Statistics		K-S 5% Critical Value	0.113345
k hat	0.625991	Data do not follow gamma distribution	
k star (bias corrected)	0.608178	at 5% significance level	
Theta hat	6.252908		
Theta star	6.436053	95% UCLs (Assuming Gamma Distribution)	
nu hat	85.13479	Approximate Gamma UCL	5.159551
nu star	82.71218	Adjusted Gamma UCL	5.190629
Approx.Chi Square Value (.05)	62.74914		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	62.37344	Lilliefors Test Statisitic	0.369928
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.383704	95% H-UCL	13.00425
Standard Deviation of log data	1.744521	95% Chebyshev (MVUE) UCL	14.83042
Variance of log data	3.043353	97.5% Chebyshev (MVUE) UCL	18.48979
		99% Chebyshev (MVUE) UCL	25.67791
		95% Non-parametric UCLs	
		CLT UCL	5.328893
		Adj-CLT UCL (Adjusted for skewness)	5.885625
		Mod-t UCL (Adjusted for skewness)	5.435566
		Jackknife UCL	5.348727
		Standard Bootstrap UCL	5.360387
		Bootstrap-t UCL	6.870067
RECOMMENDATION		Hall's Bootstrap UCL	7.046961
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.430441
		BCA Bootstrap UCL	5.980147
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.66306
		97.5% Chebyshev (Mean, Sd) UCL	9.285167
		99% Chebyshev (Mean, Sd) UCL	12.47148

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_113
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.373235
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.108242
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.393209	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.268359
Standard Deviation	4.293916		
Variance	18.43771	Gamma Distribution Test	
Coefficient of Variation	3.082033	A-D Test Statistic	6.304947
Skewness	5.172308	A-D 5% Critical Value	0.867306
		K-S Test Statistic	0.321405
Gamma Statistics		K-S 5% Critical Value	0.118422
k hat	0.294776	Data do not follow gamma distribution	
k star (bias corrected)	0.291528	at 5% significance level	
Theta hat	4.726327		
Theta star	4.778995	95% UCLs (Assuming Gamma Distribution)	
nu hat	39.50002	Approximate Gamma UCL	2.113959
nu star	39.0647	Adjusted Gamma UCL	2.133677
Approx.Chi Square Value (.05)	25.74567		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	25.50774	Lilliefors Test Statisitic	0.282482
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.014387	95% H-UCL	4.365325
Standard Deviation of log data	2.223212	95% Chebyshev (MVUE) UCL	4.025858
Variance of log data	4.942673	97.5% Chebyshev (MVUE) UCL	5.159871
		99% Chebyshev (MVUE) UCL	7.387421
		95% Non-parametric UCLs	
		CLT UCL	2.256075
		Adj-CLT UCL (Adjusted for skewness)	2.610271
		Mod-t UCL (Adjusted for skewness)	2.323606
		Jackknife UCL	2.268359
		Standard Bootstrap UCL	2.22488
		Bootstrap-t UCL	4.741725
RECOMMENDATION		Hall's Bootstrap UCL	6.911652
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.317239
		BCA Bootstrap UCL	2.660672
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.679823
		97.5% Chebyshev (Mean, Sd) UCL	4.669243
		99% Chebyshev (Mean, Sd) UCL	6.612767

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_114
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.374213
Number of Unique Samples	16	Lilliefors 5% Critical Value	0.108242
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.382597	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.258047
Standard Deviation	4.295388		
Variance	18.45036	Gamma Distribution Test	
Coefficient of Variation	3.106753	A-D Test Statistic	5.296233
Skewness	5.174509	A-D 5% Critical Value	0.872212
		K-S Test Statistic	0.271656
Gamma Statistics		K-S 5% Critical Value	0.118686
k hat	0.283817	Data do not follow gamma distribution	
k star (bias corrected)	0.281059	at 5% significance level	
Theta hat	4.871447		
Theta star	4.919249	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.03141	Approximate Gamma UCL	2.116041
nu star	37.66185	Adjusted Gamma UCL	2.1362
Approx.Chi Square Value (.05)	24.60782		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	24.3756	Lilliefors Test Statisitic	0.211048
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.127718	95% H-UCL	5.856517
Standard Deviation of log data	2.353231	95% Chebyshev (MVUE) UCL	4.969462
Variance of log data	5.537695	97.5% Chebyshev (MVUE) UCL	6.406081
		99% Chebyshev (MVUE) UCL	9.228043
		95% Non-parametric UCLs	
		CLT UCL	2.245759
		Adj-CLT UCL (Adjusted for skewness)	2.600227
		Mod-t UCL (Adjusted for skewness)	2.313337
		Jackknife UCL	2.258047
		Standard Bootstrap UCL	2.226696
		Bootstrap-t UCL	4.683404
RECOMMENDATION		Hall's Bootstrap UCL	6.881514
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.365149
		BCA Bootstrap UCL	2.682015
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.669995
		97.5% Chebyshev (Mean, Sd) UCL	4.659755
		99% Chebyshev (Mean, Sd) UCL	6.603945

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_115
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.373979
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.108242
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.385224	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.260656
Standard Deviation	4.295302		
Variance	18.44962	Gamma Distribution Test	
Coefficient of Variation	3.1008	A-D Test Statistic	5.697484
Skewness	5.172851	A-D 5% Critical Value	0.873837
		K-S Test Statistic	0.321045
Gamma Statistics		K-S 5% Critical Value	0.118773
k hat	0.280186	Data do not follow gamma distribution	
k star (bias corrected)	0.27759	at 5% significance level	
Theta hat	4.943952		
Theta star	4.990176	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.54487	Approximate Gamma UCL	2.126378
nu star	37.19709	Adjusted Gamma UCL	2.146782
Approx.Chi Square Value (.05)	24.23195		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	24.00164	Lilliefors Test Statisitic	0.264363
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.162802	95% H-UCL	5.926569
Standard Deviation of log data	2.367768	95% Chebyshev (MVUE) UCL	4.978523
Variance of log data	5.606326	97.5% Chebyshev (MVUE) UCL	6.421664
		99% Chebyshev (MVUE) UCL	9.256434
		95% Non-parametric UCLs	
		CLT UCL	2.248368
		Adj-CLT UCL (Adjusted for skewness)	2.602716
		Mod-t UCL (Adjusted for skewness)	2.315927
		Jackknife UCL	2.260656
		Standard Bootstrap UCL	2.244842
		Bootstrap-t UCL	4.668785
RECOMMENDATION		Hall's Bootstrap UCL	6.89698
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.342985
		BCA Bootstrap UCL	2.740597
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.672576
		97.5% Chebyshev (Mean, Sd) UCL	4.662316
		99% Chebyshev (Mean, Sd) UCL	6.606467

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_116
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.37666
Number of Unique Samples	17	Lilliefors 5% Critical Value	0.107443
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.347088	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.210871
Standard Deviation	4.27056		
Variance	18.23768	Gamma Distribution Test	
Coefficient of Variation	3.170215	A-D Test Statistic	6.567537
Skewness	5.208715	A-D 5% Critical Value	0.875768
		K-S Test Statistic	0.32808
Gamma Statistics		K-S 5% Critical Value	0.117978
k hat	0.276272	Data do not follow gamma distribution	
k star (bias corrected)	0.273887	at 5% significance level	
Theta hat	4.875957		
Theta star	4.918408	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.57293	Approximate Gamma UCL	2.06715
nu star	37.24864	Adjusted Gamma UCL	2.086667
Approx.Chi Square Value (.05)	24.27361		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	24.04657	Lilliefors Test Statisitic	0.264055
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.231758	95% H-UCL	4.530776
Standard Deviation of log data	2.308511	95% Chebyshev (MVUE) UCL	3.99453
Variance of log data	5.329221	97.5% Chebyshev (MVUE) UCL	5.137439
		99% Chebyshev (MVUE) UCL	7.382463
		95% Non-parametric UCLs	
		CLT UCL	2.198927
		Adj-CLT UCL (Adjusted for skewness)	2.548459
		Mod-t UCL (Adjusted for skewness)	2.265391
		Jackknife UCL	2.210871
		Standard Bootstrap UCL	2.185999
		Bootstrap-t UCL	4.57223
RECOMMENDATION		Hall's Bootstrap UCL	6.735666
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.280515
		BCA Bootstrap UCL	2.627
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.604481
		97.5% Chebyshev (Mean, Sd) UCL	4.581257
		99% Chebyshev (Mean, Sd) UCL	6.499943

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_117
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.375041
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.108242
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.374015	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.249973
Standard Deviation	4.297879		
Variance	18.47177	Gamma Distribution Test	
Coefficient of Variation	3.127971	A-D Test Statistic	5.923807
Skewness	5.17117	A-D 5% Critical Value	0.876455
		K-S Test Statistic	0.314693
Gamma Statistics		K-S 5% Critical Value	0.118913
k hat	0.274335	Data do not follow gamma distribution	
k star (bias corrected)	0.272002	at 5% significance level	
Theta hat	5.008524		
Theta star	5.051491	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.76093	Approximate Gamma UCL	2.11958
nu star	36.44825	Adjusted Gamma UCL	2.14016
Approx.Chi Square Value (.05)	23.62753		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	23.40033	Lilliefors Test Statisitic	0.252371
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.232736	95% H-UCL	5.836664
Standard Deviation of log data	2.384568	95% Chebyshev (MVUE) UCL	4.845349
Variance of log data	5.686164	97.5% Chebyshev (MVUE) UCL	6.254221
		99% Chebyshev (MVUE) UCL	9.021678
		95% Non-parametric UCLs	
		CLT UCL	2.237677
		Adj-CLT UCL (Adjusted for skewness)	2.592122
		Mod-t UCL (Adjusted for skewness)	2.305259
		Jackknife UCL	2.249973
		Standard Bootstrap UCL	2.234605
		Bootstrap-t UCL	4.610141
RECOMMENDATION		Hall's Bootstrap UCL	6.874692
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.34294
		BCA Bootstrap UCL	2.806075
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.66274
		97.5% Chebyshev (Mean, Sd) UCL	4.653073
		99% Chebyshev (Mean, Sd) UCL	6.598391

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_118
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	65	Lilliefors Test Statisitic	0.397073
Number of Unique Samples	7	Lilliefors 5% Critical Value	0.109895
Minimum	2.4	Data not normal at 5% significance level	
Maximum	50		
Mean	5.383077	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	6.952524
Standard Deviation	7.5813		
Variance	57.47612	Gamma Distribution Test	
Coefficient of Variation	1.408358	A-D Test Statistic	11.30015
Skewness	4.129217	A-D 5% Critical Value	0.769
		K-S Test Statistic	0.368005
Gamma Statistics		K-S 5% Critical Value	0.112636
k hat	1.494952	Data do not follow gamma distribution	
k star (bias corrected)	1.436211	at 5% significance level	
Theta hat	3.600835		
Theta star	3.74811	95% UCLs (Assuming Gamma Distribution)	
nu hat	194.3438	Approximate Gamma UCL	6.438849
nu star	186.7074	Adjusted Gamma UCL	6.46502
Approx.Chi Square Value (.05)	156.0932		
Adjusted Level of Significance	0.046308	Lognormal Distribution Test	
Adjusted Chi Square Value	155.4613	Lilliefors Test Statisitic	0.376933
		Lilliefors 5% Critical Value	0.109895
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.875469		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.312927	95% H-UCL	5.638187
Standard Deviation of log data	0.696812	95% Chebyshev (MVUE) UCL	6.668104
Variance of log data	0.485547	97.5% Chebyshev (MVUE) UCL	7.512482
		99% Chebyshev (MVUE) UCL	9.1711
		95% Non-parametric UCLs	
		CLT UCL	6.929806
		Adj-CLT UCL (Adjusted for skewness)	7.444416
		Mod-t UCL (Adjusted for skewness)	7.032793
		Jackknife UCL	6.952524
		Standard Bootstrap UCL	6.942206
		Bootstrap-t UCL	8.264521
RECOMMENDATION		Hall's Bootstrap UCL	8.089931
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	7.036923
		BCA Bootstrap UCL	7.613846
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.481944
		97.5% Chebyshev (Mean, Sd) UCL	11.25553
		99% Chebyshev (Mean, Sd) UCL	14.73939

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_119
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	51	Lilliefors Test Statisitic	0.40515
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.124065
Minimum	0.02	Data not normal at 5% significance level	
Maximum	39		
Mean	2.895294	95% UCL (Assuming Normal Distribution)	
Median	0.06	Student's-t UCL	4.517797
Standard Deviation	6.913872		
Variance	47.80163	Gamma Distribution Test	
Coefficient of Variation	2.387969	A-D Test Statistic	5.52284
Skewness	3.800541	A-D 5% Critical Value	0.861197
		K-S Test Statistic	0.300335
Gamma Statistics		K-S 5% Critical Value	0.134802
k hat	0.305364	Data do not follow gamma distribution	
k star (bias corrected)	0.300474	at 5% significance level	
Theta hat	9.48144		
Theta star	9.635766	95% UCLs (Assuming Gamma Distribution)	
nu hat	31.14717	Approximate Gamma UCL	4.67002
nu star	30.64832	Adjusted Gamma UCL	4.736728
Approx.Chi Square Value (.05)	19.00118		
Adjusted Level of Significance	0.045294	Lognormal Distribution Test	
Adjusted Chi Square Value	18.73358	Lilliefors Test Statisitic	0.294114
		Lilliefors 5% Critical Value	0.124065
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.912023		
Maximum of log data	3.663562	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.188563	95% H-UCL	12.37227
Standard Deviation of log data	2.231264	95% Chebyshev (MVUE) UCL	9.658953
Variance of log data	4.978539	97.5% Chebyshev (MVUE) UCL	12.47286
		99% Chebyshev (MVUE) UCL	18.00023
		95% Non-parametric UCLs	
		CLT UCL	4.487736
		Adj-CLT UCL (Adjusted for skewness)	5.038261
		Mod-t UCL (Adjusted for skewness)	4.603668
		Jackknife UCL	4.517797
		Standard Bootstrap UCL	4.475565
		Bootstrap-t UCL	6.289227
RECOMMENDATION		Hall's Bootstrap UCL	10.32782
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.658627
		BCA Bootstrap UCL	5.358431
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.1153
		97.5% Chebyshev (Mean, Sd) UCL	8.9413
		99% Chebyshev (Mean, Sd) UCL	12.52812

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_120
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.349693
Number of Unique Samples	15	Lilliefors 5% Critical Value	0.108242
Minimum	0.03	Data not normal at 5% significance level	
Maximum	50		
Mean	3.317612	95% UCL (Assuming Normal Distribution)	
Median	1.1	Student's-t UCL	4.814285
Standard Deviation	7.343411		
Variance	53.92569	Gamma Distribution Test	
Coefficient of Variation	2.213463	A-D Test Statistic	4.386163
Skewness	4.786583	A-D 5% Critical Value	0.848056
		K-S Test Statistic	0.241737
Gamma Statistics		K-S 5% Critical Value	0.117221
k hat	0.369804	Data do not follow gamma distribution	
k star (bias corrected)	0.363196	at 5% significance level	
Theta hat	8.971268		
Theta star	9.134495	95% UCLs (Assuming Gamma Distribution)	
nu hat	49.55375	Approximate Gamma UCL	4.798099
nu star	48.66826	Adjusted Gamma UCL	4.837564
Approx.Chi Square Value (.05)	33.65133		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	33.3768	Lilliefors Test Statisitic	0.261397
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.506558		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.602913	95% H-UCL	18.25786
Standard Deviation of log data	2.229589	95% Chebyshev (MVUE) UCL	16.7741
Variance of log data	4.971066	97.5% Chebyshev (MVUE) UCL	21.50545
		99% Chebyshev (MVUE) UCL	30.79928
		95% Non-parametric UCLs	
		CLT UCL	4.793277
		Adj-CLT UCL (Adjusted for skewness)	5.353846
		Mod-t UCL (Adjusted for skewness)	4.901722
		Jackknife UCL	4.814285
		Standard Bootstrap UCL	4.808501
		Bootstrap-t UCL	6.43511
RECOMMENDATION		Hall's Bootstrap UCL	11.38325
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.935522
		BCA Bootstrap UCL	5.632537
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.228157
		97.5% Chebyshev (Mean, Sd) UCL	8.920253
		99% Chebyshev (Mean, Sd) UCL	12.24405

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_121
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	66	Lilliefors Test Statisitic	0.41406
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.109059
Minimum	0.5	Data not normal at 5% significance level	
Maximum	69		
Mean	5.942121	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	8.127925
Standard Deviation	10.64196		
Variance	113.2513	Gamma Distribution Test	
Coefficient of Variation	1.790936	A-D Test Statistic	10.21956
Skewness	4.593565	A-D 5% Critical Value	0.777309
		K-S Test Statistic	0.330921
Gamma Statistics		K-S 5% Critical Value	0.112642
k hat	1.119154	Data do not follow gamma distribution	
k star (bias corrected)	1.078384	at 5% significance level	
Theta hat	5.309478		
Theta star	5.510209	95% UCLs (Assuming Gamma Distribution)	
nu hat	147.7283	Approximate Gamma UCL	7.306178
nu star	142.3467	Adjusted Gamma UCL	7.339972
Approx.Chi Square Value (.05)	115.7707		
Adjusted Level of Significance	0.046364	Lognormal Distribution Test	
Adjusted Chi Square Value	115.2377	Lilliefors Test Statisitic	0.320064
		Lilliefors 5% Critical Value	0.109059
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	4.234107	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.272855	95% H-UCL	6.171222
Standard Deviation of log data	0.817979	95% Chebyshev (MVUE) UCL	7.418506
Variance of log data	0.66909	97.5% Chebyshev (MVUE) UCL	8.48375
		99% Chebyshev (MVUE) UCL	10.57622
		95% Non-parametric UCLs	
		CLT UCL	8.096772
		Adj-CLT UCL (Adjusted for skewness)	8.888194
		Mod-t UCL (Adjusted for skewness)	8.251371
		Jackknife UCL	8.127925
		Standard Bootstrap UCL	8.074989
		Bootstrap-t UCL	10.62194
RECOMMENDATION		Hall's Bootstrap UCL	15.97798
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8.289091
		BCA Bootstrap UCL	8.90303
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	11.65199
		97.5% Chebyshev (Mean, Sd) UCL	14.12266
		99% Chebyshev (Mean, Sd) UCL	18.97581

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_122
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.377047
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.107443
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.343103	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.207122
Standard Deviation	4.271731		
Variance	18.24768	Gamma Distribution Test	
Coefficient of Variation	3.180494	A-D Test Statistic	6.834089
Skewness	5.207069	A-D 5% Critical Value	0.878969
		K-S Test Statistic	0.341437
Gamma Statistics		K-S 5% Critical Value	0.118147
k hat	0.269076	Data do not follow gamma distribution	
k star (bias corrected)	0.267009	at 5% significance level	
Theta hat	4.991537		
Theta star	5.03018	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.59434	Approximate Gamma UCL	2.073771
nu star	36.31321	Adjusted Gamma UCL	2.093642
Approx.Chi Square Value (.05)	23.51869		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	23.29548	Lilliefors Test Statisitic	0.275453
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.31353	95% H-UCL	4.935541
Standard Deviation of log data	2.361011	95% Chebyshev (MVUE) UCL	4.202635
Variance of log data	5.574374	97.5% Chebyshev (MVUE) UCL	5.417274
		99% Chebyshev (MVUE) UCL	7.803197
		95% Non-parametric UCLs	
		CLT UCL	2.195176
		Adj-CLT UCL (Adjusted for skewness)	2.544693
		Mod-t UCL (Adjusted for skewness)	2.26164
		Jackknife UCL	2.207122
		Standard Bootstrap UCL	2.217038
		Bootstrap-t UCL	4.449491
RECOMMENDATION		Hall's Bootstrap UCL	6.753615
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.24175
		BCA Bootstrap UCL	2.621221
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.601115
		97.5% Chebyshev (Mean, Sd) UCL	4.578158
		99% Chebyshev (Mean, Sd) UCL	6.497371

