

**Bay Area Air Quality Management District**

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**Permit Evaluation  
and  
Statement of Basis  
for  
MAJOR FACILITY REVIEW PERMIT**

for  
**United Technologies Corporation  
Facility #A0710**

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## **Title V Statement of Basis**

### **A. Background**

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a major facility as defined by BAAQMD Regulation 2-6-212. It is a major facility because it has the “potential to emit,” as defined by BAAQMD Regulation 2-6-218, of more than 10 tons per year of a Hazardous Air Pollutant (HAP) or more than 25 tons per year of a combination of HAPs.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all applicable requirements (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is \_A0710.

## **B. Facility Description**

United Technologies Corporation (UTC) develops, manufactures and tests solid propellant rocket motors for a variety of space exploration and defense programs. A major part of the manufacturing process involves the mixing, casting, and curing of solid rocket motor propellants.

The motor casings are either metal, composite, or filament wound pressure vessels, fabricated with ultrahigh strength continuous fiberglass roving, pre-impregnated with epoxy resin. The vessels are wound on a reusable aluminum mandrel assembly. The case - binder system is applied manually with a brush throughout the entire interior of the case. The liner applied to the case serves as an adhesive for bonding the propellant to the insulation. The cases are painted in permitted paint booths using a roller brush or an HVLP spray gun either before or after casting.

Ingredients for the propellant include, but are not limited to, a liquid polymer, powdered aluminum, ammonium perchlorate, and a liquid curing agent. These ingredients are mixed in a mix bowl, which is similar to a kitchen mixer, only much larger. The mixed propellant is cast into the empty case and cured for number of days. The casting process includes removal of cast tooling from the cases, trimming the rocket motor grain, cleaning of the cast tooling and refurbishing the Teflon coating on the cast tooling. In addition, casting operations include weighout of propellant ingredients, propellant mixing and performing the cast in a timely manner to get the propellant out of the mix bowl before it solidifies. The function of the propellant is to supply the fuel and oxidizing agent necessary to produce the combustion gases needed for the desired thrust of the motor.

Other activities at UTC include assembly of nozzle, igniter and various electronic parts on the motors. In addition, a selected number of various size motors are tested at the permitted test stands for research and development, and performance purposes. Once the nozzle, the igniter and other electronic parts are installed on the motors, the motors are prepared for shipment.

### **C. Permit Content**

The legal and factual basis for the permit follows. The permit sections are described in the order presented in the permit.

#### **I. Standard Conditions**

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District's General Provisions and Permitting rules.

Condition I.J has been added to clarify that the capacity limits shown in Table II-A are enforceable limits.

#### **II. Equipment**

This section of the permit lists all permitted or significant sources in Table II A. Each source is identified by an S and a number (e.g., S24).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302.

Significant sources are those sources that have a potential to emit of more than 2 tons of a "regulated air pollutant," as defined in BAAQMD Rule 2-6-222, per year or 400 pounds of a "hazardous air pollutant," as defined in BAAQMD Rule 2-6-210, per year.

All abatement (control) devices that control permitted or significant sources are listed in Table II B. Each abatement device the primary function of which is to reduce emissions is identified by an A and a number (e.g., A-24).

The equipment section is considered to be part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District's regulations. The capacities in the permitted sources table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403.

The following lists show sources removed from service, sources permitted after application was submitted and sources with changed permitting status:

**Devices Removed from Service or Archived since Application was submitted:**

<b>Source #</b>	<b>Source Description</b>
2	Paint Spray Booth
15	Paint Spray Booth
26	Cleaning Booth
30	Degreaser, Cold Cleaner
32	Degreaser, Vapor
50	NG Sparge
57	Test Stand (ST-9)
61	Degreaser, Vapor
66	Paint Spray Booth
67	Cleaning Booth
77	Air Stripper
86	Sand Blasting
87	Sand Blasting
91	Groundwater Sparge Tank; Contaminated Groundwater
92	Groundwater Sparge Tank; Contaminated Groundwater
93	Sparge Tank
94	Sparge Tank
95	Sparge Tank
103	Fungicide Room
105	Washcoat, D-5
107	Mixer, Propellant – Continuous
114	Sandblast Room, Custom
119	Liner, Spray Booth
401	Open Burn Facility
402	Open Burn Facility
403	Open Burn Facility
404	Open Burn Facility
405	Open Burn Facility
406	Open Burn Facility
411	Open Burn Facility
412	Open Burn Facility
503	Vapor Degreaser
507	AP Grind
508	AP Grind