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_123
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.402057
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.108242
Minimum	0.5	Data not normal at 5% significance level	
Maximum	50		
Mean	5.776119	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	7.50809
Standard Deviation	8.497898		
Variance	72.21427	Gamma Distribution Test	
Coefficient of Variation	1.471212	A-D Test Statistic	10.41333
Skewness	3.576007	A-D 5% Critical Value	0.774398
		K-S Test Statistic	0.350681
Gamma Statistics		K-S 5% Critical Value	0.111495
k hat	1.253737	Data do not follow gamma distribution	
k star (bias corrected)	1.20755	at 5% significance level	
Theta hat	4.607123		
Theta star	4.783339	95% UCLs (Assuming Gamma Distribution)	
nu hat	168.0007	Approximate Gamma UCL	7.006548
nu star	161.8116	Adjusted Gamma UCL	7.036337
Approx.Chi Square Value (.05)	133.3957		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	132.831	Lilliefors Test Statisitic	0.343449
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.304615	95% H-UCL	6.214645
Standard Deviation of log data	0.79802	95% Chebyshev (MVUE) UCL	7.448177
Variance of log data	0.636836	97.5% Chebyshev (MVUE) UCL	8.491408
		99% Chebyshev (MVUE) UCL	10.54063
		95% Non-parametric UCLs	
		CLT UCL	7.483779
		Adj-CLT UCL (Adjusted for skewness)	7.968415
		Mod-t UCL (Adjusted for skewness)	7.583683
		Jackknife UCL	7.50809
		Standard Bootstrap UCL	7.510799
		Bootstrap-t UCL	8.39617
RECOMMENDATION		Hall's Bootstrap UCL	8.382272
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	7.61194
		BCA Bootstrap UCL	7.940299
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	10.30146
		97.5% Chebyshev (Mean, Sd) UCL	12.25957
		99% Chebyshev (Mean, Sd) UCL	16.10591

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_124
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.3812
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	3.938687	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.393511
Standard Deviation	7.138085		
Variance	50.95226	Gamma Distribution Test	
Coefficient of Variation	1.812301	A-D Test Statistic	4.819499
Skewness	4.967043	A-D 5% Critical Value	0.803482
		K-S Test Statistic	0.274063
Gamma Statistics		K-S 5% Critical Value	0.11414
k hat	0.635273	Data do not follow gamma distribution	
k star (bias corrected)	0.616779	at 5% significance level	
Theta hat	6.199986		
Theta star	6.3859	95% UCLs (Assuming Gamma Distribution)	
nu hat	85.12665	Approximate Gamma UCL	5.19234
nu star	82.64834	Adjusted Gamma UCL	5.224112
Approx.Chi Square Value (.05)	62.69349		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	62.3122	Lilliefors Test Statisitic	0.353424
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.406319	95% H-UCL	12.78455
Standard Deviation of log data	1.725363	95% Chebyshev (MVUE) UCL	14.61235
Variance of log data	2.976877	97.5% Chebyshev (MVUE) UCL	18.2036
		99% Chebyshev (MVUE) UCL	25.25791
		95% Non-parametric UCLs	
		CLT UCL	5.373091
		Adj-CLT UCL (Adjusted for skewness)	5.938529
		Mod-t UCL (Adjusted for skewness)	5.481708
		Jackknife UCL	5.393511
		Standard Bootstrap UCL	5.358958
		Bootstrap-t UCL	7.150743
RECOMMENDATION		Hall's Bootstrap UCL	9.325389
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.608955
		BCA Bootstrap UCL	6.001194
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.73989
		97.5% Chebyshev (Mean, Sd) UCL	9.384674
		99% Chebyshev (Mean, Sd) UCL	12.61553

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_125
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	66	Lilliefors Test Statisitic	0.37987
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.109059
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	3.922879	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.400121
Standard Deviation	7.192205		
Variance	51.72781	Gamma Distribution Test	
Coefficient of Variation	1.8334	A-D Test Statistic	4.812503
Skewness	4.939315	A-D 5% Critical Value	0.804554
		K-S Test Statistic	0.284875
Gamma Statistics		K-S 5% Critical Value	0.115103
k hat	0.623471	Data do not follow gamma distribution	
k star (bias corrected)	0.605232	at 5% significance level	
Theta hat	6.291999		
Theta star	6.481607	95% UCLs (Assuming Gamma Distribution)	
nu hat	82.29818	Approximate Gamma UCL	5.198001
nu star	79.89068	Adjusted Gamma UCL	5.230916
Approx.Chi Square Value (.05)	60.2927		
Adjusted Level of Significance	0.046364	Lognormal Distribution Test	
Adjusted Chi Square Value	59.91331	Lilliefors Test Statisitic	0.363046
		Lilliefors 5% Critical Value	0.109059
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.381359	95% H-UCL	13.04613
Standard Deviation of log data	1.741797	95% Chebyshev (MVUE) UCL	14.7926
Variance of log data	3.033857	97.5% Chebyshev (MVUE) UCL	18.45855
		99% Chebyshev (MVUE) UCL	25.6596
		95% Non-parametric UCLs	
		CLT UCL	5.379066
		Adj-CLT UCL (Adjusted for skewness)	5.954195
		Mod-t UCL (Adjusted for skewness)	5.489829
		Jackknife UCL	5.400121
		Standard Bootstrap UCL	5.396695
		Bootstrap-t UCL	7.191383
RECOMMENDATION		Hall's Bootstrap UCL	9.136888
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.435152
		BCA Bootstrap UCL	6.166818
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.781809
		97.5% Chebyshev (Mean, Sd) UCL	9.451571
		99% Chebyshev (Mean, Sd) UCL	12.73149

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_126
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.427271
Number of Unique Samples	8	Lilliefors 5% Critical Value	0.108242
Minimum	0.04	Data not normal at 5% significance level	
Maximum	25		
Mean	2.732985	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	3.858682
Standard Deviation	5.523222		
Variance	30.50598	Gamma Distribution Test	
Coefficient of Variation	2.020948	A-D Test Statistic	6.428185
Skewness	3.270339	A-D 5% Critical Value	0.848744
		K-S Test Statistic	0.283788
Gamma Statistics		K-S 5% Critical Value	0.117265
k hat	0.366965	Data do not follow gamma distribution	
k star (bias corrected)	0.360484	at 5% significance level	
Theta hat	7.447531		
Theta star	7.581428	95% UCLs (Assuming Gamma Distribution)	
nu hat	49.17334	Approximate Gamma UCL	3.958643
nu star	48.30489	Adjusted Gamma UCL	3.991342
Approx.Chi Square Value (.05)	33.34894		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	33.07573	Lilliefors Test Statisitic	0.303531
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.218876		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.812979	95% H-UCL	13.02179
Standard Deviation of log data	2.187268	95% Chebyshev (MVUE) UCL	12.26304
Variance of log data	4.784141	97.5% Chebyshev (MVUE) UCL	15.6906
		99% Chebyshev (MVUE) UCL	22.42337
		95% Non-parametric UCLs	
		CLT UCL	3.842881
		Adj-CLT UCL (Adjusted for skewness)	4.130946
		Mod-t UCL (Adjusted for skewness)	3.903614
		Jackknife UCL	3.858682
		Standard Bootstrap UCL	3.844082
		Bootstrap-t UCL	4.439792
RECOMMENDATION		Hall's Bootstrap UCL	4.009513
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.833433
		BCA Bootstrap UCL	4.171045
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.674235
		97.5% Chebyshev (Mean, Sd) UCL	6.946916
		99% Chebyshev (Mean, Sd) UCL	9.446851

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_127
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.376698
Number of Unique Samples	16	Lilliefors 5% Critical Value	0.107443
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	1.346691	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	2.210497
Standard Deviation	4.270674		
Variance	18.23865	Gamma Distribution Test	
Coefficient of Variation	3.171235	A-D Test Statistic	6.561073
Skewness	5.208562	A-D 5% Critical Value	0.876499
		K-S Test Statistic	0.332961
Gamma Statistics		K-S 5% Critical Value	0.118016
k hat	0.274629	Data do not follow gamma distribution	
k star (bias corrected)	0.272317	at 5% significance level	
Theta hat	4.903674		
Theta star	4.945308	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.34955	Approximate Gamma UCL	2.069403
nu star	37.03511	Adjusted Gamma UCL	2.089007
Approx.Chi Square Value (.05)	24.10108		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	23.87491	Lilliefors Test Statisitic	0.272785
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.249651	95% H-UCL	4.725493
Standard Deviation of log data	2.327463	95% Chebyshev (MVUE) UCL	4.115151
Variance of log data	5.417083	97.5% Chebyshev (MVUE) UCL	5.296934
		99% Chebyshev (MVUE) UCL	7.61832
		95% Non-parametric UCLs	
		CLT UCL	2.198553
		Adj-CLT UCL (Adjusted for skewness)	2.548084
		Mod-t UCL (Adjusted for skewness)	2.265017
		Jackknife UCL	2.210497
		Standard Bootstrap UCL	2.185041
		Bootstrap-t UCL	4.553633
RECOMMENDATION		Hall's Bootstrap UCL	6.763095
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.228044
		BCA Bootstrap UCL	2.702676
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.604144
		97.5% Chebyshev (Mean, Sd) UCL	4.580946
		99% Chebyshev (Mean, Sd) UCL	6.499684

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_128
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.429678
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.108242
Minimum	0.005	Data not normal at 5% significance level	
Maximum	25		
Mean	2.765821	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	3.88935
Standard Deviation	5.512587		
Variance	30.38861	Gamma Distribution Test	
Coefficient of Variation	1.993111	A-D Test Statistic	3.788981
Skewness	3.272908	A-D 5% Critical Value	0.859887
		K-S Test Statistic	0.219048
Gamma Statistics		K-S 5% Critical Value	0.117974
k hat	0.320973	Data do not follow gamma distribution	
k star (bias corrected)	0.316551	at 5% significance level	
Theta hat	8.617002		
Theta star	8.737366	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.01032	Approximate Gamma UCL	4.118774
nu star	42.41782	Adjusted Gamma UCL	4.155414
Approx.Chi Square Value (.05)	28.48423		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	28.23307	Lilliefors Test Statisitic	0.265406
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.298317		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.107457	95% H-UCL	54.32633
Standard Deviation of log data	2.704366	95% Chebyshev (MVUE) UCL	34.89492
Variance of log data	7.313594	97.5% Chebyshev (MVUE) UCL	45.56417
		99% Chebyshev (MVUE) UCL	66.52186
		95% Non-parametric UCLs	
		CLT UCL	3.87358
		Adj-CLT UCL (Adjusted for skewness)	4.161316
		Mod-t UCL (Adjusted for skewness)	3.934231
		Jackknife UCL	3.88935
		Standard Bootstrap UCL	3.848153
		Bootstrap-t UCL	4.370641
RECOMMENDATION		Hall's Bootstrap UCL	3.964121
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.935821
		BCA Bootstrap UCL	4.259925
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.701407
		97.5% Chebyshev (Mean, Sd) UCL	6.971638
		99% Chebyshev (Mean, Sd) UCL	9.46676

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_129
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	66	Lilliefors Test Statisitic	0.395779
Number of Unique Samples	7	Lilliefors 5% Critical Value	0.109059
Minimum	1.2	Data not normal at 5% significance level	
Maximum	50		
Mean	5.321212	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	6.869842
Standard Deviation	7.539772		
Variance	56.84816	Gamma Distribution Test	
Coefficient of Variation	1.416927	A-D Test Statistic	11.07603
Skewness	4.154026	A-D 5% Critical Value	0.7694
		K-S Test Statistic	0.367002
Gamma Statistics		K-S 5% Critical Value	0.111838
k hat	1.476853	Data do not follow gamma distribution	
k star (bias corrected)	1.419824	at 5% significance level	
Theta hat	3.603075		
Theta star	3.747796	95% UCLs (Assuming Gamma Distribution)	
nu hat	194.9446	Approximate Gamma UCL	6.36258
nu star	187.4168	Adjusted Gamma UCL	6.387985
Approx.Chi Square Value (.05)	156.7422		
Adjusted Level of Significance	0.046364	Lognormal Distribution Test	
Adjusted Chi Square Value	156.1188	Lilliefors Test Statisitic	0.371802
		Lilliefors 5% Critical Value	0.109059
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.182322		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.296415	95% H-UCL	5.583616
Standard Deviation of log data	0.704941	95% Chebyshev (MVUE) UCL	6.607837
Variance of log data	0.496942	97.5% Chebyshev (MVUE) UCL	7.448206
		99% Chebyshev (MVUE) UCL	9.098948
		95% Non-parametric UCLs	
		CLT UCL	6.847771
		Adj-CLT UCL (Adjusted for skewness)	7.354836
		Mod-t UCL (Adjusted for skewness)	6.948934
		Jackknife UCL	6.869842
		Standard Bootstrap UCL	6.839401
		Bootstrap-t UCL	7.97672
RECOMMENDATION		Hall's Bootstrap UCL	7.991902
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.931818
		BCA Bootstrap UCL	7.348485
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.366627
		97.5% Chebyshev (Mean, Sd) UCL	11.11708
		99% Chebyshev (Mean, Sd) UCL	14.55551

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_130
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	117	Lilliefors Test Statisitic	0.449584
Number of Unique Samples	29	Lilliefors 5% Critical Value	0.081911
Minimum	0.05	Data not normal at 5% significance level	
Maximum	670		
Mean	36.13262	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	52.81511
Standard Deviation	108.8289		
Variance	11843.72	Gamma Distribution Test	
Coefficient of Variation	3.011928	A-D Test Statistic	13.01472
Skewness	4.070601	A-D 5% Critical Value	0.897479
		K-S Test Statistic	0.330824
Gamma Statistics		K-S 5% Critical Value	0.09358
k hat	0.233863	Data do not follow gamma distribution	
k star (bias corrected)	0.233565	at 5% significance level	
Theta hat	154.5032		
Theta star	154.7006	95% UCLs (Assuming Gamma Distribution)	
nu hat	54.72401	Approximate Gamma UCL	51.07614
nu star	54.65416	Adjusted Gamma UCL	51.29808
Approx.Chi Square Value (.05)	38.66381		
Adjusted Level of Significance	0.047949	Lognormal Distribution Test	
Adjusted Chi Square Value	38.49653	Lilliefors Test Statisitic	0.149662
		Lilliefors 5% Critical Value	0.081911
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	6.507278	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.517263	95% H-UCL	78.34394
Standard Deviation of log data	2.442207	95% Chebyshev (MVUE) UCL	82.0626
Variance of log data	5.964374	97.5% Chebyshev (MVUE) UCL	104.5492
		99% Chebyshev (MVUE) UCL	148.7199
		95% Non-parametric UCLs	
		CLT UCL	52.68188
		Adj-CLT UCL (Adjusted for skewness)	56.72761
		Mod-t UCL (Adjusted for skewness)	53.44616
		Jackknife UCL	52.81511
		Standard Bootstrap UCL	52.73082
		Bootstrap-t UCL	60.95979
RECOMMENDATION		Hall's Bootstrap UCL	59.11105
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	53.41809
		BCA Bootstrap UCL	59.27921
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	79.98852
		97.5% Chebyshev (Mean, Sd) UCL	98.965
		99% Chebyshev (Mean, Sd) UCL	136.2406

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_131
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.434561
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	25		
Mean	2.83209	95% UCL (Assuming Normal Distribution)	
Median	2.3	Student's-t UCL	3.951221
Standard Deviation	5.491009		
Variance	30.15118	Gamma Distribution Test	
Coefficient of Variation	1.938854	A-D Test Statistic	5.651113
Skewness	3.278652	A-D 5% Critical Value	0.840611
		K-S Test Statistic	0.236536
Gamma Statistics		K-S 5% Critical Value	0.116747
k hat	0.40053	Data do not follow gamma distribution	
k star (bias corrected)	0.392546	at 5% significance level	
Theta hat	7.070847		
Theta star	7.21466	95% UCLs (Assuming Gamma Distribution)	
nu hat	53.67108	Approximate Gamma UCL	4.032972
nu star	52.60123	Adjusted Gamma UCL	4.064715
Approx.Chi Square Value (.05)	36.93837		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	36.6499	Lilliefors Test Statisitic	0.266046
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.60155	95% H-UCL	13.42608
Standard Deviation of log data	2.125991	95% Chebyshev (MVUE) UCL	13.07604
Variance of log data	4.519838	97.5% Chebyshev (MVUE) UCL	16.68045
		99% Chebyshev (MVUE) UCL	23.76061
		95% Non-parametric UCLs	
		CLT UCL	3.935512
		Adj-CLT UCL (Adjusted for skewness)	4.222626
		Mod-t UCL (Adjusted for skewness)	3.996005
		Jackknife UCL	3.951221
		Standard Bootstrap UCL	3.908686
		Bootstrap-t UCL	4.560402
RECOMMENDATION		Hall's Bootstrap UCL	4.043116
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.021045
		BCA Bootstrap UCL	4.24194
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.756185
		97.5% Chebyshev (Mean, Sd) UCL	7.021443
		99% Chebyshev (Mean, Sd) UCL	9.506799

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_132
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.429078
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.108242
Minimum	0.1	Data not normal at 5% significance level	
Maximum	85		
Mean	3.006866	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	5.218193
Standard Deviation	10.84986		
Variance	117.7194	Gamma Distribution Test	
Coefficient of Variation	3.608361	A-D Test Statistic	6.724664
Skewness	6.884094	A-D 5% Critical Value	0.835356
		K-S Test Statistic	0.296642
Gamma Statistics		K-S 5% Critical Value	0.116413
k hat	0.422224	Data do not follow gamma distribution	
k star (bias corrected)	0.413268	at 5% significance level	
Theta hat	7.1215		
Theta star	7.275819	95% UCLs (Assuming Gamma Distribution)	
nu hat	56.57797	Approximate Gamma UCL	4.239845
nu star	55.37796	Adjusted Gamma UCL	4.272262
Approx.Chi Square Value (.05)	39.27363		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	38.97562	Lilliefors Test Statisitic	0.222923
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.302585		
Maximum of log data	4.442651	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.444133	95% H-UCL	3.271638
Standard Deviation of log data	1.493563	95% Chebyshev (MVUE) UCL	3.928808
Variance of log data	2.23073	97.5% Chebyshev (MVUE) UCL	4.810218
		99% Chebyshev (MVUE) UCL	6.541577
		95% Non-parametric UCLs	
		CLT UCL	5.187154
		Adj-CLT UCL (Adjusted for skewness)	6.378331
		Mod-t UCL (Adjusted for skewness)	5.403993
		Jackknife UCL	5.218193
		Standard Bootstrap UCL	5.179188
		Bootstrap-t UCL	11.17709
RECOMMENDATION		Hall's Bootstrap UCL	12.54504
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.447164
		BCA Bootstrap UCL	7.29791
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	8.784678
		97.5% Chebyshev (Mean, Sd) UCL	11.28474
		99% Chebyshev (Mean, Sd) UCL	16.19563