**Devices Permitted Since Application was submitted:**

<b>Source #</b>	<b>Source Description</b>
122	Reaction Tumbler
123	Digester Tank
124	Wave Soldering Machine
125	Fungicide Application Operation
516	Clemco San Blast Machine With Pneumatic
517	Standby Emergency Diesel Generator
518	Standby Emergency Diesel Generator
519	Standby Emergency Diesel Generator
520	Standby Emergency Diesel Generator
521	Enclosed Coating Operation

**Devices with Changed Permit Status:**

<b>Source #</b>	<b>Comments</b>
6	Previously Permitted Electric Oven Currently Exempt per Reg. 2-1-116.10
24	Previously Permitted Diesel Fired Boiler Currently Exempt - Heat Input < 1 MM Btu/hr
29	Previously Permitted Diesel Fired Boiler Currently Exempt - Heat Input < 1 MM Btu/hr
517	Previously Exempt I.C. Engines Currently Permitted - Loss of Exemption I.C. Engines
518	Previously Exempt I.C. Engines Currently Permitted - Loss of Exemption I.C. Engines
519	Previously Exempt I.C. Engines Currently Permitted - Loss of Exemption I.C. Engines
520	Previously Exempt I.C. Engines Currently Permitted - Loss of Exemption I.C. Engines

### III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement will appear in Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound) are placed in this section.

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V permit if they are considered *significant sources* pursuant to the definition in BAAQMD Rule 2-6-239.

### IV. Source-Specific Applicable Requirements

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

- District Rules
- SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation Plan. SIP rules are “federally enforceable” and a “Y” (yes) indication will appear in the “Federally Enforceable” column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the “Federally Enforceable” column will have a “Y” for “yes”. If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.
- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.
- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District’s or EPA’s websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

### **Complex Applicability Determinations**

Sources at UTC subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) include the Aerospace Paint Booths (Sources 5, 20, 74, 75, 76, 81, 82, 83, 89, 101, 125 and 521) and the Site Wide Wipe Cleaning Operation (Source 85). Specifically, the Aerospace Spray Paint Booths and the Site Wide Wipe Cleaning Operation are subject to the requirements of 40 CFR Part 63, Subpart GG - National Emission Standards for Aerospace Manufacturing and Rework Facilities (MACT GG).

The Aerospace Paint Booths and the Wipe Cleaning Operations are subject to MACT GG because the rule is applicable to facilities such as UTC that are engaged in part or in whole, in the manufacture or rework of commercial, civil, or military aerospace vehicles or components. Secondly, MACT GG is applicable because the plant is a major source for HAPs as defined in Section 63.2 of 40 CFR Part 63, Subpart A. Out of the 12 Aerospace Paint Booths at UTC, the company indicated that spray guns are used to coat various aerospace components at sources 20, 75, 83 and 89. The spray guns in the above spray booths are cleaned by the disassembled spray gun cleaning technique defined in Section 63.744(c)(3).

Spray Paint Booth S-25 is used to coat miscellaneous non-aerospace metal parts. Therefore, the spray booth is not subject to the standards prescribed in MACT GG. However, UTC must demonstrate coating operations at S-25 comply with Regulation 8, Rule 19 "Organic Compounds – Surface Coating of Miscellaneous Metal Parts and Products". In addition to the above, aerosol spray painting operations are conducted in S-25, therefore the plant must demonstrate compliance with Regulation 8, Rule 49 "Organic Compounds – Aerosol Paint Products".