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_133
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.365499
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.107443
Minimum	0.048	Data not normal at 5% significance level	
Maximum	50		
Mean	3.910706	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.346684
Standard Deviation	7.099508		
Variance	50.40301	Gamma Distribution Test	
Coefficient of Variation	1.815403	A-D Test Statistic	4.947159
Skewness	4.98136	A-D 5% Critical Value	0.805627
		K-S Test Statistic	0.280918
Gamma Statistics		K-S 5% Critical Value	0.113442
k hat	0.613689	Data do not follow gamma distribution	
k star (bias corrected)	0.596418	at 5% significance level	
Theta hat	6.37246		
Theta star	6.556988	95% UCLs (Assuming Gamma Distribution)	
nu hat	83.46165	Approximate Gamma UCL	5.169971
nu star	81.11285	Adjusted Gamma UCL	5.201449
Approx.Chi Square Value (.05)	61.35596		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	60.98465	Lilliefors Test Statisitic	0.358219
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.036554		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.360227	95% H-UCL	13.68918
Standard Deviation of log data	1.77559	95% Chebyshev (MVUE) UCL	15.47122
Variance of log data	3.152721	97.5% Chebyshev (MVUE) UCL	19.32898
		99% Chebyshev (MVUE) UCL	26.90679
		95% Non-parametric UCLs	
		CLT UCL	5.326829
		Adj-CLT UCL (Adjusted for skewness)	5.882538
		Mod-t UCL (Adjusted for skewness)	5.433364
		Jackknife UCL	5.346684
		Standard Bootstrap UCL	5.317349
		Bootstrap-t UCL	6.813946
RECOMMENDATION		Hall's Bootstrap UCL	9.257634
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.3985
		BCA Bootstrap UCL	6.277147
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.663464
		97.5% Chebyshev (Mean, Sd) UCL	9.287285
		99% Chebyshev (Mean, Sd) UCL	12.47697

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_134
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.446002
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.107443
Minimum	1.1	Data not normal at 5% significance level	
Maximum	190		
Mean	16.41912	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	24.86396
Standard Deviation	41.75149		
Variance	1743.187	Gamma Distribution Test	
Coefficient of Variation	2.542859	A-D Test Statistic	15.27096
Skewness	3.413393	A-D 5% Critical Value	0.816663
		K-S Test Statistic	0.419155
Gamma Statistics		K-S 5% Critical Value	0.114341
k hat	0.49969	Data do not follow gamma distribution	
k star (bias corrected)	0.487449	at 5% significance level	
Theta hat	32.85857		
Theta star	33.68375	95% UCLs (Assuming Gamma Distribution)	
nu hat	67.95791	Approximate Gamma UCL	22.41822
nu star	66.2931	Adjusted Gamma UCL	22.57085
Approx.Chi Square Value (.05)	48.5531		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	48.22478	Lilliefors Test Statisitic	0.327807
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.09531		
Maximum of log data	5.247024	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.527175	95% H-UCL	13.45328
Standard Deviation of log data	1.194599	95% Chebyshev (MVUE) UCL	16.54301
Variance of log data	1.427067	97.5% Chebyshev (MVUE) UCL	19.70425
		99% Chebyshev (MVUE) UCL	25.91391
		95% Non-parametric UCLs	
		CLT UCL	24.7472
		Adj-CLT UCL (Adjusted for skewness)	26.98659
		Mod-t UCL (Adjusted for skewness)	25.21326
		Jackknife UCL	24.86396
		Standard Bootstrap UCL	24.66581
		Bootstrap-t UCL	29.00669
RECOMMENDATION		Hall's Bootstrap UCL	24.68386
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	25.87206
		BCA Bootstrap UCL	26.51618
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	38.48871
		97.5% Chebyshev (Mean, Sd) UCL	48.03824
		99% Chebyshev (Mean, Sd) UCL	66.79645

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_135
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.379759
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.107443
Minimum	0.05	Data not normal at 5% significance level	
Maximum	50		
Mean	3.903618	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	5.338347
Standard Deviation	7.093335		
Variance	50.3154	Gamma Distribution Test	
Coefficient of Variation	1.817118	A-D Test Statistic	5.06492
Skewness	4.997631	A-D 5% Critical Value	0.804698
		K-S Test Statistic	0.283088
Gamma Statistics		K-S 5% Critical Value	0.113366
k hat	0.623318	Data do not follow gamma distribution	
k star (bias corrected)	0.605623	at 5% significance level	
Theta hat	6.26264		
Theta star	6.445625	95% UCLs (Assuming Gamma Distribution)	
nu hat	84.77128	Approximate Gamma UCL	5.148751
nu star	82.3647	Adjusted Gamma UCL	5.179836
Approx.Chi Square Value (.05)	62.44628		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	62.07153	Lilliefors Test Statisitic	0.362142
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.37616	95% H-UCL	13.1563
Standard Deviation of log data	1.752529	95% Chebyshev (MVUE) UCL	14.96958
Variance of log data	3.071358	97.5% Chebyshev (MVUE) UCL	18.67341
		99% Chebyshev (MVUE) UCL	25.94886
		95% Non-parametric UCLs	
		CLT UCL	5.31851
		Adj-CLT UCL (Adjusted for skewness)	5.875549
		Mod-t UCL (Adjusted for skewness)	5.425234
		Jackknife UCL	5.338347
		Standard Bootstrap UCL	5.258491
		Bootstrap-t UCL	7.048297
RECOMMENDATION		Hall's Bootstrap UCL	8.91341
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.397
		BCA Bootstrap UCL	5.872794
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7.653113
		97.5% Chebyshev (Mean, Sd) UCL	9.275522
		99% Chebyshev (Mean, Sd) UCL	12.46243

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_136
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	68	Lilliefors Test Statisitic	0.428359
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.107443
Minimum	0.02	Data not normal at 5% significance level	
Maximum	25		
Mean	2.728088	95% UCL (Assuming Normal Distribution)	
Median	1.5	Student's-t UCL	3.836864
Standard Deviation	5.481811		
Variance	30.05025	Gamma Distribution Test	
Coefficient of Variation	2.009397	A-D Test Statistic	5.818751
Skewness	3.296551	A-D 5% Critical Value	0.846394
		K-S Test Statistic	0.254606
Gamma Statistics		K-S 5% Critical Value	0.116225
k hat	0.377404	Data do not follow gamma distribution	
k star (bias corrected)	0.370557	at 5% significance level	
Theta hat	7.228571		
Theta star	7.362123	95% UCLs (Assuming Gamma Distribution)	
nu hat	51.32688	Approximate Gamma UCL	3.917819
nu star	50.39579	Adjusted Gamma UCL	3.948931
Approx.Chi Square Value (.05)	35.09202		
Adjusted Level of Significance	0.046471	Lognormal Distribution Test	
Adjusted Chi Square Value	34.81554	Lilliefors Test Statisitic	0.280953
		Lilliefors 5% Critical Value	0.107443
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.912023		
Maximum of log data	3.218876	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.756452	95% H-UCL	12.49199
Standard Deviation of log data	2.157222	95% Chebyshev (MVUE) UCL	12.04354
Variance of log data	4.653609	97.5% Chebyshev (MVUE) UCL	15.38069
		99% Chebyshev (MVUE) UCL	21.93588
		95% Non-parametric UCLs	
		CLT UCL	3.821533
		Adj-CLT UCL (Adjusted for skewness)	4.105492
		Mod-t UCL (Adjusted for skewness)	3.881156
		Jackknife UCL	3.836864
		Standard Bootstrap UCL	3.807856
		Bootstrap-t UCL	4.325608
RECOMMENDATION		Hall's Bootstrap UCL	3.90629
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.898382
		BCA Bootstrap UCL	4.138529
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.625741
		97.5% Chebyshev (Mean, Sd) UCL	6.879558
		99% Chebyshev (Mean, Sd) UCL	9.342439

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_137
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	67	Lilliefors Test Statisitic	0.429904
Number of Unique Samples	22	Lilliefors 5% Critical Value	0.108242
Minimum	0.05	Data not normal at 5% significance level	
Maximum	120		
Mean	5.267612	95% UCL (Assuming Normal Distribution)	
Median	2.4	Student's-t UCL	8.377715
Standard Deviation	15.25969		
Variance	232.8582	Gamma Distribution Test	
Coefficient of Variation	2.89689	A-D Test Statistic	6.19031
Skewness	6.733947	A-D 5% Critical Value	0.817987
		K-S Test Statistic	0.339356
Gamma Statistics		K-S 5% Critical Value	0.115308
k hat	0.493911	Data do not follow gamma distribution	
k star (bias corrected)	0.481746	at 5% significance level	
Theta hat	10.66509		
Theta star	10.93441	95% UCLs (Assuming Gamma Distribution)	
nu hat	66.18413	Approximate Gamma UCL	7.225017
nu star	64.554	Adjusted Gamma UCL	7.275712
Approx.Chi Square Value (.05)	47.06499		
Adjusted Level of Significance	0.046418	Lognormal Distribution Test	
Adjusted Chi Square Value	46.73706	Lilliefors Test Statisitic	0.332638
		Lilliefors 5% Critical Value	0.108242
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.995732		
Maximum of log data	4.787492	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.373105	95% H-UCL	11.64154
Standard Deviation of log data	1.699658	95% Chebyshev (MVUE) UCL	13.39923
Variance of log data	2.888837	97.5% Chebyshev (MVUE) UCL	16.66262
		99% Chebyshev (MVUE) UCL	23.07291
		95% Non-parametric UCLs	
		CLT UCL	8.33406
		Adj-CLT UCL (Adjusted for skewness)	9.972842
		Mod-t UCL (Adjusted for skewness)	8.633332
		Jackknife UCL	8.377715
		Standard Bootstrap UCL	8.302514
		Bootstrap-t UCL	14.42761
RECOMMENDATION		Hall's Bootstrap UCL	18.46412
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8.80209
		BCA Bootstrap UCL	10.92112
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	13.39377
		97.5% Chebyshev (Mean, Sd) UCL	16.90996
		99% Chebyshev (Mean, Sd) UCL	23.81685

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_139
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.515247
Number of Unique Samples	15	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	960		
Mean	32.74458	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	55.3793
Standard Deviation	149.5699		
Variance	22371.16	Gamma Distribution Test	
Coefficient of Variation	4.567776	A-D Test Statistic	39.15584
Skewness	5.174447	A-D 5% Critical Value	0.939455
		K-S Test Statistic	0.483186
Gamma Statistics		K-S 5% Critical Value	0.094263
k hat	0.17832	Data do not follow gamma distribution	
k star (bias corrected)	0.179418	at 5% significance level	
Theta hat	183.628		
Theta star	182.5047	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.79685	Approximate Gamma UCL	48.60065
nu star	43.06026	Adjusted Gamma UCL	48.83621
Approx.Chi Square Value (.05)	29.01176		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	28.87182	Lilliefors Test Statisitic	0.458689
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	6.866933	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.711846	95% H-UCL	4.614259
Standard Deviation of log data	1.853538	95% Chebyshev (MVUE) UCL	5.627371
Variance of log data	3.435602	97.5% Chebyshev (MVUE) UCL	6.922609
		99% Chebyshev (MVUE) UCL	9.466853
		95% Non-parametric UCLs	
		CLT UCL	55.20309
		Adj-CLT UCL (Adjusted for skewness)	62.09449
		Mod-t UCL (Adjusted for skewness)	56.45422
		Jackknife UCL	55.3793
		Standard Bootstrap UCL	55.44198
		Bootstrap-t UCL	68.41589
RECOMMENDATION		Hall's Bootstrap UCL	57.96006
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	57.61708
		BCA Bootstrap UCL	62.49833
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	92.26013
		97.5% Chebyshev (Mean, Sd) UCL	118.0126
		99% Chebyshev (Mean, Sd) UCL	168.5982

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_140
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.448056
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.08088
Minimum	0.09	Data not normal at 5% significance level	
Maximum	200		
Mean	2.481167	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.252436
Standard Deviation	18.31252		
Variance	335.3482	Gamma Distribution Test	
Coefficient of Variation	7.380607	A-D Test Statistic	35.254
Skewness	10.72854	A-D 5% Critical Value	0.854839
		K-S Test Statistic	0.491122
Gamma Statistics		K-S 5% Critical Value	0.090865
k hat	0.353422	Data do not follow gamma distribution	
k star (bias corrected)	0.350142	at 5% significance level	
Theta hat	7.020411		
Theta star	7.086175	95% UCLs (Assuming Gamma Distribution)	
nu hat	84.82125	Approximate Gamma UCL	3.262841
nu star	84.03405	Adjusted Gamma UCL	3.273722
Approx.Chi Square Value (.05)	63.90214		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	63.68974	Lilliefors Test Statisitic	0.47571
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.407946		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.990906	95% H-UCL	0.83627
Standard Deviation of log data	1.083796	95% Chebyshev (MVUE) UCL	1.015454
Variance of log data	1.174614	97.5% Chebyshev (MVUE) UCL	1.168042
		99% Chebyshev (MVUE) UCL	1.467772
		95% Non-parametric UCLs	
		CLT UCL	5.230862
		Adj-CLT UCL (Adjusted for skewness)	6.980257
		Mod-t UCL (Adjusted for skewness)	5.525306
		Jackknife UCL	5.252436
		Standard Bootstrap UCL	5.200327
		Bootstrap-t UCL	28.8794
RECOMMENDATION		Hall's Bootstrap UCL	17.1548
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.791583
		BCA Bootstrap UCL	9.05275
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.767922
		97.5% Chebyshev (Mean, Sd) UCL	12.92091
		99% Chebyshev (Mean, Sd) UCL	19.11433

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_141
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.443921
Number of Unique Samples	15	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	2.843333	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.626025
Standard Deviation	18.38799		
Variance	338.1182	Gamma Distribution Test	
Coefficient of Variation	6.467054	A-D Test Statistic	33.25981
Skewness	10.54175	A-D 5% Critical Value	0.856103
		K-S Test Statistic	0.486085
Gamma Statistics		K-S 5% Critical Value	0.090926
k hat	0.348264	Data do not follow gamma distribution	
k star (bias corrected)	0.345113	at 5% significance level	
Theta hat	8.164303		
Theta star	8.238847	95% UCLs (Assuming Gamma Distribution)	
nu hat	83.58337	Approximate Gamma UCL	3.747137
nu star	82.82712	Adjusted Gamma UCL	3.759733
Approx.Chi Square Value (.05)	62.84934		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	62.63879	Lilliefors Test Statisitic	0.474501
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.887413	95% H-UCL	1.144953
Standard Deviation of log data	1.22708	95% Chebyshev (MVUE) UCL	1.408596
Variance of log data	1.505726	97.5% Chebyshev (MVUE) UCL	1.643934
		99% Chebyshev (MVUE) UCL	2.106211
		95% Non-parametric UCLs	
		CLT UCL	5.604362
		Adj-CLT UCL (Adjusted for skewness)	7.330383
		Mod-t UCL (Adjusted for skewness)	5.895249
		Jackknife UCL	5.626025
		Standard Bootstrap UCL	5.653135
		Bootstrap-t UCL	18.69642
RECOMMENDATION		Hall's Bootstrap UCL	14.76563
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.212917
		BCA Bootstrap UCL	7.98125
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	10.16012
		97.5% Chebyshev (Mean, Sd) UCL	13.3261
		99% Chebyshev (Mean, Sd) UCL	19.54506

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_142
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.448534
Number of Unique Samples	52	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	3200		
Mean	138.2763	95% UCL (Assuming Normal Distribution)	
Median	0.445	Student's-t UCL	208.0402
Standard Deviation	460.9986		
Variance	212519.7	Gamma Distribution Test	
Coefficient of Variation	3.333893	A-D Test Statistic	23.3964
Skewness	4.349045	A-D 5% Critical Value	0.952178
		K-S Test Statistic	0.368462
Gamma Statistics		K-S 5% Critical Value	0.09469
k hat	0.168014	Data do not follow gamma distribution	
k star (bias corrected)	0.16937	at 5% significance level	
Theta hat	823.0027		
Theta star	816.4175	95% UCLs (Assuming Gamma Distribution)	
nu hat	40.32346	Approximate Gamma UCL	207.8976
nu star	40.64871	Adjusted Gamma UCL	208.939
Approx.Chi Square Value (.05)	27.03617		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	26.90141	Lilliefors Test Statisitic	0.249786
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	8.070906	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.430738	95% H-UCL	167.7572
Standard Deviation of log data	2.708303	95% Chebyshev (MVUE) UCL	157.5476
Variance of log data	7.334903	97.5% Chebyshev (MVUE) UCL	202.8815
		99% Chebyshev (MVUE) UCL	291.9311
		95% Non-parametric UCLs	
		CLT UCL	207.4971
		Adj-CLT UCL (Adjusted for skewness)	225.3493
		Mod-t UCL (Adjusted for skewness)	210.8248
		Jackknife UCL	208.0402
		Standard Bootstrap UCL	205.1949
		Bootstrap-t UCL	240.6773
RECOMMENDATION		Hall's Bootstrap UCL	234.9549
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	208.4398
		BCA Bootstrap UCL	228.0703
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	321.7128
		97.5% Chebyshev (Mean, Sd) UCL	401.0859
		99% Chebyshev (Mean, Sd) UCL	556.9991

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_143
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.464826
Number of Unique Samples	29	Lilliefors 5% Critical Value	0.081219
Minimum	0.25	Data not normal at 5% significance level	
Maximum	250		
Mean	13.27395	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	20.78672
Standard Deviation	49.43374		
Variance	2443.695	Gamma Distribution Test	
Coefficient of Variation	3.724117	A-D Test Statistic	30.50894
Skewness	4.09161	A-D 5% Critical Value	0.897689
		K-S Test Statistic	0.384589
Gamma Statistics		K-S 5% Critical Value	0.09302
k hat	0.233475	Data do not follow gamma distribution	
k star (bias corrected)	0.233191	at 5% significance level	
Theta hat	56.85382		
Theta star	56.92299	95% UCLs (Assuming Gamma Distribution)	
nu hat	55.56707	Approximate Gamma UCL	18.70925
nu star	55.49955	Adjusted Gamma UCL	18.78847
Approx.Chi Square Value (.05)	39.37614		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	39.21012	Lilliefors Test Statisitic	0.37972
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.521461	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.490052	95% H-UCL	5.114961
Standard Deviation of log data	1.800848	95% Chebyshev (MVUE) UCL	6.269058
Variance of log data	3.243055	97.5% Chebyshev (MVUE) UCL	7.685638
		99% Chebyshev (MVUE) UCL	10.46824
		95% Non-parametric UCLs	
		CLT UCL	20.72774
		Adj-CLT UCL (Adjusted for skewness)	22.54389
		Mod-t UCL (Adjusted for skewness)	21.07001
		Jackknife UCL	20.78672
		Standard Bootstrap UCL	20.7207
		Bootstrap-t UCL	24.50256
RECOMMENDATION		Hall's Bootstrap UCL	21.0033
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	20.93076
		BCA Bootstrap UCL	23.77849
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	33.02667
		97.5% Chebyshev (Mean, Sd) UCL	41.57368
		99% Chebyshev (Mean, Sd) UCL	58.36264

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_144
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	103	Lilliefors Test Statisitic	0.422968
Number of Unique Samples	16	Lilliefors 5% Critical Value	0.0873
Minimum	0.15	Data not normal at 5% significance level	
Maximum	20		
Mean	1.090291	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	1.524313
Standard Deviation	2.653633		
Variance	7.041768	Gamma Distribution Test	
Coefficient of Variation	2.433875	A-D Test Statistic	24.37776
Skewness	4.870885	A-D 5% Critical Value	0.806896
		K-S Test Statistic	0.45279
Gamma Statistics		K-S 5% Critical Value	0.092973
k hat	0.623768	Data do not follow gamma distribution	
k star (bias corrected)	0.612073	at 5% significance level	
Theta hat	1.747911		
Theta star	1.78131	95% UCLs (Assuming Gamma Distribution)	
nu hat	128.4962	Approximate Gamma UCL	1.359123
nu star	126.087	Adjusted Gamma UCL	1.363371
Approx.Chi Square Value (.05)	101.1472		
Adjusted Level of Significance	0.04767	Lognormal Distribution Test	
Adjusted Chi Square Value	100.8321	Lilliefors Test Statisitic	0.442772
		Lilliefors 5% Critical Value	0.0873
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.89712		
Maximum of log data	2.995732	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.898484	95% H-UCL	0.917669
Standard Deviation of log data	1.069914	95% Chebyshev (MVUE) UCL	1.118194
Variance of log data	1.144717	97.5% Chebyshev (MVUE) UCL	1.292426
		99% Chebyshev (MVUE) UCL	1.634672
		95% Non-parametric UCLs	
		CLT UCL	1.520372
		Adj-CLT UCL (Adjusted for skewness)	1.65446
		Mod-t UCL (Adjusted for skewness)	1.545229
		Jackknife UCL	1.524313
		Standard Bootstrap UCL	1.517709
		Bootstrap-t UCL	1.79867
RECOMMENDATION		Hall's Bootstrap UCL	2.13682
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.569417
		BCA Bootstrap UCL	1.721359
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.230014
		97.5% Chebyshev (Mean, Sd) UCL	2.723172
		99% Chebyshev (Mean, Sd) UCL	3.691887

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_145
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.430742
Number of Unique Samples	19	Lilliefors 5% Critical Value	0.081219
Minimum	0.14	Data not normal at 5% significance level	
Maximum	200		
Mean	3.632773	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	6.674983
Standard Deviation	20.01762		
Variance	400.705	Gamma Distribution Test	
Coefficient of Variation	5.510285	A-D Test Statistic	32.52509
Skewness	8.727316	A-D 5% Critical Value	0.863116
		K-S Test Statistic	0.453229
Gamma Statistics		K-S 5% Critical Value	0.09154
k hat	0.319577	Data do not follow gamma distribution	
k star (bias corrected)	0.317122	at 5% significance level	
Theta hat	11.36745		
Theta star	11.45543	95% UCLs (Assuming Gamma Distribution)	
nu hat	76.05927	Approximate Gamma UCL	4.856106
nu star	75.47515	Adjusted Gamma UCL	4.873433
Approx.Chi Square Value (.05)	56.46172		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	56.26097	Lilliefors Test Statisitic	0.440681
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.966113		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.845597	95% H-UCL	1.38483
Standard Deviation of log data	1.318151	95% Chebyshev (MVUE) UCL	1.713885
Variance of log data	1.737521	97.5% Chebyshev (MVUE) UCL	2.018526
		99% Chebyshev (MVUE) UCL	2.616934
		95% Non-parametric UCLs	
		CLT UCL	6.651099
		Adj-CLT UCL (Adjusted for skewness)	8.219751
		Mod-t UCL (Adjusted for skewness)	6.919661
		Jackknife UCL	6.674983
		Standard Bootstrap UCL	6.714131
		Bootstrap-t UCL	19.86527
RECOMMENDATION		Hall's Bootstrap UCL	18.1043
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	7.003361
		BCA Bootstrap UCL	9.302521
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	11.6314
		97.5% Chebyshev (Mean, Sd) UCL	15.09242
		99% Chebyshev (Mean, Sd) UCL	21.89091

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_146
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	64	Lilliefors Test Statisitic	0.426777
Number of Unique Samples	25	Lilliefors 5% Critical Value	0.11075
Minimum	0.2	Data not normal at 5% significance level	
Maximum	650		
Mean	66.33016	95% UCL (Assuming Normal Distribution)	
Median	0.4	Student's-t UCL	101.7792
Standard Deviation	169.8766		
Variance	28858.06	Gamma Distribution Test	
Coefficient of Variation	2.561077	A-D Test Statistic	9.786237
Skewness	2.677778	A-D 5% Critical Value	0.908829
		K-S Test Statistic	0.337604
Gamma Statistics		K-S 5% Critical Value	0.123413
k hat	0.20216	Data do not follow gamma distribution	
k star (bias corrected)	0.2031	at 5% significance level	
Theta hat	328.1071		
Theta star	326.5879	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.87649	Approximate Gamma UCL	112.1537
nu star	25.99686	Adjusted Gamma UCL	113.547
Approx.Chi Square Value (.05)	15.37512		
Adjusted Level of Significance	0.04625	Lognormal Distribution Test	
Adjusted Chi Square Value	15.18645	Lilliefors Test Statisitic	0.251637
		Lilliefors 5% Critical Value	0.11075
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	6.476972	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.560459	95% H-UCL	261.1591
Standard Deviation of log data	2.6673	95% Chebyshev (MVUE) UCL	167.2744
Variance of log data	7.114488	97.5% Chebyshev (MVUE) UCL	218.3706
		99% Chebyshev (MVUE) UCL	318.7391
		95% Non-parametric UCLs	
		CLT UCL	101.2579
		Adj-CLT UCL (Adjusted for skewness)	108.8526
		Mod-t UCL (Adjusted for skewness)	102.9638
		Jackknife UCL	101.7792
		Standard Bootstrap UCL	100.3877
		Bootstrap-t UCL	115.1907
RECOMMENDATION		Hall's Bootstrap UCL	102.5695
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	103.5453
		BCA Bootstrap UCL	112.9641
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	158.8895
		97.5% Chebyshev (Mean, Sd) UCL	198.94
		99% Chebyshev (Mean, Sd) UCL	277.6115

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_147
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	116	Lilliefors Test Statisitic	0.421046
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.082263
Minimum	0.025	Data not normal at 5% significance level	
Maximum	50		
Mean	1.565733	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	2.39679
Standard Deviation	5.397842		
Variance	29.1367	Gamma Distribution Test	
Coefficient of Variation	3.447486	A-D Test Statistic	12.30604
Skewness	7.160765	A-D 5% Critical Value	0.828604
		K-S Test Statistic	0.291222
Gamma Statistics		K-S 5% Critical Value	0.090715
k hat	0.460106	Data do not follow gamma distribution	
k star (bias corrected)	0.453954	at 5% significance level	
Theta hat	3.402981		
Theta star	3.4491	95% UCLs (Assuming Gamma Distribution)	
nu hat	106.7446	Approximate Gamma UCL	1.995614
nu star	105.3173	Adjusted Gamma UCL	2.001704
Approx.Chi Square Value (.05)	82.6306		
Adjusted Level of Significance	0.047931	Lognormal Distribution Test	
Adjusted Chi Square Value	82.37919	Lilliefors Test Statisitic	0.255678
		Lilliefors 5% Critical Value	0.082263
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.688879		
Maximum of log data	3.912023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.950237	95% H-UCL	1.706316
Standard Deviation of log data	1.491282	95% Chebyshev (MVUE) UCL	2.12079
Variance of log data	2.223921	97.5% Chebyshev (MVUE) UCL	2.539737
		99% Chebyshev (MVUE) UCL	3.362678
		95% Non-parametric UCLs	
		CLT UCL	2.390096
		Adj-CLT UCL (Adjusted for skewness)	2.746138
		Mod-t UCL (Adjusted for skewness)	2.452326
		Jackknife UCL	2.39679
		Standard Bootstrap UCL	2.39352
		Bootstrap-t UCL	3.521182
RECOMMENDATION		Hall's Bootstrap UCL	5.460182
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.444397
		BCA Bootstrap UCL	2.927371
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.750313
		97.5% Chebyshev (Mean, Sd) UCL	4.695583
		99% Chebyshev (Mean, Sd) UCL	6.552382

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_148
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.451309
Number of Unique Samples	32	Lilliefors 5% Critical Value	0.08088
Minimum	0.13	Data not normal at 5% significance level	
Maximum	7800		
Mean	87.30442	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	195.1253
Standard Deviation	712.479		
Variance	507626.4	Gamma Distribution Test	
Coefficient of Variation	8.160859	A-D Test Statistic	24.91241
Skewness	10.84002	A-D 5% Critical Value	0.948339
		K-S Test Statistic	0.398708
Gamma Statistics		K-S 5% Critical Value	0.094561
k hat	0.171124	Data do not follow gamma distribution	
k star (bias corrected)	0.172401	at 5% significance level	
Theta hat	510.1827		
Theta star	506.4023	95% UCLs (Assuming Gamma Distribution)	
nu hat	41.06972	Approximate Gamma UCL	130.7354
nu star	41.37631	Adjusted Gamma UCL	131.3837
Approx.Chi Square Value (.05)	27.63089		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	27.49455	Lilliefors Test Statisitic	0.411836
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.040221		
Maximum of log data	8.961879	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.064781	95% H-UCL	56.60765
Standard Deviation of log data	2.48751	95% Chebyshev (MVUE) UCL	58.77492
Variance of log data	6.187705	97.5% Chebyshev (MVUE) UCL	74.98026
		99% Chebyshev (MVUE) UCL	106.8125
		95% Non-parametric UCLs	
		CLT UCL	194.2859
		Adj-CLT UCL (Adjusted for skewness)	263.0563
		Mod-t UCL (Adjusted for skewness)	205.8521
		Jackknife UCL	195.1253
		Standard Bootstrap UCL	194.8969
		Bootstrap-t UCL	1158.562
RECOMMENDATION		Hall's Bootstrap UCL	595.3486
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	217.8178
		BCA Bootstrap UCL	286.7303
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	370.8078
		97.5% Chebyshev (Mean, Sd) UCL	493.48
		99% Chebyshev (Mean, Sd) UCL	734.4456

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_149
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.431395
Number of Unique Samples	18	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	3.533333	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	6.408344
Standard Deviation	18.99804		
Variance	360.9254	Gamma Distribution Test	
Coefficient of Variation	5.376803	A-D Test Statistic	33.01757
Skewness	9.552897	A-D 5% Critical Value	0.861603
		K-S Test Statistic	0.474306
Gamma Statistics		K-S 5% Critical Value	0.091188
k hat	0.325819	Data do not follow gamma distribution	
k star (bias corrected)	0.323229	at 5% significance level	
Theta hat	10.84446		
Theta star	10.93135	95% UCLs (Assuming Gamma Distribution)	
nu hat	78.19662	Approximate Gamma UCL	4.703008
nu star	77.57504	Adjusted Gamma UCL	4.719396
Approx.Chi Square Value (.05)	58.28153		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	58.07914	Lilliefors Test Statisitic	0.46171
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.82583	95% H-UCL	1.472265
Standard Deviation of log data	1.343606	95% Chebyshev (MVUE) UCL	1.824308
Variance of log data	1.805276	97.5% Chebyshev (MVUE) UCL	2.152946
		99% Chebyshev (MVUE) UCL	2.798493
		95% Non-parametric UCLs	
		CLT UCL	6.385963
		Adj-CLT UCL (Adjusted for skewness)	8.001969
		Mod-t UCL (Adjusted for skewness)	6.660408
		Jackknife UCL	6.408344
		Standard Bootstrap UCL	6.417553
		Bootstrap-t UCL	12.9442
RECOMMENDATION		Hall's Bootstrap UCL	15.52609
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.883333
		BCA Bootstrap UCL	8.608333
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	11.09287
		97.5% Chebyshev (Mean, Sd) UCL	14.36388
		99% Chebyshev (Mean, Sd) UCL	20.78916

Data File	C:\lhilsche\AMCO\EPCs15\all._3EPCs15.txt	Variable:	_150
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.451128
Number of Unique Samples	14	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	200		
Mean	2.442083	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.20485
Standard Deviation	18.25633		
Variance	333.2935	Gamma Distribution Test	
Coefficient of Variation	7.475719	A-D Test Statistic	32.77806
Skewness	10.82928	A-D 5% Critical Value	0.851882
		K-S Test Statistic	0.473443
Gamma Statistics		K-S 5% Critical Value	0.090724
k hat	0.365488	Data do not follow gamma distribution	
k star (bias corrected)	0.361906	at 5% significance level	
Theta hat	6.681709		
Theta star	6.747835	95% UCLs (Assuming Gamma Distribution)	
nu hat	87.71708	Approximate Gamma UCL	3.195955
nu star	86.85749	Adjusted Gamma UCL	3.206421
Approx.Chi Square Value (.05)	66.36928		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	66.15264	Lilliefors Test Statisitic	0.469067
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.934069	95% H-UCL	0.894194
Standard Deviation of log data	1.0911	95% Chebyshev (MVUE) UCL	1.086627
Variance of log data	1.1905	97.5% Chebyshev (MVUE) UCL	1.250861
		99% Chebyshev (MVUE) UCL	1.573467
		95% Non-parametric UCLs	
		CLT UCL	5.183342
		Adj-CLT UCL (Adjusted for skewness)	6.943745
		Mod-t UCL (Adjusted for skewness)	5.479437
		Jackknife UCL	5.20485
		Standard Bootstrap UCL	5.209656
		Bootstrap-t UCL	31.04179
RECOMMENDATION		Hall's Bootstrap UCL	16.09539
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.769583
		BCA Bootstrap UCL	7.54875
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.706481
		97.5% Chebyshev (Mean, Sd) UCL	12.84979
		99% Chebyshev (Mean, Sd) UCL	19.02422

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_151
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	64	Lilliefors Test Statisitic	0.427991
Number of Unique Samples	21	Lilliefors 5% Critical Value	0.11075
Minimum	0.2	Data not normal at 5% significance level	
Maximum	270		
Mean	26.94	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	40.91217
Standard Deviation	66.95651		
Variance	4483.174	Gamma Distribution Test	
Coefficient of Variation	2.485394	A-D Test Statistic	10.37961
Skewness	2.569205	A-D 5% Critical Value	0.893358
		K-S Test Statistic	0.321338
Gamma Statistics		K-S 5% Critical Value	0.122553
k hat	0.236105	Data do not follow gamma distribution	
k star (bias corrected)	0.235455	at 5% significance level	
Theta hat	114.1016		
Theta star	114.417	95% UCLs (Assuming Gamma Distribution)	
nu hat	30.22149	Approximate Gamma UCL	43.65302
nu star	30.13819	Adjusted Gamma UCL	44.14978
Approx.Chi Square Value (.05)	18.59947		
Adjusted Level of Significance	0.04625	Lognormal Distribution Test	
Adjusted Chi Square Value	18.39019	Lilliefors Test Statisitic	0.291476
		Lilliefors 5% Critical Value	0.11075
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	5.598422	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.257473	95% H-UCL	59.95438
Standard Deviation of log data	2.324889	95% Chebyshev (MVUE) UCL	50.49093
Variance of log data	5.405108	97.5% Chebyshev (MVUE) UCL	65.08622
		99% Chebyshev (MVUE) UCL	93.75584
		95% Non-parametric UCLs	
		CLT UCL	40.70671
		Adj-CLT UCL (Adjusted for skewness)	43.57876
		Mod-t UCL (Adjusted for skewness)	41.36015
		Jackknife UCL	40.91217
		Standard Bootstrap UCL	40.51082
		Bootstrap-t UCL	45.86681
RECOMMENDATION		Hall's Bootstrap UCL	41.96333
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	41.13703
		BCA Bootstrap UCL	44.77359
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	63.42208
		97.5% Chebyshev (Mean, Sd) UCL	79.20791
		99% Chebyshev (Mean, Sd) UCL	110.2161

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_152
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.464277
Number of Unique Samples	19	Lilliefors 5% Critical Value	0.081219
Minimum	0.14	Data not normal at 5% significance level	
Maximum	360		
Mean	5.592689	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	11.30204
Standard Deviation	37.56728		
Variance	1411.301	Gamma Distribution Test	
Coefficient of Variation	6.717212	A-D Test Statistic	34.56958
Skewness	8.429197	A-D 5% Critical Value	0.881158
		K-S Test Statistic	0.44661
Gamma Statistics		K-S 5% Critical Value	0.092326
k hat	0.27041	Data do not follow gamma distribution	
k star (bias corrected)	0.269195	at 5% significance level	
Theta hat	20.68224		
Theta star	20.77558	95% UCLs (Assuming Gamma Distribution)	
nu hat	64.35762	Approximate Gamma UCL	7.680898
nu star	64.0685	Adjusted Gamma UCL	7.71091
Approx.Chi Square Value (.05)	46.65017		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	46.4686	Lilliefors Test Statisitic	0.436408
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.966113		
Maximum of log data	5.886104	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.872099	95% H-UCL	1.287465
Standard Deviation of log data	1.290097	95% Chebyshev (MVUE) UCL	1.590886
Variance of log data	1.66435	97.5% Chebyshev (MVUE) UCL	1.86869
		99% Chebyshev (MVUE) UCL	2.414382
		95% Non-parametric UCLs	
		CLT UCL	11.25721
		Adj-CLT UCL (Adjusted for skewness)	14.10056
		Mod-t UCL (Adjusted for skewness)	11.74554
		Jackknife UCL	11.30204
		Standard Bootstrap UCL	11.23054
		Bootstrap-t UCL	97.56384
RECOMMENDATION		Hall's Bootstrap UCL	65.80307
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	11.95613
		BCA Bootstrap UCL	16.08235
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	20.60381
		97.5% Chebyshev (Mean, Sd) UCL	27.09913
		99% Chebyshev (Mean, Sd) UCL	39.85794

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_153
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.488715
Number of Unique Samples	32	Lilliefors 5% Critical Value	0.081219
Minimum	0.2	Data not normal at 5% significance level	
Maximum	3500		
Mean	33.98319	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	82.78903
Standard Deviation	321.1404		
Variance	103131.2	Gamma Distribution Test	
Coefficient of Variation	9.449977	A-D Test Statistic	32.71089
Skewness	10.83669	A-D 5% Critical Value	0.931563
		K-S Test Statistic	0.393856
Gamma Statistics		K-S 5% Critical Value	0.094287
k hat	0.184595	Data do not follow gamma distribution	
k star (bias corrected)	0.185544	at 5% significance level	
Theta hat	184.0957		
Theta star	183.1545	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.93367	Approximate Gamma UCL	50.16254
nu star	44.15943	Adjusted Gamma UCL	50.40426
Approx.Chi Square Value (.05)	29.91631		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	29.77285	Lilliefors Test Statisitic	0.410635
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	8.160518	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.510543	95% H-UCL	4.046031
Standard Deviation of log data	1.704031	95% Chebyshev (MVUE) UCL	4.99935
Variance of log data	2.903722	97.5% Chebyshev (MVUE) UCL	6.085057
		99% Chebyshev (MVUE) UCL	8.217718
		95% Non-parametric UCLs	
		CLT UCL	82.40586
		Adj-CLT UCL (Adjusted for skewness)	113.6541
		Mod-t UCL (Adjusted for skewness)	87.66312
		Jackknife UCL	82.78903
		Standard Bootstrap UCL	81.3472
		Bootstrap-t UCL	1008.536
RECOMMENDATION		Hall's Bootstrap UCL	920.2949
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	92.15966
		BCA Bootstrap UCL	148.7168
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	162.3044
		97.5% Chebyshev (Mean, Sd) UCL	217.829
		99% Chebyshev (Mean, Sd) UCL	326.8965

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_154
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.344512
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	12.5		
Mean	0.82	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	1.287352
Standard Deviation	1.971118		
Variance	3.885306	Gamma Distribution Test	
Coefficient of Variation	2.403802	A-D Test Statistic	12.76897
Skewness	4.834572	A-D 5% Critical Value	0.793261
		K-S Test Statistic	0.453546
Gamma Statistics		K-S 5% Critical Value	0.13037
k hat	0.751669	Data do not follow gamma distribution	
k star (bias corrected)	0.719902	at 5% significance level	
Theta hat	1.090906		
Theta star	1.139044	95% UCLs (Assuming Gamma Distribution)	
nu hat	75.16689	Approximate Gamma UCL	1.104425
nu star	71.99021	Adjusted Gamma UCL	1.114317
Approx.Chi Square Value (.05)	53.4504		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	52.97594	Shapiro-Wilk Test Statisitic	0.500574
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	2.525729	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.994618	95% H-UCL	0.753747
Standard Deviation of log data	0.916722	95% Chebyshev (MVUE) UCL	0.91882
Variance of log data	0.840379	97.5% Chebyshev (MVUE) UCL	1.075597
		99% Chebyshev (MVUE) UCL	1.383555
		95% Non-parametric UCLs	
		CLT UCL	1.278516
		Adj-CLT UCL (Adjusted for skewness)	1.482165
		Mod-t UCL (Adjusted for skewness)	1.319117
		Jackknife UCL	1.287352
		Standard Bootstrap UCL	1.269058
		Bootstrap-t UCL	2.006934
RECOMMENDATION		Hall's Bootstrap UCL	2.512998
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.35
		BCA Bootstrap UCL	1.59
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.035079
		97.5% Chebyshev (Mean, Sd) UCL	2.560844
		99% Chebyshev (Mean, Sd) UCL	3.593609