Sandblasting Operations performed at sources 7, 115, and 516 are not subject to the depainting standards outlined in Section 63.746 of MACT GG. The rationale for this determination was based on the fact that the aerospace parts, subassemblies, and assemblies processed at the above sources are normally removed from the primary aircraft structure before depainting. Therefore, the above non-chemical depainting operations are exempt from the depainting standards of MACT GG per Section 63.746(a)(3)(ii).

### **V. Schedule of Compliance**

A schedule of compliance is required in all Title V permits pursuant to BAAQMD Regulation 2-6-409.10 which provides that a major facility review permit shall contain the following information and provisions:

"409.10 A schedule of compliance containing the following elements:

- 10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;
- 10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and
- 10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan

was achieved and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.”

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

The BAAQMD Compliance and Enforcement Division has conducted a review of compliance over the past year and has no records of compliance problems at this facility during the past year. The compliance report is contained in Appendix A of this permit evaluation and statement of basis.

## **VI. Permit Conditions**

During the Title V permit development, the District has reviewed the existing permit conditions, deleted the obsolete conditions, and, as appropriate, revised the conditions for clarity and enforceability. Each permit condition is identified with a unique numerical identifier, up to five digits.

When necessary to meet Title V requirements, additional monitoring, recordkeeping, or reporting requirements have been added to the permit.

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all “strike-out” language will be deleted; all “underline” language will be retained, subject to consideration of comments received.

The existing permit conditions are derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). Permit conditions may also be imposed or revised as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 et seq., an order of abatement pursuant to H&SC § 42450 et seq., or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

The District has reviewed and, where appropriate, revised or added new annual and daily throughput limits on sources so as to help ensure compliance with District rules addressing preconstruction review. The applicability of preconstruction review depends on whether there is a “modified source” as defined in District Rule 2-1-234. Whether there is a modified source depends in part on whether there has been an “increase” in “emission level.” 2-1-234 defines what will be considered an emissions level increase, and takes a somewhat different approach depending on whether a source has previously been permitted by the District.

Sources that were modified or constructed since the District began issuing new source review permits will have permits that contain throughput limits, and these limits are reflected in the Title V permit. These limits have previously undergone District review, and are considered to be the legally binding “emission level” for purposes of 2-234.1 and 2-1-234.2. By contrast, for older sources that have never been through preconstruction review (commonly referred to as

“grandfathered” sources), an “increase” in “emission level” is addressed in 2-1-234.3. A grandfathered source is not subject to preconstruction review unless its emission level increases above the highest of either: 1) the design capacity of the source, 3) the capacity listed in a permit to operate, or 3) highest capacity demonstrated prior to March 2000. However, if the throughput capacity of a grandfathered source is limited by upstream or downstream equipment (i.e., is “bottlenecked”), then the relaxing of that limitation (“debottlenecking”) is considered a modification.

The District has written throughput limits into the Title V permit for grandfathered sources. As discussed above, these limits are written for the purpose of determining whether an increase in emission levels has occurred. The purpose of these limits is to facilitate implementation of the preconstruction review program. If these limits are exceeded, the facility would be expected to report the exceedence, and the District would treat the reported exceedence as presumptively establishing the occurrence of a modification. The facility would then be expected to apply for a preconstruction permit addressing the modification and the District would consider whether an enforcement action was appropriate.

It is important to note the presumptive nature of throughput limits for grandfathered sources that are created in the Title V permit. These limits are generally based upon the District’s review of information provided by the facility regarding the design capacity or highest documented capacity of the grandfathered source. To verify whether these limits reflect the true design, documented, or “bottlenecked” capacity (pursuant to 2-10234.1) of each source is beyond the resource abilities of the District in this Title V process. Moreover, the District cannot be completely confident that the facility has had time or resources necessary to provide the most accurate information available in this regard. Creating throughput limits in the Title V permit for grandfathered sources is not required by either Part 70 or the District’s Major Facility Review rules. Despite the lack of such a requirement, and despite the resource and information challenges presented in the Title V process, the District believes that writing presumptive limits for grandfathered sources into the Title V permit will provide a measure of predictability regarding the future applicability of the preconstruction review program, and that this increased predictability is universally beneficial.