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_155
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.396271
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.2	Data not normal at 5% significance level	
Maximum	12.5		
Mean	0.962	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	1.478362
Standard Deviation	2.177823		
Variance	4.742914	Gamma Distribution Test	
Coefficient of Variation	2.26385	A-D Test Statistic	12.11979
Skewness	3.967044	A-D 5% Critical Value	0.79922
		K-S Test Statistic	0.442964
Gamma Statistics		K-S 5% Critical Value	0.130947
k hat	0.679853	Data do not follow gamma distribution	
k star (bias corrected)	0.652395	at 5% significance level	
Theta hat	1.415011		
Theta star	1.474566	95% UCLs (Assuming Gamma Distribution)	
nu hat	67.98533	Approximate Gamma UCL	1.31708
nu star	65.23954	Adjusted Gamma UCL	1.32954
Approx.Chi Square Value (.05)	47.6512		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	47.20462	Shapiro-Wilk Test Statisitic	0.539668
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	2.525729	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.931325	95% H-UCL	0.917969
Standard Deviation of log data	1.010416	95% Chebyshev (MVUE) UCL	1.121748
Variance of log data	1.02094	97.5% Chebyshev (MVUE) UCL	1.327295
		99% Chebyshev (MVUE) UCL	1.731054
		95% Non-parametric UCLs	
		CLT UCL	1.4686
		Adj-CLT UCL (Adjusted for skewness)	1.653229
		Mod-t UCL (Adjusted for skewness)	1.50716
		Jackknife UCL	1.478362
		Standard Bootstrap UCL	1.453884
		Bootstrap-t UCL	2.073892
RECOMMENDATION		Hall's Bootstrap UCL	1.831671
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.491
		BCA Bootstrap UCL	1.723
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.3045
		97.5% Chebyshev (Mean, Sd) UCL	2.885401
		99% Chebyshev (Mean, Sd) UCL	4.026469

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_156
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	97	Lilliefors Test Statisitic	0.426888
Number of Unique Samples	15	Lilliefors 5% Critical Value	0.08996
Minimum	2	Data not normal at 5% significance level	
Maximum	200		
Mean	10.35052	95% UCL (Assuming Normal Distribution)	
Median	3	Student's-t UCL	15.37791
Standard Deviation	29.81192		
Variance	888.7509	Gamma Distribution Test	
Coefficient of Variation	2.880236	A-D Test Statistic	19.74871
Skewness	5.404775	A-D 5% Critical Value	0.803301
		K-S Test Statistic	0.393744
Gamma Statistics		K-S 5% Critical Value	0.095048
k hat	0.658634	Data do not follow gamma distribution	
k star (bias corrected)	0.645136	at 5% significance level	
Theta hat	15.71514		
Theta star	16.04392	95% UCLs (Assuming Gamma Distribution)	
nu hat	127.7749	Approximate Gamma UCL	12.91386
nu star	125.1564	Adjusted Gamma UCL	12.95694
Approx.Chi Square Value (.05)	100.3135		
Adjusted Level of Significance	0.047526	Lognormal Distribution Test	
Adjusted Chi Square Value	99.97988	Lilliefors Test Statisitic	0.340338
		Lilliefors 5% Critical Value	0.08996
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.411536	95% H-UCL	7.952129
Standard Deviation of log data	0.950559	95% Chebyshev (MVUE) UCL	9.584778
Variance of log data	0.903563	97.5% Chebyshev (MVUE) UCL	10.96188
		99% Chebyshev (MVUE) UCL	13.66692
		95% Non-parametric UCLs	
		CLT UCL	15.32939
		Adj-CLT UCL (Adjusted for skewness)	17.1043
		Mod-t UCL (Adjusted for skewness)	15.65476
		Jackknife UCL	15.37791
		Standard Bootstrap UCL	15.36014
		Bootstrap-t UCL	22.28892
RECOMMENDATION		Hall's Bootstrap UCL	20.09267
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.76289
		BCA Bootstrap UCL	17.90722
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	23.54465
		97.5% Chebyshev (Mean, Sd) UCL	29.25376
		99% Chebyshev (Mean, Sd) UCL	40.46821

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_157
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	121	Lilliefors Test Statisitic	0.470633
Number of Unique Samples	34	Lilliefors 5% Critical Value	0.080545
Minimum	2	Data not normal at 5% significance level	
Maximum	3300		
Mean	163.6033	95% UCL (Assuming Normal Distribution)	
Median	4	Student's-t UCL	248.9952
Standard Deviation	566.6518		
Variance	321094.3	Gamma Distribution Test	
Coefficient of Variation	3.463572	A-D Test Statistic	26.06771
Skewness	4.06924	A-D 5% Critical Value	0.895218
		K-S Test Statistic	0.372432
Gamma Statistics		K-S 5% Critical Value	0.092348
k hat	0.239075	Data do not follow gamma distribution	
k star (bias corrected)	0.238657	at 5% significance level	
Theta hat	684.3173		
Theta star	685.5154	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.8562	Approximate Gamma UCL	228.8895
nu star	57.75508	Adjusted Gamma UCL	229.8212
Approx.Chi Square Value (.05)	41.28159		
Adjusted Level of Significance	0.048017	Lognormal Distribution Test	
Adjusted Chi Square Value	41.11423	Lilliefors Test Statisitic	0.273366
		Lilliefors 5% Critical Value	0.080545
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	8.101678	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.105024	95% H-UCL	81.9639
Standard Deviation of log data	1.880282	95% Chebyshev (MVUE) UCL	99.7238
Variance of log data	3.53546	97.5% Chebyshev (MVUE) UCL	122.8661
		99% Chebyshev (MVUE) UCL	168.3246
		95% Non-parametric UCLs	
		CLT UCL	248.336
		Adj-CLT UCL (Adjusted for skewness)	268.6982
		Mod-t UCL (Adjusted for skewness)	252.1713
		Jackknife UCL	248.9952
		Standard Bootstrap UCL	247.0665
		Bootstrap-t UCL	281.7814
RECOMMENDATION		Hall's Bootstrap UCL	258.7328
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	250.3554
		BCA Bootstrap UCL	265.3636
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	388.1468
		97.5% Chebyshev (Mean, Sd) UCL	485.3069
		99% Chebyshev (Mean, Sd) UCL	676.1592

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_158
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	122	Lilliefors Test Statisitic	0.439755
Number of Unique Samples	43	Lilliefors 5% Critical Value	0.080215
Minimum	0.16	Data not normal at 5% significance level	
Maximum	4000		
Mean	64.66074	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	120.5304
Standard Deviation	372.2979		
Variance	138605.7	Gamma Distribution Test	
Coefficient of Variation	5.757712	A-D Test Statistic	28.36183
Skewness	9.968892	A-D 5% Critical Value	0.941672
		K-S Test Statistic	0.399335
Gamma Statistics		K-S 5% Critical Value	0.093756
k hat	0.176862	Data do not follow gamma distribution	
k star (bias corrected)	0.177978	at 5% significance level	
Theta hat	365.5997		
Theta star	363.3084	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.15436	Approximate Gamma UCL	95.79371
nu star	43.42652	Adjusted Gamma UCL	96.24806
Approx.Chi Square Value (.05)	29.31289		
Adjusted Level of Significance	0.048033	Lognormal Distribution Test	
Adjusted Chi Square Value	29.17452	Lilliefors Test Statisitic	0.259569
		Lilliefors 5% Critical Value	0.080215
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.832581		
Maximum of log data	8.29405	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.07135	95% H-UCL	28.28608
Standard Deviation of log data	2.304781	95% Chebyshev (MVUE) UCL	31.48151
Variance of log data	5.312014	97.5% Chebyshev (MVUE) UCL	39.78234
		99% Chebyshev (MVUE) UCL	56.08773
		95% Non-parametric UCLs	
		CLT UCL	120.1026
		Adj-CLT UCL (Adjusted for skewness)	152.6082
		Mod-t UCL (Adjusted for skewness)	125.6006
		Jackknife UCL	120.5304
		Standard Bootstrap UCL	120.7828
		Bootstrap-t UCL	262.7556
RECOMMENDATION		Hall's Bootstrap UCL	313.4961
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	128.1666
		BCA Bootstrap UCL	168.7337
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	211.583
		97.5% Chebyshev (Mean, Sd) UCL	275.1563
		99% Chebyshev (Mean, Sd) UCL	400.0339

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_159
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.454608
Number of Unique Samples	8	Lilliefors 5% Critical Value	0.081219
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	2.340336	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.126332
Standard Deviation	18.33174		
Variance	336.0527	Gamma Distribution Test	
Coefficient of Variation	7.832952	A-D Test Statistic	36.08041
Skewness	10.80501	A-D 5% Critical Value	0.853445
		K-S Test Statistic	0.478675
Gamma Statistics		K-S 5% Critical Value	0.091077
k hat	0.359036	Data do not follow gamma distribution	
k star (bias corrected)	0.355587	at 5% significance level	
Theta hat	6.518393		
Theta star	6.581619	95% UCLs (Assuming Gamma Distribution)	
nu hat	85.45051	Approximate Gamma UCL	3.07444
nu star	84.62963	Adjusted Gamma UCL	3.084741
Approx.Chi Square Value (.05)	64.42207		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	64.20695	Lilliefors Test Statisitic	0.467335
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.014849	95% H-UCL	0.738104
Standard Deviation of log data	1.007585	95% Chebyshev (MVUE) UCL	0.888816
Variance of log data	1.015227	97.5% Chebyshev (MVUE) UCL	1.014504
		99% Chebyshev (MVUE) UCL	1.261393
		95% Non-parametric UCLs	
		CLT UCL	5.10446
		Adj-CLT UCL (Adjusted for skewness)	6.882994
		Mod-t UCL (Adjusted for skewness)	5.403747
		Jackknife UCL	5.126332
		Standard Bootstrap UCL	5.166069
		Bootstrap-t UCL	36.62991
RECOMMENDATION		Hall's Bootstrap UCL	19.46757
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.686975
		BCA Bootstrap UCL	9.006303
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.665326
		97.5% Chebyshev (Mean, Sd) UCL	12.83485
		99% Chebyshev (Mean, Sd) UCL	19.06078

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_160
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	100	Lilliefors Test Statisitic	0.448832
Number of Unique Samples	19	Lilliefors 5% Critical Value	0.0886
Minimum	0.19	Data not normal at 5% significance level	
Maximum	200		
Mean	2.7604	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	6.07877
Standard Deviation	19.98548		
Variance	399.4193	Gamma Distribution Test	
Coefficient of Variation	7.240066	A-D Test Statistic	27.0829
Skewness	9.907346	A-D 5% Critical Value	0.855502
		K-S Test Statistic	0.436861
Gamma Statistics		K-S 5% Critical Value	0.096472
k hat	0.349259	Data do not follow gamma distribution	
k star (bias corrected)	0.345448	at 5% significance level	
Theta hat	7.903585		
Theta star	7.99078	95% UCLs (Assuming Gamma Distribution)	
nu hat	69.85185	Approximate Gamma UCL	3.742968
nu star	69.08963	Adjusted Gamma UCL	3.759719
Approx.Chi Square Value (.05)	50.95288		
Adjusted Level of Significance	0.0476	Lognormal Distribution Test	
Adjusted Chi Square Value	50.72587	Lilliefors Test Statisitic	0.435898
		Lilliefors 5% Critical Value	0.0886
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.660731		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.910613	95% H-UCL	0.963456
Standard Deviation of log data	1.109812	95% Chebyshev (MVUE) UCL	1.179167
Variance of log data	1.231683	97.5% Chebyshev (MVUE) UCL	1.370297
		99% Chebyshev (MVUE) UCL	1.745735
		95% Non-parametric UCLs	
		CLT UCL	6.047719
		Adj-CLT UCL (Adjusted for skewness)	8.16341
		Mod-t UCL (Adjusted for skewness)	6.408775
		Jackknife UCL	6.07877
		Standard Bootstrap UCL	5.97568
		Bootstrap-t UCL	48.45382
RECOMMENDATION		Hall's Bootstrap UCL	23.84233
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.6734
		BCA Bootstrap UCL	9.2992
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	11.47187
		97.5% Chebyshev (Mean, Sd) UCL	15.24133
		99% Chebyshev (Mean, Sd) UCL	22.6457

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_161
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.454795
Number of Unique Samples	9	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	2.323333	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.086389
Standard Deviation	18.25824		
Variance	333.3632	Gamma Distribution Test	
Coefficient of Variation	7.858638	A-D Test Statistic	36.96155
Skewness	10.84561	A-D 5% Critical Value	0.853686
		K-S Test Statistic	0.48691
Gamma Statistics		K-S 5% Critical Value	0.09081
k hat	0.358128	Data do not follow gamma distribution	
k star (bias corrected)	0.354731	at 5% significance level	
Theta hat	6.487435		
Theta star	6.549572	95% UCLs (Assuming Gamma Distribution)	
nu hat	85.95076	Approximate Gamma UCL	3.049435
nu star	85.13533	Adjusted Gamma UCL	3.059532
Approx.Chi Square Value (.05)	64.86374		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	64.64968	Lilliefors Test Statisitic	0.472753
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.027637	95% H-UCL	0.725522
Standard Deviation of log data	1.004901	95% Chebyshev (MVUE) UCL	0.873103
Variance of log data	1.009826	97.5% Chebyshev (MVUE) UCL	0.995946
		99% Chebyshev (MVUE) UCL	1.237247
		95% Non-parametric UCLs	
		CLT UCL	5.064879
		Adj-CLT UCL (Adjusted for skewness)	6.828122
		Mod-t UCL (Adjusted for skewness)	5.361419
		Jackknife UCL	5.086389
		Standard Bootstrap UCL	5.022157
		Bootstrap-t UCL	36.70916
RECOMMENDATION		Hall's Bootstrap UCL	19.49577
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.6
		BCA Bootstrap UCL	8.885417
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.58849
		97.5% Chebyshev (Mean, Sd) UCL	12.73213
		99% Chebyshev (Mean, Sd) UCL	18.9072

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_162
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.43391
Number of Unique Samples	33	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	6700		
Mean	104.5521	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	199.4393
Standard Deviation	627.0136		
Variance	393146	Gamma Distribution Test	
Coefficient of Variation	5.997141	A-D Test Statistic	25.11827
Skewness	9.989674	A-D 5% Critical Value	0.953042
		K-S Test Statistic	0.408834
Gamma Statistics		K-S 5% Critical Value	0.094719
k hat	0.167315	Data do not follow gamma distribution	
k star (bias corrected)	0.168687	at 5% significance level	
Theta hat	624.8827		
Theta star	619.7977	95% UCLs (Assuming Gamma Distribution)	
nu hat	40.15554	Approximate Gamma UCL	157.3381
nu star	40.48498	Adjusted Gamma UCL	158.1281
Approx.Chi Square Value (.05)	26.90251		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	26.76811	Lilliefors Test Statisitic	0.416159
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	8.809863	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.129531	95% H-UCL	102.8716
Standard Deviation of log data	2.652503	95% Chebyshev (MVUE) UCL	99.32657
Variance of log data	7.035773	97.5% Chebyshev (MVUE) UCL	127.622
		99% Chebyshev (MVUE) UCL	183.2028
		95% Non-parametric UCLs	
		CLT UCL	198.7006
		Adj-CLT UCL (Adjusted for skewness)	254.4741
		Mod-t UCL (Adjusted for skewness)	208.1388
		Jackknife UCL	199.4393
		Standard Bootstrap UCL	196.2256
		Bootstrap-t UCL	458.3385
RECOMMENDATION		Hall's Bootstrap UCL	502.3363
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	210.9313
		BCA Bootstrap UCL	293.2771
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	354.0478
		97.5% Chebyshev (Mean, Sd) UCL	462.0048
		99% Chebyshev (Mean, Sd) UCL	674.0654

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_163
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.467131
Number of Unique Samples	21	Lilliefors 5% Critical Value	0.08088
Minimum	0.17	Data not normal at 5% significance level	
Maximum	680		
Mean	21.0035	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	33.72973
Standard Deviation	84.09476		
Variance	7071.929	Gamma Distribution Test	
Coefficient of Variation	4.003845	A-D Test Statistic	33.6369
Skewness	5.778131	A-D 5% Critical Value	0.910869
		K-S Test Statistic	0.480955
Gamma Statistics		K-S 5% Critical Value	0.093288
k hat	0.204069	Data do not follow gamma distribution	
k star (bias corrected)	0.204523	at 5% significance level	
Theta hat	102.9235		
Theta star	102.6951	95% UCLs (Assuming Gamma Distribution)	
nu hat	48.97655	Approximate Gamma UCL	30.32362
nu star	49.08547	Adjusted Gamma UCL	30.46005
Approx.Chi Square Value (.05)	33.9988		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	33.84652	Lilliefors Test Statisitic	0.461346
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.771957		
Maximum of log data	6.522093	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.550213	95% H-UCL	7.917725
Standard Deviation of log data	2.009141	95% Chebyshev (MVUE) UCL	9.43224
Variance of log data	4.03665	97.5% Chebyshev (MVUE) UCL	11.72426
		99% Chebyshev (MVUE) UCL	16.2265
		95% Non-parametric UCLs	
		CLT UCL	33.63066
		Adj-CLT UCL (Adjusted for skewness)	37.95734
		Mod-t UCL (Adjusted for skewness)	34.4046
		Jackknife UCL	33.72973
		Standard Bootstrap UCL	33.2973
		Bootstrap-t UCL	44.8348
RECOMMENDATION		Hall's Bootstrap UCL	50.31291
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	35.13975
		BCA Bootstrap UCL	38.99017
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	54.46575
		97.5% Chebyshev (Mean, Sd) UCL	68.94489
		99% Chebyshev (Mean, Sd) UCL	97.38636

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_164
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	119	Lilliefors Test Statisitic	0.454612
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.081219
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	2.340336	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.12658
Standard Deviation	18.33337		
Variance	336.1124	Gamma Distribution Test	
Coefficient of Variation	7.833647	A-D Test Statistic	36.24051
Skewness	10.80232	A-D 5% Critical Value	0.853596
		K-S Test Statistic	0.486609
Gamma Statistics		K-S 5% Critical Value	0.091085
k hat	0.35842	Data do not follow gamma distribution	
k star (bias corrected)	0.354986	at 5% significance level	
Theta hat	6.529599		
Theta star	6.592755	95% UCLs (Assuming Gamma Distribution)	
nu hat	85.30386	Approximate Gamma UCL	3.075205
nu star	84.48668	Adjusted Gamma UCL	3.085518
Approx.Chi Square Value (.05)	64.29725		
Adjusted Level of Significance	0.047983	Lognormal Distribution Test	
Adjusted Chi Square Value	64.08235	Lilliefors Test Statisitic	0.47408
		Lilliefors 5% Critical Value	0.081219
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.018577	95% H-UCL	0.737316
Standard Deviation of log data	1.009642	95% Chebyshev (MVUE) UCL	0.888087
Variance of log data	1.019378	97.5% Chebyshev (MVUE) UCL	1.013896
		99% Chebyshev (MVUE) UCL	1.261022
		95% Non-parametric UCLs	
		CLT UCL	5.104705
		Adj-CLT UCL (Adjusted for skewness)	6.882955
		Mod-t UCL (Adjusted for skewness)	5.403951
		Jackknife UCL	5.12658
		Standard Bootstrap UCL	5.071839
		Bootstrap-t UCL	37.33015
RECOMMENDATION		Hall's Bootstrap UCL	20.46044
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.660504
		BCA Bootstrap UCL	8.936134
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.665976
		97.5% Chebyshev (Mean, Sd) UCL	12.83579
		99% Chebyshev (Mean, Sd) UCL	19.06227

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_165
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	121	Lilliefors Test Statisitic	0.449585
Number of Unique Samples	24	Lilliefors 5% Critical Value	0.080545
Minimum	0.2	Data not normal at 5% significance level	
Maximum	200		
Mean	2.503884	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.243876
Standard Deviation	18.18231		
Variance	330.5963	Gamma Distribution Test	
Coefficient of Variation	7.26164	A-D Test Statistic	28.90715
Skewness	10.85908	A-D 5% Critical Value	0.848248
		K-S Test Statistic	0.373704
Gamma Statistics		K-S 5% Critical Value	0.090273
k hat	0.380396	Data do not follow gamma distribution	
k star (bias corrected)	0.376475	at 5% significance level	
Theta hat	6.582303		
Theta star	6.65087	95% UCLs (Assuming Gamma Distribution)	
nu hat	92.05593	Approximate Gamma UCL	3.254537
nu star	91.10688	Adjusted Gamma UCL	3.264833
Approx.Chi Square Value (.05)	70.09325		
Adjusted Level of Significance	0.048017	Lognormal Distribution Test	
Adjusted Chi Square Value	69.8722	Lilliefors Test Statisitic	0.35657
		Lilliefors 5% Critical Value	0.080545
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.82613	95% H-UCL	1.001418
Standard Deviation of log data	1.095669	95% Chebyshev (MVUE) UCL	1.217181
Variance of log data	1.20049	97.5% Chebyshev (MVUE) UCL	1.401335
		99% Chebyshev (MVUE) UCL	1.76307
		95% Non-parametric UCLs	
		CLT UCL	5.222724
		Adj-CLT UCL (Adjusted for skewness)	6.966285
		Mod-t UCL (Adjusted for skewness)	5.515837
		Jackknife UCL	5.243876
		Standard Bootstrap UCL	5.26882
		Bootstrap-t UCL	29.09884
RECOMMENDATION		Hall's Bootstrap UCL	15.44211
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.774132
		BCA Bootstrap UCL	9.076281
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.708869
		97.5% Chebyshev (Mean, Sd) UCL	12.82647
		99% Chebyshev (Mean, Sd) UCL	18.9504

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_166
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	80	Lilliefors Test Statisitic	0.438389
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.099058
Minimum	0.21	Data not normal at 5% significance level	
Maximum	200		
Mean	3.692375	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	7.871621
Standard Deviation	22.45912		
Variance	504.4121	Gamma Distribution Test	
Coefficient of Variation	6.082568	A-D Test Statistic	23.31322
Skewness	8.673591	A-D 5% Critical Value	0.862207
		K-S Test Statistic	0.503792
Gamma Statistics		K-S 5% Critical Value	0.108135
k hat	0.311679	Data do not follow gamma distribution	
k star (bias corrected)	0.308324	at 5% significance level	
Theta hat	11.84672		
Theta star	11.97561	95% UCLs (Assuming Gamma Distribution)	
nu hat	49.86866	Approximate Gamma UCL	5.325428
nu star	49.33191	Adjusted Gamma UCL	5.36162
Approx.Chi Square Value (.05)	34.20419		
Adjusted Level of Significance	0.047	Lognormal Distribution Test	
Adjusted Chi Square Value	33.9733	Lilliefors Test Statisitic	0.486397
		Lilliefors 5% Critical Value	0.099058
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.560648		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.892402	95% H-UCL	1.362827
Standard Deviation of log data	1.291748	95% Chebyshev (MVUE) UCL	1.681251
Variance of log data	1.668613	97.5% Chebyshev (MVUE) UCL	2.007973
		99% Chebyshev (MVUE) UCL	2.649754
		95% Non-parametric UCLs	
		CLT UCL	7.822613
		Adj-CLT UCL (Adjusted for skewness)	10.42446
		Mod-t UCL (Adjusted for skewness)	8.277457
		Jackknife UCL	7.871621
		Standard Bootstrap UCL	7.685603
		Bootstrap-t UCL	32.73539
RECOMMENDATION		Hall's Bootstrap UCL	23.98938
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	8.7345
		BCA Bootstrap UCL	11.84413
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	14.6376
		97.5% Chebyshev (Mean, Sd) UCL	19.3736
		99% Chebyshev (Mean, Sd) UCL	28.67657

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_167
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	93	Lilliefors Test Statisitic	0.373683
Number of Unique Samples	13	Lilliefors 5% Critical Value	0.091874
Minimum	0.25	Data not normal at 5% significance level	
Maximum	100		
Mean	7.300538	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	9.835919
Standard Deviation	14.71507		
Variance	216.5332	Gamma Distribution Test	
Coefficient of Variation	2.015614	A-D Test Statistic	7.223985
Skewness	3.621855	A-D 5% Critical Value	0.832965
		K-S Test Statistic	0.273235
Gamma Statistics		K-S 5% Critical Value	0.098881
k hat	0.441175	Data do not follow gamma distribution	
k star (bias corrected)	0.434112	at 5% significance level	
Theta hat	16.54794		
Theta star	16.81718	95% UCLs (Assuming Gamma Distribution)	
nu hat	82.05854	Approximate Gamma UCL	9.657972
nu star	80.74482	Adjusted Gamma UCL	9.700686
Approx.Chi Square Value (.05)	61.03565		
Adjusted Level of Significance	0.047419	Lognormal Distribution Test	
Adjusted Chi Square Value	60.7669	Lilliefors Test Statisitic	0.219562
		Lilliefors 5% Critical Value	0.091874
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	4.60517	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.519604	95% H-UCL	12.88272
Standard Deviation of log data	1.729818	95% Chebyshev (MVUE) UCL	15.51558
Variance of log data	2.992269	97.5% Chebyshev (MVUE) UCL	19.10384
		99% Chebyshev (MVUE) UCL	26.15228
		95% Non-parametric UCLs	
		CLT UCL	9.810389
		Adj-CLT UCL (Adjusted for skewness)	10.42273
		Mod-t UCL (Adjusted for skewness)	9.931432
		Jackknife UCL	9.835919
		Standard Bootstrap UCL	9.810824
		Bootstrap-t UCL	10.83171
RECOMMENDATION		Hall's Bootstrap UCL	11.25413
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.926882
		BCA Bootstrap UCL	10.72204
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	13.9517
		97.5% Chebyshev (Mean, Sd) UCL	16.82966
		99% Chebyshev (Mean, Sd) UCL	22.48286

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_168
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.437548
Number of Unique Samples	27	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	4000		
Mean	82.94492	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	143.8996
Standard Deviation	402.7878		
Variance	162238	Gamma Distribution Test	
Coefficient of Variation	4.856088	A-D Test Statistic	31.8081
Skewness	8.216223	A-D 5% Critical Value	0.959694
		K-S Test Statistic	0.439469
Gamma Statistics		K-S 5% Critical Value	0.094943
k hat	0.161926	Data do not follow gamma distribution	
k star (bias corrected)	0.163434	at 5% significance level	
Theta hat	512.2388		
Theta star	507.5143	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.8623	Approximate Gamma UCL	125.7355
nu star	39.22408	Adjusted Gamma UCL	126.3784
Approx.Chi Square Value (.05)	25.87525		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	25.74362	Lilliefors Test Statisitic	0.42432
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	8.29405	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.275255	95% H-UCL	36.84328
Standard Deviation of log data	2.458743	95% Chebyshev (MVUE) UCL	38.68988
Variance of log data	6.045415	97.5% Chebyshev (MVUE) UCL	49.29161
		99% Chebyshev (MVUE) UCL	70.11665
		95% Non-parametric UCLs	
		CLT UCL	143.4251
		Adj-CLT UCL (Adjusted for skewness)	172.8929
		Mod-t UCL (Adjusted for skewness)	148.496
		Jackknife UCL	143.8996
		Standard Bootstrap UCL	144.8857
		Bootstrap-t UCL	232.8782
RECOMMENDATION		Hall's Bootstrap UCL	346.6369
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	148.5963
		BCA Bootstrap UCL	189.7341
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	243.2187
		97.5% Chebyshev (Mean, Sd) UCL	312.5693
		99% Chebyshev (Mean, Sd) UCL	448.7951

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_169
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	6	Shapiro-Wilk Test Statisitic	0.499241
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.788
Minimum	2	Data not normal at 5% significance level	
Maximum	430		
Mean	73.66667	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	217.2739
Standard Deviation	174.5688		
Variance	30474.27	Gamma Distribution Test	
Coefficient of Variation	2.369712	A-D Test Statistic	1.531466
Skewness	2.449374	A-D 5% Critical Value	0.777353
		K-S Test Statistic	0.480327
Gamma Statistics		K-S 5% Critical Value	0.35885
k hat	0.270212	Data do not follow gamma distribution	
k star (bias corrected)	0.246217	at 5% significance level	
Theta hat	272.6257		
Theta star	299.1941	95% UCLs (Assuming Gamma Distribution)	
nu hat	3.242541	Approximate Gamma UCL	606.4042
nu star	2.954604	Adjusted Gamma UCL	1351.194
Approx.Chi Square Value (.05)	0.358929		
Adjusted Level of Significance	0.01222	Lognormal Distribution Test	
Adjusted Chi Square Value	0.161084	Shapiro-Wilk Test Statisitic	0.573828
		Shapiro-Wilk 5% Critical Value	0.788
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	6.063785	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.703778	95% H-UCL	234773
Standard Deviation of log data	2.153878	95% Chebyshev (MVUE) UCL	114.2339
Variance of log data	4.639191	97.5% Chebyshev (MVUE) UCL	152.0903
		99% Chebyshev (MVUE) UCL	226.4518
		95% Non-parametric UCLs	
		CLT UCL	190.8911
		Adj-CLT UCL (Adjusted for skewness)	267.0378
		Mod-t UCL (Adjusted for skewness)	229.1513
		Jackknife UCL	217.2739
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's B	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Can't recommend Hall's Bootstrap UCL*		95% Chebyshev (Mean, Sd) UCL	384.3141
		97.5% Chebyshev (Mean, Sd) UCL	518.7315
		99% Chebyshev (Mean, Sd) UCL	782.7685

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_170
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.395974
Number of Unique Samples	27	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	250		
Mean	8.715667	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	13.58424
Standard Deviation	32.17149		
Variance	1035.005	Gamma Distribution Test	
Coefficient of Variation	3.691225	A-D Test Statistic	27.1957
Skewness	5.849736	A-D 5% Critical Value	0.882069
		K-S Test Statistic	0.442163
Gamma Statistics		K-S 5% Critical Value	0.092082
k hat	0.26841	Data do not follow gamma distribution	
k star (bias corrected)	0.267256	at 5% significance level	
Theta hat	32.47142		
Theta star	32.61171	95% UCLs (Assuming Gamma Distribution)	
nu hat	64.4185	Approximate Gamma UCL	11.96758
nu star	64.14137	Adjusted Gamma UCL	12.01392
Approx.Chi Square Value (.05)	46.71242		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	46.53225	Lilliefors Test Statisitic	0.436525
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	5.521461	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.45091	95% H-UCL	5.741352
Standard Deviation of log data	1.835282	95% Chebyshev (MVUE) UCL	7.016757
Variance of log data	3.36826	97.5% Chebyshev (MVUE) UCL	8.6207
		99% Chebyshev (MVUE) UCL	11.77134
		95% Non-parametric UCLs	
		CLT UCL	13.54634
		Adj-CLT UCL (Adjusted for skewness)	15.22208
		Mod-t UCL (Adjusted for skewness)	13.84562
		Jackknife UCL	13.58424
		Standard Bootstrap UCL	13.48885
		Bootstrap-t UCL	19.67131
RECOMMENDATION		Hall's Bootstrap UCL	18.81221
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	14.20917
		BCA Bootstrap UCL	16.7325
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	21.51706
		97.5% Chebyshev (Mean, Sd) UCL	27.05624
		99% Chebyshev (Mean, Sd) UCL	37.93687

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_171
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	79	Lilliefors Test Statisitic	0.47404
Number of Unique Samples	8	Lilliefors 5% Critical Value	0.099683
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	4.857595	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	9.569221
Standard Deviation	25.15754		
Variance	632.9017	Gamma Distribution Test	
Coefficient of Variation	5.179011	A-D Test Statistic	26.94376
Skewness	6.701672	A-D 5% Critical Value	0.877269
		K-S Test Statistic	0.54097
Gamma Statistics		K-S 5% Critical Value	0.109634
k hat	0.272906	Data do not follow gamma distribution	
k star (bias corrected)	0.270981	at 5% significance level	
Theta hat	17.79951		
Theta star	17.92593	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.11917	Approximate Gamma UCL	7.21888
nu star	42.81507	Adjusted Gamma UCL	7.272758
Approx.Chi Square Value (.05)	28.81032		
Adjusted Level of Significance	0.046962	Lognormal Distribution Test	
Adjusted Chi Square Value	28.59689	Lilliefors Test Statisitic	0.508016
		Lilliefors 5% Critical Value	0.099683
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.985463	95% H-UCL	1.242602
Standard Deviation of log data	1.29059	95% Chebyshev (MVUE) UCL	1.532417
Variance of log data	1.665623	97.5% Chebyshev (MVUE) UCL	1.830961
		99% Chebyshev (MVUE) UCL	2.417393
		95% Non-parametric UCLs	
		CLT UCL	9.513261
		Adj-CLT UCL (Adjusted for skewness)	11.79363
		Mod-t UCL (Adjusted for skewness)	9.924912
		Jackknife UCL	9.569221
		Standard Bootstrap UCL	9.506336
		Bootstrap-t UCL	16.70012
RECOMMENDATION		Hall's Bootstrap UCL	13.00409
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.908228
		BCA Bootstrap UCL	12.62342
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	17.19522
		97.5% Chebyshev (Mean, Sd) UCL	22.53371
		99% Chebyshev (Mean, Sd) UCL	33.02016

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_172
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	118	Lilliefors Test Statisitic	0.482083
Number of Unique Samples	26	Lilliefors 5% Critical Value	0.081563
Minimum	0.82	Data not normal at 5% significance level	
Maximum	3800		
Mean	118.0281	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	200.8565
Standard Deviation	542.6759		
Variance	294497.1	Gamma Distribution Test	
Coefficient of Variation	4.597852	A-D Test Statistic	33.26947
Skewness	5.309327	A-D 5% Critical Value	0.90291
		K-S Test Statistic	0.458959
Gamma Statistics		K-S 5% Critical Value	0.093525
k hat	0.221769	Data do not follow gamma distribution	
k star (bias corrected)	0.221781	at 5% significance level	
Theta hat	532.2112		
Theta star	532.1836	95% UCLs (Assuming Gamma Distribution)	
nu hat	52.33757	Approximate Gamma UCL	168.2383
nu star	52.34028	Adjusted Gamma UCL	168.9808
Approx.Chi Square Value (.05)	36.71951		
Adjusted Level of Significance	0.047966	Lognormal Distribution Test	
Adjusted Chi Square Value	36.55815	Lilliefors Test Statisitic	0.326854
		Lilliefors 5% Critical Value	0.081563
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.198451		
Maximum of log data	8.242756	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.506056	95% H-UCL	26.62414
Standard Deviation of log data	1.640221	95% Chebyshev (MVUE) UCL	32.9983
Variance of log data	2.690326	97.5% Chebyshev (MVUE) UCL	39.9788
		99% Chebyshev (MVUE) UCL	53.69066
		95% Non-parametric UCLs	
		CLT UCL	200.2007
		Adj-CLT UCL (Adjusted for skewness)	226.2909
		Mod-t UCL (Adjusted for skewness)	204.9261
		Jackknife UCL	200.8565
		Standard Bootstrap UCL	199.4726
		Bootstrap-t UCL	261.8108
RECOMMENDATION		Hall's Bootstrap UCL	200.8303
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	202.9568
		BCA Bootstrap UCL	237.8051
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	335.7872
		97.5% Chebyshev (Mean, Sd) UCL	430.0118
		99% Chebyshev (Mean, Sd) UCL	615.0976

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_173
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	98	Lilliefors Test Statisitic	0.441828
Number of Unique Samples	20	Lilliefors 5% Critical Value	0.0895
Minimum	1.1	Data not normal at 5% significance level	
Maximum	40000		
Mean	708.098	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	1400.706
Standard Deviation	4128.629		
Variance	17045579	Gamma Distribution Test	
Coefficient of Variation	5.83059	A-D Test Statistic	26.35905
Skewness	9.103387	A-D 5% Critical Value	0.951686
		K-S Test Statistic	0.478609
Gamma Statistics		K-S 5% Critical Value	0.101616
k hat	0.162533	Data do not follow gamma distribution	
k star (bias corrected)	0.164361	at 5% significance level	
Theta hat	4356.63		
Theta star	4308.197	95% UCLs (Assuming Gamma Distribution)	
nu hat	31.85655	Approximate Gamma UCL	1127.019
nu star	32.21468	Adjusted Gamma UCL	1134.965
Approx.Chi Square Value (.05)	20.24026		
Adjusted Level of Significance	0.047551	Lognormal Distribution Test	
Adjusted Chi Square Value	20.09856	Lilliefors Test Statisitic	0.384387
		Lilliefors 5% Critical Value	0.0895
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.09531		
Maximum of log data	10.59663	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.889283	95% H-UCL	245.7502
Standard Deviation of log data	2.337236	95% Chebyshev (MVUE) UCL	252.1523
Variance of log data	5.462673	97.5% Chebyshev (MVUE) UCL	321.3732
		99% Chebyshev (MVUE) UCL	457.3441
		95% Non-parametric UCLs	
		CLT UCL	1394.092
		Adj-CLT UCL (Adjusted for skewness)	1803.883
		Mod-t UCL (Adjusted for skewness)	1464.626
		Jackknife UCL	1400.706
		Standard Bootstrap UCL	1407.106
		Bootstrap-t UCL	3519.25
RECOMMENDATION		Hall's Bootstrap UCL	3594.049
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1487.765
		BCA Bootstrap UCL	2055.464
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2525.996
		97.5% Chebyshev (Mean, Sd) UCL	3312.603
		99% Chebyshev (Mean, Sd) UCL	4857.738

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_174
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	121	Lilliefors Test Statisitic	0.426451
Number of Unique Samples	33	Lilliefors 5% Critical Value	0.080545
Minimum	0.055	Data not normal at 5% significance level	
Maximum	200		
Mean	6.457066	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	10.08798
Standard Deviation	24.09436		
Variance	580.5383	Gamma Distribution Test	
Coefficient of Variation	3.731472	A-D Test Statistic	23.52738
Skewness	5.865651	A-D 5% Critical Value	0.867053
		K-S Test Statistic	0.332695
Gamma Statistics		K-S 5% Critical Value	0.091168
k hat	0.303642	Data do not follow gamma distribution	
k star (bias corrected)	0.301624	at 5% significance level	
Theta hat	21.26537		
Theta star	21.40769	95% UCLs (Assuming Gamma Distribution)	
nu hat	73.48145	Approximate Gamma UCL	8.677423
nu star	72.99292	Adjusted Gamma UCL	8.708432
Approx.Chi Square Value (.05)	54.31568		
Adjusted Level of Significance	0.048017	Lognormal Distribution Test	
Adjusted Chi Square Value	54.12227	Lilliefors Test Statisitic	0.329497
		Lilliefors 5% Critical Value	0.080545
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.900422		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.401336	95% H-UCL	3.909946
Standard Deviation of log data	1.637953	95% Chebyshev (MVUE) UCL	4.852846
Variance of log data	2.68289	97.5% Chebyshev (MVUE) UCL	5.872411
		99% Chebyshev (MVUE) UCL	7.87515
		95% Non-parametric UCLs	
		CLT UCL	10.05995
		Adj-CLT UCL (Adjusted for skewness)	11.30798
		Mod-t UCL (Adjusted for skewness)	10.28265
		Jackknife UCL	10.08798
		Standard Bootstrap UCL	10.06258
		Bootstrap-t UCL	13.67997
RECOMMENDATION		Hall's Bootstrap UCL	16.61449
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	10.39839
		BCA Bootstrap UCL	12.13079
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	16.00478
		97.5% Chebyshev (Mean, Sd) UCL	20.13609
		99% Chebyshev (Mean, Sd) UCL	28.25124