It follows from the presumptive nature of these throughput limits for grandfathered sources that exceedence of these limits is not per se a violation of the permit. *Failure to report an exceedence would be a permit violation.* In this sense, the throughput limits function as monitoring levels, and are imposed pursuant to the District’s authority to required monitoring that provides a reasonable assurance of compliance. If an exceedence occurs, the facility would have an opportunity to demonstrate that the throughput limit in fact did not reflect the appropriate limit for purposes of 2-1-234.3. If the facility can demonstrate this, no enforcement action would follow, and the permit would be revised at the next opportunity. It also follows that compliance with these limits is not a “safe harbor” for the facility. If evidence clearly shows that a grandfathered source has undergone a “modification” as defined in 2-1-234.3, the District would consider that a preconstruction review-triggering event, notwithstanding compliance with the throughput limit in the Title V permit. In other words, the protection afforded the facility by complying with the throughput limit in the Title V permit is only as strong as the information on which it was based. There is no Title V “permit shield” associated with throughput limits for

grandfathered sources, as they are being proposed. A shield may be provided if the District determines with certainty that a particular limit is appropriate for purposes of 2-1-234.3.

Conditions that are obsolete or that have no regulatory basis have been deleted from the permit.

Conditions have also been deleted due to the following:

- Redundancy in record-keeping requirements.
- Redundancy in other conditions, regulations and rules.
- The condition has been superseded by other regulations and rules.
- The equipment has been taken out of service or is exempt.
- The event has already occurred (i.e. initial or start-up source tests).

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

- BACT: This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
- Cumulative Increase: This term is used for a condition imposed by the APCO which limits a source's operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- Offsets: This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- PSD: This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
- TRMP: This term is used for a condition imposed by the APCO to ensure compliance with limits that arise from the District's Toxic Risk Management Policy.

***Parameter monitoring has been added for each abatement device.*** Additional monitoring has been added, where appropriate, to assure compliance with the applicable requirements.

All permit conditions have been re-written in active voice and hold the owner/operator responsible for non-compliance with emission limits and/or permit condition requirements.

Table 1 summarizes the Permit Conditions (PC) governing the operation of sources at UTC. Please note that sources 1, 5, 8, 9, 10, 20, 21, 25, 27, 28, 34, 39, 41, 46, 56, 62, 64, 70, 71, 72, 76, 82, 108, and 502 did not have PCs governing their operation. New PCs were assigned to govern sources 39, 41, 64, 70, 71, 72, and 502 in the proposed permit. These PCs explicitly spellout the implied throughput limitations and other relevant information provided by UTC to the District when permitting the above sources. PC 5619 previously governed the operation of steam boiler S-104. Steam Boilers 1, 8, 9, 10, 21, 27, 28, 34, 62, and 108 did not have PCs governing their operation. Therefore, since all the boilers combust diesel fuel, the above sources were linked to PC 5619. For lack of throughput information and/or applications submitted by UTC for grandfathered sources 5, 20, 25, 46, 56, 76, and 82, no PCs have been assigned to the

above sources. The sources are expected to comply with the applicable requirements outlined in Table IV of the proposed permit.

<b>Table 1</b>	
<b>Source #</b>	<b>Permit Condition Governing The Source</b>
1	5619
5	SWPC
7	13479
8	5619
9	5619
10	5619
20	SWPC
21	5619
25	SWPC
27	5619
28	5619
34	5619
39	20628
41	20663
46	SWPC
56	SWPC
62	5619
64	20628
68	13438
69	295
70	20675
71	20675
72	20675
74	675
75	738
76	SWPC
81	1747
82	SWPC
83	15069
85	5544
88	2503
89	2611
90	3143
97	14098
100	6005
101	5097
104	5619
106	9093

<b>Table 1</b>	
<b>Source #</b>	<b>Permit Condition Governing The Source</b>
108	5619
109	9093
110	9226
111	9226
112	8991
113	8991
115	9098
116	9712
122	13610
123	13610
124	13715
125	15641
502	20642
504	6789
505	6789
506	6797
509	10746
510	20435
516	18833
517	19326
518	19326
519	19326
520	19326
521	19165

Note:

1. SWPC – Sources Without Permit Conditions;
2. Sources Linked to an Existing Permit Condition – Sources 1, 8, 9, 10, 21, 27, 28, 34, 62, and 108 linked to PC 5619 previously governing Source 104;
3. Sources With New Permit Conditions – Sources 39, 41, 64, 70, 71, 72, and 502.