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_175
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	80	Lilliefors Test Statisitic	0.437584
Number of Unique Samples	12	Lilliefors 5% Critical Value	0.099058
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	5.84375	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	10.82048
Standard Deviation	26.74479		
Variance	715.2839	Gamma Distribution Test	
Coefficient of Variation	4.576649	A-D Test Statistic	23.38616
Skewness	6.163843	A-D 5% Critical Value	0.877013
		K-S Test Statistic	0.509717
Gamma Statistics		K-S 5% Critical Value	0.108886
k hat	0.273385	Data do not follow gamma distribution	
k star (bias corrected)	0.271466	at 5% significance level	
Theta hat	21.37555		
Theta star	21.52663	95% UCLs (Assuming Gamma Distribution)	
nu hat	43.74156	Approximate Gamma UCL	8.657058
nu star	43.43458	Adjusted Gamma UCL	8.720315
Approx.Chi Square Value (.05)	29.31953		
Adjusted Level of Significance	0.047	Lognormal Distribution Test	
Adjusted Chi Square Value	29.10684	Lilliefors Test Statisitic	0.4905
		Lilliefors 5% Critical Value	0.099058
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.795412	95% H-UCL	2.22395
Standard Deviation of log data	1.501858	95% Chebyshev (MVUE) UCL	2.714105
Variance of log data	2.255579	97.5% Chebyshev (MVUE) UCL	3.302374
		99% Chebyshev (MVUE) UCL	4.457914
		95% Non-parametric UCLs	
		CLT UCL	10.76212
		Adj-CLT UCL (Adjusted for skewness)	12.96394
		Mod-t UCL (Adjusted for skewness)	11.16392
		Jackknife UCL	10.82048
		Standard Bootstrap UCL	10.82561
		Bootstrap-t UCL	29.50405
RECOMMENDATION		Hall's Bootstrap UCL	28.41349
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	11.44688
		BCA Bootstrap UCL	13.61313
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	18.87755
		97.5% Chebyshev (Mean, Sd) UCL	24.51728
		99% Chebyshev (Mean, Sd) UCL	35.59545

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_176
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.418879
Number of Unique Samples	42	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	110		
Mean	2.3475	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	3.897683
Standard Deviation	10.24359		
Variance	104.9311	Gamma Distribution Test	
Coefficient of Variation	4.363616	A-D Test Statistic	18.10253
Skewness	9.950862	A-D 5% Critical Value	0.826763
		K-S Test Statistic	0.295609
Gamma Statistics		K-S 5% Critical Value	0.089526
k hat	0.467995	Data do not follow gamma distribution	
k star (bias corrected)	0.461851	at 5% significance level	
Theta hat	5.016078		
Theta star	5.082811	95% UCLs (Assuming Gamma Distribution)	
nu hat	112.3188	Approximate Gamma UCL	2.972512
nu star	110.8442	Adjusted Gamma UCL	2.981036
Approx.Chi Square Value (.05)	87.53764		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	87.28734	Lilliefors Test Statisitic	0.277002
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	4.70048	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.517987	95% H-UCL	1.788769
Standard Deviation of log data	1.275418	95% Chebyshev (MVUE) UCL	2.2081
Variance of log data	1.62669	97.5% Chebyshev (MVUE) UCL	2.589137
		99% Chebyshev (MVUE) UCL	3.337611
		95% Non-parametric UCLs	
		CLT UCL	3.885615
		Adj-CLT UCL (Adjusted for skewness)	4.793251
		Mod-t UCL (Adjusted for skewness)	4.039256
		Jackknife UCL	3.897683
		Standard Bootstrap UCL	3.815367
		Bootstrap-t UCL	7.791854
RECOMMENDATION		Hall's Bootstrap UCL	9.446427
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4.13975
		BCA Bootstrap UCL	5.553
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	6.423539
		97.5% Chebyshev (Mean, Sd) UCL	8.187244
		99% Chebyshev (Mean, Sd) UCL	11.6517

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_177
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	118	Lilliefors Test Statisitic	0.440909
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.081563
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	3.059322	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.943581
Standard Deviation	18.89712		
Variance	357.1012	Gamma Distribution Test	
Coefficient of Variation	6.176898	A-D Test Statistic	34.9885
Skewness	9.915779	A-D 5% Critical Value	0.860182
		K-S Test Statistic	0.494282
Gamma Statistics		K-S 5% Critical Value	0.091679
k hat	0.331479	Data do not follow gamma distribution	
k star (bias corrected)	0.328702	at 5% significance level	
Theta hat	9.229296		
Theta star	9.307289	95% UCLs (Assuming Gamma Distribution)	
nu hat	78.22916	Approximate Gamma UCL	4.072091
nu star	77.57361	Adjusted Gamma UCL	4.086527
Approx.Chi Square Value (.05)	58.28029		
Adjusted Level of Significance	0.047966	Lognormal Distribution Test	
Adjusted Chi Square Value	58.07442	Lilliefors Test Statisitic	0.477627
		Lilliefors 5% Critical Value	0.081563
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.928462	95% H-UCL	1.077302
Standard Deviation of log data	1.212629	95% Chebyshev (MVUE) UCL	1.324353
Variance of log data	1.47047	97.5% Chebyshev (MVUE) UCL	1.544499
		99% Chebyshev (MVUE) UCL	1.976932
		95% Non-parametric UCLs	
		CLT UCL	5.920744
		Adj-CLT UCL (Adjusted for skewness)	7.617506
		Mod-t UCL (Adjusted for skewness)	6.208242
		Jackknife UCL	5.943581
		Standard Bootstrap UCL	5.884915
		Bootstrap-t UCL	15.95123
RECOMMENDATION		Hall's Bootstrap UCL	14.59495
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.574153
		BCA Bootstrap UCL	8.476695
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	10.64215
		97.5% Chebyshev (Mean, Sd) UCL	13.92325
		99% Chebyshev (Mean, Sd) UCL	20.36833

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_178
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.447833
Number of Unique Samples	21	Lilliefors 5% Critical Value	0.08088
Minimum	0.15	Data not normal at 5% significance level	
Maximum	200		
Mean	2.546583	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.312192
Standard Deviation	18.27511		
Variance	333.9796	Gamma Distribution Test	
Coefficient of Variation	7.176324	A-D Test Statistic	31.51724
Skewness	10.7797	A-D 5% Critical Value	0.852194
		K-S Test Statistic	0.452441
Gamma Statistics		K-S 5% Critical Value	0.090739
k hat	0.364215	Data do not follow gamma distribution	
k star (bias corrected)	0.360665	at 5% significance level	
Theta hat	6.991983		
Theta star	7.060801	95% UCLs (Assuming Gamma Distribution)	
nu hat	87.41154	Approximate Gamma UCL	3.334375
nu star	86.55959	Adjusted Gamma UCL	3.345316
Approx.Chi Square Value (.05)	66.1087		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	65.8925	Lilliefors Test Statisitic	0.448521
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.89712		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.899593	95% H-UCL	0.993213
Standard Deviation of log data	1.140714	95% Chebyshev (MVUE) UCL	1.212955
Variance of log data	1.301227	97.5% Chebyshev (MVUE) UCL	1.403431
		99% Chebyshev (MVUE) UCL	1.777583
		95% Non-parametric UCLs	
		CLT UCL	5.290662
		Adj-CLT UCL (Adjusted for skewness)	7.044808
		Mod-t UCL (Adjusted for skewness)	5.585803
		Jackknife UCL	5.312192
		Standard Bootstrap UCL	5.236481
		Bootstrap-t UCL	26.61115
RECOMMENDATION		Hall's Bootstrap UCL	15.55573
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.871167
		BCA Bootstrap UCL	7.766583
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.818454
		97.5% Chebyshev (Mean, Sd) UCL	12.965
		99% Chebyshev (Mean, Sd) UCL	19.14577

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_179
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	121	Lilliefors Test Statisitic	0.496792
Number of Unique Samples	37	Lilliefors 5% Critical Value	0.080545
Minimum	0.074	Data not normal at 5% significance level	
Maximum	31000		
Mean	1467.176	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	2240.96
Standard Deviation	5134.751		
Variance	26365667	Gamma Distribution Test	
Coefficient of Variation	3.499751	A-D Test Statistic	32.65081
Skewness	4.084569	A-D 5% Critical Value	1.021626
		K-S Test Statistic	0.444656
Gamma Statistics		K-S 5% Critical Value	0.096719
k hat	0.112358	Data do not follow gamma distribution	
k star (bias corrected)	0.115081	at 5% significance level	
Theta hat	13058.1		
Theta star	12749.02	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.19052	Approximate Gamma UCL	2430.84
nu star	27.84971	Adjusted Gamma UCL	2445.89
Approx.Chi Square Value (.05)	16.80918		
Adjusted Level of Significance	0.048017	Lognormal Distribution Test	
Adjusted Chi Square Value	16.70575	Lilliefors Test Statisitic	0.340503
		Lilliefors 5% Critical Value	0.080545
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.60369		
Maximum of log data	10.34174	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.170821	95% H-UCL	1596.656
Standard Deviation of log data	3.368896	95% Chebyshev (MVUE) UCL	955.503
Variance of log data	11.34946	97.5% Chebyshev (MVUE) UCL	1255.843
		99% Chebyshev (MVUE) UCL	1845.802
		95% Non-parametric UCLs	
		CLT UCL	2234.986
		Adj-CLT UCL (Adjusted for skewness)	2420.195
		Mod-t UCL (Adjusted for skewness)	2269.849
		Jackknife UCL	2240.96
		Standard Bootstrap UCL	2244.25
		Bootstrap-t UCL	2572.653
RECOMMENDATION		Hall's Bootstrap UCL	2312.47
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2232.33
		BCA Bootstrap UCL	2455.748
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3501.891
		97.5% Chebyshev (Mean, Sd) UCL	4382.313
		99% Chebyshev (Mean, Sd) UCL	6111.733

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_180
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.445574
Number of Unique Samples	38	Lilliefors 5% Critical Value	0.08088
Minimum	0.096	Data not normal at 5% significance level	
Maximum	880		
Mean	11.1028	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	23.27425
Standard Deviation	80.42878		
Variance	6468.788	Gamma Distribution Test	
Coefficient of Variation	7.244008	A-D Test Statistic	22.37923
Skewness	10.77478	A-D 5% Critical Value	0.886021
		K-S Test Statistic	0.342681
Gamma Statistics		K-S 5% Critical Value	0.092247
k hat	0.259583	Data do not follow gamma distribution	
k star (bias corrected)	0.258649	at 5% significance level	
Theta hat	42.77165		
Theta star	42.92611	95% UCLs (Assuming Gamma Distribution)	
nu hat	62.29996	Approximate Gamma UCL	15.33279
nu star	62.07579	Adjusted Gamma UCL	15.39325
Approx.Chi Square Value (.05)	44.9504		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	44.77386	Lilliefors Test Statisitic	0.362289
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.343407		
Maximum of log data	6.779922	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.312495	95% H-UCL	5.576794
Standard Deviation of log data	1.761314	95% Chebyshev (MVUE) UCL	6.865358
Variance of log data	3.102226	97.5% Chebyshev (MVUE) UCL	8.389639
		99% Chebyshev (MVUE) UCL	11.38379
		95% Non-parametric UCLs	
		CLT UCL	23.17949
		Adj-CLT UCL (Adjusted for skewness)	30.89597
		Mod-t UCL (Adjusted for skewness)	24.47786
		Jackknife UCL	23.27425
		Standard Bootstrap UCL	23.0412
		Bootstrap-t UCL	105.7268
RECOMMENDATION		Hall's Bootstrap UCL	67.60626
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	25.47985
		BCA Bootstrap UCL	34.11825
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	43.10631
		97.5% Chebyshev (Mean, Sd) UCL	56.95426
		99% Chebyshev (Mean, Sd) UCL	84.15586

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_181
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.484546
Number of Unique Samples	42	Lilliefors 5% Critical Value	0.08088
Minimum	0.2	Data not normal at 5% significance level	
Maximum	8400		
Mean	360.5287	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	571.4845
Standard Deviation	1393.994		
Variance	1943218	Gamma Distribution Test	
Coefficient of Variation	3.866526	A-D Test Statistic	26.04746
Skewness	4.537109	A-D 5% Critical Value	0.984535
		K-S Test Statistic	0.346253
Gamma Statistics		K-S 5% Critical Value	0.095777
k hat	0.141805	Data do not follow gamma distribution	
k star (bias corrected)	0.143815	at 5% significance level	
Theta hat	2542.427		
Theta star	2506.885	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.03319	Approximate Gamma UCL	563.7162
nu star	34.51569	Adjusted Gamma UCL	566.8198
Approx.Chi Square Value (.05)	22.07475		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	21.95388	Lilliefors Test Statisitic	0.301603
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	9.035987	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.423524	95% H-UCL	307.2689
Standard Deviation of log data	2.882738	95% Chebyshev (MVUE) UCL	261.7901
Variance of log data	8.310176	97.5% Chebyshev (MVUE) UCL	339.2959
		99% Chebyshev (MVUE) UCL	491.5409
		95% Non-parametric UCLs	
		CLT UCL	569.8423
		Adj-CLT UCL (Adjusted for skewness)	626.1592
		Mod-t UCL (Adjusted for skewness)	580.2688
		Jackknife UCL	571.4845
		Standard Bootstrap UCL	568.8737
		Bootstrap-t UCL	692.7883
RECOMMENDATION		Hall's Bootstrap UCL	586.1277
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	584.5359
		BCA Bootstrap UCL	657.4647
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	915.2144
		97.5% Chebyshev (Mean, Sd) UCL	1155.227
		99% Chebyshev (Mean, Sd) UCL	1626.686

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_182
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	71	Lilliefors Test Statisitic	0.468164
Number of Unique Samples	27	Lilliefors 5% Critical Value	0.105149
Minimum	0.18	Data not normal at 5% significance level	
Maximum	4000		
Mean	187.0151	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	313.8431
Standard Deviation	641.108		
Variance	411019.5	Gamma Distribution Test	
Coefficient of Variation	3.428109	A-D Test Statistic	16.06579
Skewness	4.343861	A-D 5% Critical Value	0.947723
		K-S Test Statistic	0.417113
Gamma Statistics		K-S 5% Critical Value	0.118894
k hat	0.154202	Data do not follow gamma distribution	
k star (bias corrected)	0.157076	at 5% significance level	
Theta hat	1212.793		
Theta star	1190.602	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.89668	Approximate Gamma UCL	331.9692
nu star	22.3048	Adjusted Gamma UCL	336.03
Approx.Chi Square Value (.05)	12.56542		
Adjusted Level of Significance	0.04662	Lognormal Distribution Test	
Adjusted Chi Square Value	12.41358	Lilliefors Test Statisitic	0.313122
		Lilliefors 5% Critical Value	0.105149
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.714798		
Maximum of log data	8.29405	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.266992	95% H-UCL	256.278
Standard Deviation of log data	2.764195	95% Chebyshev (MVUE) UCL	162.7585
Variance of log data	7.640773	97.5% Chebyshev (MVUE) UCL	212.6631
		99% Chebyshev (MVUE) UCL	310.6912
		95% Non-parametric UCLs	
		CLT UCL	312.1646
		Adj-CLT UCL (Adjusted for skewness)	354.0757
		Mod-t UCL (Adjusted for skewness)	320.3804
		Jackknife UCL	313.8431
		Standard Bootstrap UCL	309.4637
		Bootstrap-t UCL	413.3799
RECOMMENDATION		Hall's Bootstrap UCL	363.7886
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	316.5144
		BCA Bootstrap UCL	364.0286
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	518.6642
		97.5% Chebyshev (Mean, Sd) UCL	662.169
		99% Chebyshev (Mean, Sd) UCL	944.0565

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_183
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	70	Lilliefors Test Statisitic	0.479838
Number of Unique Samples	25	Lilliefors 5% Critical Value	0.105897
Minimum	0.2	Data not normal at 5% significance level	
Maximum	1600		
Mean	97.15057	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	155.3899
Standard Deviation	292.2589		
Variance	85415.28	Gamma Distribution Test	
Coefficient of Variation	3.008309	A-D Test Statistic	16.20221
Skewness	3.550945	A-D 5% Critical Value	0.936922
		K-S Test Statistic	0.396487
Gamma Statistics		K-S 5% Critical Value	0.119167
k hat	0.166738	Data do not follow gamma distribution	
k star (bias corrected)	0.169116	at 5% significance level	
Theta hat	582.6553		
Theta star	574.4627	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.34327	Approximate Gamma UCL	169.117
nu star	23.67618	Adjusted Gamma UCL	171.1419
Approx.Chi Square Value (.05)	13.60096		
Adjusted Level of Significance	0.046571	Lognormal Distribution Test	
Adjusted Chi Square Value	13.44004	Lilliefors Test Statisitic	0.340201
		Lilliefors 5% Critical Value	0.105897
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.609438		
Maximum of log data	7.377759	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.038116	95% H-UCL	161.0708
Standard Deviation of log data	2.697556	95% Chebyshev (MVUE) UCL	107.5725
Variance of log data	7.276806	97.5% Chebyshev (MVUE) UCL	140.3027
		99% Chebyshev (MVUE) UCL	204.5949
		95% Non-parametric UCLs	
		CLT UCL	154.608
		Adj-CLT UCL (Adjusted for skewness)	170.4494
		Mod-t UCL (Adjusted for skewness)	157.8609
		Jackknife UCL	155.3899
		Standard Bootstrap UCL	152.5859
		Bootstrap-t UCL	198.0963
RECOMMENDATION		Hall's Bootstrap UCL	170.9405
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	158.122
		BCA Bootstrap UCL	178.794
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	249.414
		97.5% Chebyshev (Mean, Sd) UCL	315.2985
		99% Chebyshev (Mean, Sd) UCL	444.7158

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_184
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.322586
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	4600		
Mean	266.5692	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	491.2741
Standard Deviation	947.722		
Variance	898177	Gamma Distribution Test	
Coefficient of Variation	3.555257	A-D Test Statistic	15.34526
Skewness	3.736976	A-D 5% Critical Value	0.95226
		K-S Test Statistic	0.496197
Gamma Statistics		K-S 5% Critical Value	0.141352
k hat	0.132358	Data do not follow gamma distribution	
k star (bias corrected)	0.13775	at 5% significance level	
Theta hat	2014.003		
Theta star	1935.17	95% UCLs (Assuming Gamma Distribution)	
nu hat	13.23579	Approximate Gamma UCL	572.2759
nu star	13.77498	Adjusted Gamma UCL	585.9302
Approx.Chi Square Value (.05)	6.416459		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	6.266932	Shapiro-Wilk Test Statisitic	0.432284
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	8.433812	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.325718	95% H-UCL	200.1419
Standard Deviation of log data	2.758682	95% Chebyshev (MVUE) UCL	87.73053
Variance of log data	7.610327	97.5% Chebyshev (MVUE) UCL	115.3726
		99% Chebyshev (MVUE) UCL	169.6702
		95% Non-parametric UCLs	
		CLT UCL	487.0259
		Adj-CLT UCL (Adjusted for skewness)	562.7112
		Mod-t UCL (Adjusted for skewness)	503.0795
		Jackknife UCL	491.2741
		Standard Bootstrap UCL	486.6398
		Bootstrap-t UCL	795.9123
RECOMMENDATION		Hall's Bootstrap UCL	515.9647
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	500.4832
		BCA Bootstrap UCL	590.267
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	850.7843
		97.5% Chebyshev (Mean, Sd) UCL	1103.575
		99% Chebyshev (Mean, Sd) UCL	1600.132