As previously discussed, PCs with implied limits have been rewritten explicitly. In other words, conditions have been spelled out to help enable District enforcement staff to better understand and effectively enforce the conditions. As an example, consider PC 295. The old PC limited the maximum number of solid propellant rocket motor test firings for sources 68 and 69 to 1 per day. However, the old PC did not limit the quantity of propellant that can be combusted for a given time period (hourly, daily, weekly, monthly, annually). Neither did it restrict the types of propellants that can be combusted, nor did it specify any restrictions on the constituents in the propellants. The revised PC 295 incorporates conditions that govern the amount of propellant that can be combusted at S-69 for a given time period (per day in this case), restricts the use of certain materials and constituents, and includes recordkeeping requirements. The intent of revised PC's such as PC 265 is to limit emissions from sources such as 69 that are almost

impossible to abate due to the nature of their operation. It should be noted that PC 295 was originally intended to govern sources 68 and 69. However, UTC applied to the District and modified S-68, implying PC (# 13438) pertains to the operation of S-68. Changes similar to the ones discussed in the above example were incorporated into PC 13438 (governs S-68), PC 20628 (governs S-39, S-64), PC 20663 (governs S-41), PC 20675 (governs S-70, S-71, S-72). Sources 39, 41, 64, 70, 71, and 72 did not have existing PCs, since they are grandfathered sources, i.e., *sources that have neither been modified nor reconstructed since their installation date*. Please note that sources 39 and 64 are test stands that combust Jet Fuel A, source 41 combusts both Jet Fuel A and solid propellant, and sources 70 through 72 only combust solid propellant.

UTC operates 13 paint booths of which 5 (Sources 5, 20, 25, 76, 82) have never been formally assigned a PC because they are grandfathered sources. Sources 74, 75, 81, 83, 89, 101, 125 and 521 are governed by PCs 675, 738, 1747, 15069, 2611, 5097, 15641 and 19165 respectively. As previously discussed in Section IV under “Complex Applicability Determinations” the aforementioned spray booths are used to coat aerospace components and hence are subject to MACT GG and the District’s Regulation 8, Rule 29 “Organic Compounds – Aerospace Assembly and Component Coating Operations”. Facilities such as UTC are required to use compliant coatings that meet the “Coating Limitations” prescribed in Reg. 8-29-302. However, an exemption under the rule (Reg. 8-29-112) provides facilities the flexibility to use aerospace coatings that do not meet the coating limitations of Reg. 8-29-302 provided the plant files for a “Low Usage Coating Petition” with the District per Reg. 8-29-402. Specifically, approval of such a petition by the District’s Enforcement Division would allow a facility such as UTC to use individual non-compliant coatings if the annual usage of each individual coating is less than 20 gallons per calendar year and the sum total of all individual non-compliant coatings combined is less than 200 gallons. For example, consider PC 675 (governs S-74). The old PC simply restricted the coating applied at the booth to less than 200 gallons and required UTC to maintain a log of coating usage. Research into permit applications filed by UTC with the District for S-74 in April 1986 indicated that the restriction of 200 gallons in the old condition was in light of the Reg. 8-29-112 exemption. However, the condition did not contain language in it to inform enforcement staff and/or the facility, that the 200 gallons referred to the cumulative use of all non-compliant coatings, provided, a petition for the use of such coatings was approved by the District. Therefore, the revised PC 675 explains the language contained in Reg. 8-29-112. Changes similar to the one discussed above, were incorporated into PCs 738, 1747, and 2611.

UTC operates 11 diesel-fired boilers (Sources 1, 8, 9, 10, 21, 27, 28, 34, 62, 104 and 108). It should be noted that none of the above sources have a maximum heat input greater than 10 MBTU/hr and do not combust natural gas for safety reasons. In May 1991, UTC was granted a Permit to Operate S-104 as a distillate oil fired boiler that was governed by PC 5619. UTC recently indicated that all the boilers at the plant including S-104 are diesel fired. Therefore, in light of the fact that the fuel combusted in the above sources is similar coupled with the fact that there were no existing PCs that governed the remaining 10 boilers at the plant, PC 5619 was re-written to address all the 11 boilers and contains restrictions on the amount of sulfur that can be contained in the fuel combusted in them along with vendor fuel oil certification and related recordkeeping requirements. Since Regulation 9, Rule 7 “Inorganic Gaseous Pollutants - Nitrogen Oxides And Carbon Monoxide From Industrial, Institutional, And Commercial Boilers, Steam Generators, And Process Heaters”, does not contain NO<sub>x</sub> and CO emission limits for non-

gaseous fuel fired boilers rated less than 10 MMBTU/hr, UTC is required to perform annual tune-up of the boilers in accordance with Regulation 9-7-304.2.

PC 9093 governs the operation of propellant mixers 106 and 109. The old PC required UTC to maintain logs of the liquid and powdered material throughput through the above sources and did not limit the quantity of propellant materials that could be processed at the above sources. A permit application submitted by the plant in August 1992 indicated that UTC planned to process 2,400 and 10,000 TPY of propellant materials in sources 106 and 109 respectively. UTC indicated that 85% of the total material processed through each mixer is powdered solid material and estimated the POC content of the propellant resin processed in the above mixers to be 4% by volume. Therefore, the revised PC 9093 spells-out the implied conditions and requires UTC to maintain logs of the solid and liquid propellant materials throughput at the above sources.

Sources 110 and 111 are two separate, exactly identical propellant mixers that were permitted together in March 1993 and are governed by PC 9226. Emission calculations performed in the engineering evaluation for the above sources are similar, since the capacities and material processed through the above sources is the same. This would imply that PCs for either source would be identical to the other. However, the old PC 9226 is missing parts 2 through 7 for S-110 which are contained under S-111. In addition, part 1 of the PC for S-110 is similar to part 7 of S-111, implying some of this information may have been lost during data transfer or could be an artifact of the program used by the District at that time. The above error has been corrected in the revised PC 9226 and it addresses the above sources together, instead of separately.

Source 502, where Ammonium Perchlorate (AP), a major ingredient of the solid rocket fuel, is milled was permitted in October 1988 but was not assigned a PC to govern the amount of AP that can be throughput through S-502. A newly assigned PC 20642 spells out the implied conditions that was part of the previously submitted permit application.

Periodic Inspection, Monitoring and Recordkeeping requirements were incorporated into PCs 6797 (governs S-506), 9098 (governs S-115), 13479 (governs S-7), 18833 (governs S-516) and 20642 (governs S-502). Particulate emissions are the primary pollutant of concern from the above sources

## **VII. Applicable Limits and Compliance Monitoring Requirements**

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

The District has reviewed all monitoring and has determined the existing monitoring is adequate with the following exceptions.

The tables below contain only the limits for which there is no monitoring or inadequate monitoring in the applicable requirements. The District has examined the monitoring for other limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance. Calculations for potential to emit will be provided in the discussion when no monitoring is proposed due to the size of a source.

Monitoring decisions are typically the result of a balancing of several different factors including: 1) the likelihood of a violation given the characteristics of normal operation, 2) degree of variability in the operation and in the control device, if there is one, 3) the potential severity of impact of an undetected violation, 4) the technical feasibility and probative value of indicator monitoring, 5) the economic feasibility of indicator monitoring, and 6) whether there is some other factor, such as a different regulatory restriction applicable to the same operation, that also provides some assurance of compliance with the limit in question.

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements. It follows that, although Title V calls for a re-examination of all monitoring, there is a presumption that these factors have been appropriately balanced and incorporated in the District's prior rule development and/or permit issuance. It is possible that, where a rule or permit requirement has historically had no monitoring associated with it, no monitoring may still be appropriate in the Title V permit if, for instance, there is little likelihood of a violation. Compliance behavior and associated costs of compliance are determined in part by the frequency and nature of associated monitoring requirements. As a result, the District will generally revise the nature or frequency of monitoring only when it can support a conclusion that existing monitoring is inadequate.