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_185
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	121	Lilliefors Test Statisitic	0.462718
Number of Unique Samples	64	Lilliefors 5% Critical Value	0.080545
Minimum	0.25	Data not normal at 5% significance level	
Maximum	90000		
Mean	2811.853	95% UCL (Assuming Normal Distribution)	
Median	0.66	Student's-t UCL	4629.233
Standard Deviation	12059.95		
Variance	1.45E+08	Gamma Distribution Test	
Coefficient of Variation	4.288967	A-D Test Statistic	20.90111
Skewness	5.525184	A-D 5% Critical Value	1.011096
		K-S Test Statistic	0.311052
Gamma Statistics		K-S 5% Critical Value	0.096367
k hat	0.12083	Data do not follow gamma distribution	
k star (bias corrected)	0.123344	at 5% significance level	
Theta hat	23271.11		
Theta star	22796.83	95% UCLs (Assuming Gamma Distribution)	
nu hat	29.24091	Approximate Gamma UCL	4568.372
nu star	29.84926	Adjusted Gamma UCL	4595.522
Approx.Chi Square Value (.05)	18.37235		
Adjusted Level of Significance	0.048017	Lognormal Distribution Test	
Adjusted Chi Square Value	18.26381	Lilliefors Test Statisitic	0.223472
		Lilliefors 5% Critical Value	0.080545
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	11.40756	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.384595	95% H-UCL	17976.78
Standard Deviation of log data	3.643425	95% Chebyshev (MVUE) UCL	8264.137
Variance of log data	13.27454	97.5% Chebyshev (MVUE) UCL	10927.36
		99% Chebyshev (MVUE) UCL	16158.75
		95% Non-parametric UCLs	
		CLT UCL	4615.203
		Adj-CLT UCL (Adjusted for skewness)	5203.622
		Mod-t UCL (Adjusted for skewness)	4721.014
		Jackknife UCL	4629.233
		Standard Bootstrap UCL	4609.707
		Bootstrap-t UCL	6144.583
RECOMMENDATION		Hall's Bootstrap UCL	5295.331
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4667.74
		BCA Bootstrap UCL	5325.286
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	7590.77
		97.5% Chebyshev (Mean, Sd) UCL	9658.611
		99% Chebyshev (Mean, Sd) UCL	13720.48

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_186
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.453999
Number of Unique Samples	10	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	200		
Mean	2.359917	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	5.122884
Standard Deviation	18.25766		
Variance	333.342	Gamma Distribution Test	
Coefficient of Variation	7.736568	A-D Test Statistic	35.63645
Skewness	10.84056	A-D 5% Critical Value	0.853059
		K-S Test Statistic	0.4824
Gamma Statistics		K-S 5% Critical Value	0.090781
k hat	0.360686	Data do not follow gamma distribution	
k star (bias corrected)	0.357224	at 5% significance level	
Theta hat	6.542863		
Theta star	6.606265	95% UCLs (Assuming Gamma Distribution)	
nu hat	86.56455	Approximate Gamma UCL	3.094279
nu star	85.73377	Adjusted Gamma UCL	3.104485
Approx.Chi Square Value (.05)	65.38666		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	65.1717	Lilliefors Test Statisitic	0.472279
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.298317	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.996602	95% H-UCL	0.77426
Standard Deviation of log data	1.030978	95% Chebyshev (MVUE) UCL	0.934641
Variance of log data	1.062915	97.5% Chebyshev (MVUE) UCL	1.06912
		99% Chebyshev (MVUE) UCL	1.333277
		95% Non-parametric UCLs	
		CLT UCL	5.101375
		Adj-CLT UCL (Adjusted for skewness)	6.863741
		Mod-t UCL (Adjusted for skewness)	5.397777
		Jackknife UCL	5.122884
		Standard Bootstrap UCL	5.140525
		Bootstrap-t UCL	33.70298
RECOMMENDATION		Hall's Bootstrap UCL	17.36838
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	5.643667
		BCA Bootstrap UCL	7.679083
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	9.624842
		97.5% Chebyshev (Mean, Sd) UCL	12.76838
		99% Chebyshev (Mean, Sd) UCL	18.94326

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_187
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.498277
Number of Unique Samples	14	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	150		
Mean	13.011	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	20.27844
Standard Deviation	30.65137		
Variance	939.5063	Gamma Distribution Test	
Coefficient of Variation	2.355804	A-D Test Statistic	9.497803
Skewness	2.844269	A-D 5% Critical Value	0.878223
		K-S Test Statistic	0.412273
Gamma Statistics		K-S 5% Critical Value	0.137069
k hat	0.264837	Data do not follow gamma distribution	
k star (bias corrected)	0.26228	at 5% significance level	
Theta hat	49.12828		
Theta star	49.60722	95% UCLs (Assuming Gamma Distribution)	
nu hat	26.48373	Approximate Gamma UCL	21.94096
nu star	26.22804	Adjusted Gamma UCL	22.29201
Approx.Chi Square Value (.05)	15.55324		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	15.30831	Shapiro-Wilk Test Statisitic	0.622459
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.010635	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.091302	95% H-UCL	30.93122
Standard Deviation of log data	2.168955	95% Chebyshev (MVUE) UCL	25.00084
Variance of log data	4.704368	97.5% Chebyshev (MVUE) UCL	32.21343
		99% Chebyshev (MVUE) UCL	46.38115
		95% Non-parametric UCLs	
		CLT UCL	20.14104
		Adj-CLT UCL (Adjusted for skewness)	22.00412
		Mod-t UCL (Adjusted for skewness)	20.56904
		Jackknife UCL	20.27844
		Standard Bootstrap UCL	20.10274
		Bootstrap-t UCL	23.79143
RECOMMENDATION		Hall's Bootstrap UCL	22.04081
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	20.144
		BCA Bootstrap UCL	22.421
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	31.90577
		97.5% Chebyshev (Mean, Sd) UCL	40.08155
		99% Chebyshev (Mean, Sd) UCL	56.1413

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_188
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.405541
Number of Unique Samples	11	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	23		
Mean	1.9	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	3.031777
Standard Deviation	4.773417		
Variance	22.78551	Gamma Distribution Test	
Coefficient of Variation	2.512325	A-D Test Statistic	11.39785
Skewness	3.635545	A-D 5% Critical Value	0.822076
		K-S Test Statistic	0.419319
Gamma Statistics		K-S 5% Critical Value	0.132994
k hat	0.467563	Data do not follow gamma distribution	
k star (bias corrected)	0.452843	at 5% significance level	
Theta hat	4.06362		
Theta star	4.195715	95% UCLs (Assuming Gamma Distribution)	
nu hat	46.75634	Approximate Gamma UCL	2.789479
nu star	45.28429	Adjusted Gamma UCL	2.821912
Approx.Chi Square Value (.05)	30.84453		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	30.49002	Shapiro-Wilk Test Statisitic	0.562433
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	3.135494	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.730949	95% H-UCL	1.857345
Standard Deviation of log data	1.307173	95% Chebyshev (MVUE) UCL	2.220073
Variance of log data	1.708702	97.5% Chebyshev (MVUE) UCL	2.705772
		99% Chebyshev (MVUE) UCL	3.659834
		95% Non-parametric UCLs	
		CLT UCL	3.01038
		Adj-CLT UCL (Adjusted for skewness)	3.381239
		Mod-t UCL (Adjusted for skewness)	3.089624
		Jackknife UCL	3.031777
		Standard Bootstrap UCL	2.99467
		Bootstrap-t UCL	4.334178
RECOMMENDATION		Hall's Bootstrap UCL	3.921839
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.074
		BCA Bootstrap UCL	3.551
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.842532
		97.5% Chebyshev (Mean, Sd) UCL	6.115768
		99% Chebyshev (Mean, Sd) UCL	8.616793

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_189
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.410562
Number of Unique Samples	15	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	210		
Mean	15.726	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	26.31198
Standard Deviation	44.64772		
Variance	1993.419	Gamma Distribution Test	
Coefficient of Variation	2.839102	A-D Test Statistic	11.47237
Skewness	3.213675	A-D 5% Critical Value	0.891338
		K-S Test Statistic	0.413525
Gamma Statistics		K-S 5% Critical Value	0.137906
k hat	0.235694	Data do not follow gamma distribution	
k star (bias corrected)	0.234886	at 5% significance level	
Theta hat	66.72202		
Theta star	66.95163	95% UCLs (Assuming Gamma Distribution)	
nu hat	23.56943	Approximate Gamma UCL	27.44552
nu star	23.4886	Adjusted Gamma UCL	27.91479
Approx.Chi Square Value (.05)	13.45873		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	13.23247	Shapiro-Wilk Test Statisitic	0.579867
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.347108	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.286968	95% H-UCL	19.84283
Standard Deviation of log data	2.088353	95% Chebyshev (MVUE) UCL	17.03641
Variance of log data	4.361219	97.5% Chebyshev (MVUE) UCL	21.87053
		99% Chebyshev (MVUE) UCL	31.36624
		95% Non-parametric UCLs	
		CLT UCL	26.11184
		Adj-CLT UCL (Adjusted for skewness)	29.17812
		Mod-t UCL (Adjusted for skewness)	26.79025
		Jackknife UCL	26.31198
		Standard Bootstrap UCL	25.89275
		Bootstrap-t UCL	34.14011
RECOMMENDATION		Hall's Bootstrap UCL	27.68676
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	26.721
		BCA Bootstrap UCL	30.323
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	43.2487
		97.5% Chebyshev (Mean, Sd) UCL	55.1578
		99% Chebyshev (Mean, Sd) UCL	78.55091

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_190
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.505097
Number of Unique Samples	12	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	13		
Mean	2.092	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	3.044042
Standard Deviation	4.015358		
Variance	16.1231	Gamma Distribution Test	
Coefficient of Variation	1.919387	A-D Test Statistic	10.46367
Skewness	2.077121	A-D 5% Critical Value	0.819051
		K-S Test Statistic	0.399005
Gamma Statistics		K-S 5% Critical Value	0.132764
k hat	0.480133	Data do not follow gamma distribution	
k star (bias corrected)	0.464658	at 5% significance level	
Theta hat	4.357126		
Theta star	4.502232	95% UCLs (Assuming Gamma Distribution)	
nu hat	48.0133	Approximate Gamma UCL	3.054681
nu star	46.46584	Adjusted Gamma UCL	3.089679
Approx.Chi Square Value (.05)	31.82215		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	31.46169	Shapiro-Wilk Test Statisitic	0.587159
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	2.564949	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.593191	95% H-UCL	2.641839
Standard Deviation of log data	1.415306	95% Chebyshev (MVUE) UCL	3.093197
Variance of log data	2.003092	97.5% Chebyshev (MVUE) UCL	3.804997
		99% Chebyshev (MVUE) UCL	5.203189
		95% Non-parametric UCLs	
		CLT UCL	3.026042
		Adj-CLT UCL (Adjusted for skewness)	3.204279
		Mod-t UCL (Adjusted for skewness)	3.071843
		Jackknife UCL	3.044042
		Standard Bootstrap UCL	3.020114
		Bootstrap-t UCL	3.385734
RECOMMENDATION		Hall's Bootstrap UCL	3.100019
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.063
		BCA Bootstrap UCL	3.207
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.567233
		97.5% Chebyshev (Mean, Sd) UCL	5.638268
		99% Chebyshev (Mean, Sd) UCL	7.742109

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_191
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	76	Lilliefors Test Statisitic	0.375916
Number of Unique Samples	27	Lilliefors 5% Critical Value	0.101631
Minimum	5	Data not normal at 5% significance level	
Maximum	500		
Mean	50.10526	95% UCL (Assuming Normal Distribution)	
Median	25	Student's-t UCL	67.91641
Standard Deviation	93.23384		
Variance	8692.549	Gamma Distribution Test	
Coefficient of Variation	1.860759	A-D Test Statistic	6.967372
Skewness	3.560556	A-D 5% Critical Value	0.792542
		K-S Test Statistic	0.310995
Gamma Statistics		K-S 5% Critical Value	0.106459
k hat	0.757915	Data do not follow gamma distribution	
k star (bias corrected)	0.736769	at 5% significance level	
Theta hat	66.10936		
Theta star	68.00674	95% UCLs (Assuming Gamma Distribution)	
nu hat	115.2031	Approximate Gamma UCL	63.36371
nu star	111.9889	Adjusted Gamma UCL	63.6521
Approx.Chi Square Value (.05)	88.55594		
Adjusted Level of Significance	0.046842	Lognormal Distribution Test	
Adjusted Chi Square Value	88.15472	Lilliefors Test Statisitic	0.216265
		Lilliefors 5% Critical Value	0.101631
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.609438		
Maximum of log data	6.214608	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.125404	95% H-UCL	56.46304
Standard Deviation of log data	1.104053	95% Chebyshev (MVUE) UCL	69.36107
Variance of log data	1.218933	97.5% Chebyshev (MVUE) UCL	81.47839
		99% Chebyshev (MVUE) UCL	105.2805
		95% Non-parametric UCLs	
		CLT UCL	67.6964
		Adj-CLT UCL (Adjusted for skewness)	72.36362
		Mod-t UCL (Adjusted for skewness)	68.6444
		Jackknife UCL	67.91641
		Standard Bootstrap UCL	67.88484
		Bootstrap-t UCL	78.25889
RECOMMENDATION		Hall's Bootstrap UCL	78.47521
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	68.03947
		BCA Bootstrap UCL	72.43421
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	96.72218
		97.5% Chebyshev (Mean, Sd) UCL	116.8934
		99% Chebyshev (Mean, Sd) UCL	156.5157

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_192
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	50	Shapiro-Wilk Test Statisitic	0.401273
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.947
Minimum	0.25	Data not normal at 5% significance level	
Maximum	12.5		
Mean	0.916	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	1.385889
Standard Deviation	1.981816		
Variance	3.927596	Gamma Distribution Test	
Coefficient of Variation	2.163555	A-D Test Statistic	10.52217
Skewness	4.616547	A-D 5% Critical Value	0.793147
		K-S Test Statistic	0.43729
Gamma Statistics		K-S 5% Critical Value	0.130358
k hat	0.753787	Data do not follow gamma distribution	
k star (bias corrected)	0.721893	at 5% significance level	
Theta hat	1.215198		
Theta star	1.268886	95% UCLs (Assuming Gamma Distribution)	
nu hat	75.37866	Approximate Gamma UCL	1.233174
nu star	72.18928	Adjusted Gamma UCL	1.244201
Approx.Chi Square Value (.05)	53.6221		
Adjusted Level of Significance	0.0452	Lognormal Distribution Test	
Adjusted Chi Square Value	53.14685	Shapiro-Wilk Test Statisitic	0.581266
		Shapiro-Wilk 5% Critical Value	0.947
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	2.525729	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.881367	95% H-UCL	0.940222
Standard Deviation of log data	0.992849	95% Chebyshev (MVUE) UCL	1.148774
Variance of log data	0.985748	97.5% Chebyshev (MVUE) UCL	1.356618
		99% Chebyshev (MVUE) UCL	1.764886
		95% Non-parametric UCLs	
		CLT UCL	1.377005
		Adj-CLT UCL (Adjusted for skewness)	1.572525
		Mod-t UCL (Adjusted for skewness)	1.416386
		Jackknife UCL	1.385889
		Standard Bootstrap UCL	1.373623
		Bootstrap-t UCL	1.975294
RECOMMENDATION		Hall's Bootstrap UCL	2.873208
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.384
		BCA Bootstrap UCL	1.602
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.137674
		97.5% Chebyshev (Mean, Sd) UCL	2.666293
		99% Chebyshev (Mean, Sd) UCL	3.704663

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_193
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.445671
Number of Unique Samples	39	Lilliefors 5% Critical Value	0.08088
Minimum	0.06	Data not normal at 5% significance level	
Maximum	4000		
Mean	58.33542	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	115.4949
Standard Deviation	377.7092		
Variance	142664.3	Gamma Distribution Test	
Coefficient of Variation	6.474784	A-D Test Statistic	27.41675
Skewness	9.814682	A-D 5% Critical Value	0.940611
		K-S Test Statistic	0.347467
Gamma Statistics		K-S 5% Critical Value	0.094302
k hat	0.177384	Data do not follow gamma distribution	
k star (bias corrected)	0.178505	at 5% significance level	
Theta hat	328.865		
Theta star	326.7998	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.57218	Approximate Gamma UCL	86.6807
nu star	42.84121	Adjusted Gamma UCL	87.10207
Approx.Chi Square Value (.05)	28.83179		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	28.69231	Lilliefors Test Statisitic	0.360008
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.813411		
Maximum of log data	8.29405	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.159924	95% H-UCL	20.26611
Standard Deviation of log data	2.216037	95% Chebyshev (MVUE) UCL	23.04398
Variance of log data	4.91082	97.5% Chebyshev (MVUE) UCL	28.99736
		99% Chebyshev (MVUE) UCL	40.69162
		95% Non-parametric UCLs	
		CLT UCL	115.0499
		Adj-CLT UCL (Adjusted for skewness)	148.059
		Mod-t UCL (Adjusted for skewness)	120.6437
		Jackknife UCL	115.4949
		Standard Bootstrap UCL	114.3005
		Bootstrap-t UCL	307.5118
RECOMMENDATION		Hall's Bootstrap UCL	293.7944
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	122.3923
		BCA Bootstrap UCL	169.2078
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	208.6302
		97.5% Chebyshev (Mean, Sd) UCL	273.6628
		99% Chebyshev (Mean, Sd) UCL	401.4069

Data File	C:\lhilsche\AMCO\EPCs15\all._4EPCs15.txt	Variable:	_194
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	120	Lilliefors Test Statisitic	0.467273
Number of Unique Samples	11	Lilliefors 5% Critical Value	0.08088
Minimum	0.25	Data not normal at 5% significance level	
Maximum	250		
Mean	4.437167	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	8.834405
Standard Deviation	29.0569		
Variance	844.3032	Gamma Distribution Test	
Coefficient of Variation	6.548525	A-D Test Statistic	37.5669
Skewness	7.760969	A-D 5% Critical Value	0.874437
		K-S Test Statistic	0.476021
Gamma Statistics		K-S 5% Critical Value	0.091762
k hat	0.285462	Data do not follow gamma distribution	
k star (bias corrected)	0.283881	at 5% significance level	
Theta hat	15.54383		
Theta star	15.63039	95% UCLs (Assuming Gamma Distribution)	
nu hat	68.5108	Approximate Gamma UCL	6.030568
nu star	68.13137	Adjusted Gamma UCL	6.053147
Approx.Chi Square Value (.05)	50.12965		
Adjusted Level of Significance	0.048	Lognormal Distribution Test	
Adjusted Chi Square Value	49.94266	Lilliefors Test Statisitic	0.461462
		Lilliefors 5% Critical Value	0.08088
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.386294		
Maximum of log data	5.521461	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.945243	95% H-UCL	1.017484
Standard Deviation of log data	1.187837	95% Chebyshev (MVUE) UCL	1.247858
Variance of log data	1.410957	97.5% Chebyshev (MVUE) UCL	1.450693
		99% Chebyshev (MVUE) UCL	1.849125
		95% Non-parametric UCLs	
		CLT UCL	8.800173
		Adj-CLT UCL (Adjusted for skewness)	10.80818
		Mod-t UCL (Adjusted for skewness)	9.147612
		Jackknife UCL	8.834405
		Standard Bootstrap UCL	8.717053
		Bootstrap-t UCL	86.22272
RECOMMENDATION		Hall's Bootstrap UCL	59.5105
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.068417
		BCA Bootstrap UCL	11.82758
Use 97.5% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	15.99923
		97.5% Chebyshev (Mean, Sd) UCL	21.00215
		99% Chebyshev (Mean, Sd) UCL	30.8294