**SO<sub>2</sub> Sources**

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
Steam Boilers: S-1, S-8, S-9, S-10, S-21, S-27, S-28, S-34, S-62, S-104, and S-108	BAAQMD 9-1-301	Ground level concentrations of SO <sub>2</sub> shall not exceed: 0.5 ppm for 3 consecutive minutes AND 0.25 ppm averaged over 60 consecutive minutes AND 0.05 ppm averaged over 24 hours	None
	BAAQMD 9-1-304	Sulfur Content < 0.5% by weight, for liquid fuel < 300 ppm (dry), for solid fuel	None
S-39 – 1811D1 Ramjet Test Stand; Firing Jet Fuel A  S-64 - 1810K05 Ramjet Test Stand (RT-2); Firing Jet Fuel A	BAAQMD 9-1-301	Ground level concentrations of SO <sub>2</sub> shall not exceed: 0.5 ppm for 3 consecutive minutes AND 0.25 ppm averaged over 60 consecutive minutes AND 0.05 ppm averaged over 24 hours	None
S-41 – 1810D1 Ramjet Test Stand	BAAQMD 9-1-301	Ground level concentrations of SO <sub>2</sub> shall not exceed: 0.5 ppm for 3 consecutive minutes AND 0.25 ppm averaged over 60 consecutive minutes AND 0.05 ppm averaged over 24 hours	None
S – 517 – Emergency Standby Diesel Generator (ESDG)  S – 518 – ESDG  S – 519 – ESDG  S – 520 – ESDG	BAAQMD 9-1-301	Ground level concentrations of SO <sub>2</sub> shall not exceed: 0.5 ppm for 3 consecutive minutes AND 0.25 ppm averaged over 60 consecutive minutes AND 0.05 ppm averaged over 24 hours	None

**SO<sub>2</sub> Discussion:**

**BAAQMD Regulation 9-1-301**

**Boilers:**

The sum of the individual maximum heat input rates for the 11 boilers at UTC is equal to 41.03 MM BTU/hr. Assuming the heating value of diesel combusted in the boilers is 141,000 BTU/gallon, the boilers consume approximately 291 gallons of diesel per hour. The SO<sub>2</sub> emission factor for boilers similar to sources 1, 8, 9, 10, 21, 27, 28, 34, 62, 104 and 108 was taken from US EPA’s AP-42, Table 1.3-1 “Criteria Pollutant Emission Factors for Fuel Oil Combustion”, September 1998. The prescribed SO<sub>2</sub> emission rate in AP-42 is 142\*S lb/1000 gallon, where “S” is the percent weight of sulfur in the fuel. Part 1 of Permit Condition 5619 limits the “S” in the diesel combusted at the boilers to 0.5%. Therefore, the SO<sub>2</sub> emission rate can be translated to 71 lb/1000 gallon or 0.071 lb/gallon of diesel. At this emission rate and assuming the hourly fuel consumption of 291 gallon/hour, the boilers emit approximately 21 lbs/hr of SO<sub>2</sub> emissions.

Assuming the boilers operate for 24 hours per day for 365 days in a year, the Potential To Emit (PTE) and/or worst-case annual SO<sub>2</sub> emissions is approximately equal to 90 TPY. The most recently approved plant update for UTC indicates the total amount of diesel consumed at sources 8, 9, 10, 27, 28, 62, 104 and 108 was 35,300, 35,300, 35,300, 8,300, 8,300, 800, 18,400, 8,300 gallons respectively. The above fuel consumptions translate to the following annual hours of operation for the above sources:

1,136 hrs/yr for sources 8, 9 and 10; 668 hrs/yr for sources 27 and 28; 75 hrs/yr for source 62; 496 hrs/yr for S-104 and 1,147 hrs/yr for S-108.

It can be seen that though the Potential To Emit (PTE) and/or worst-case emission calculations assumed 8,760 hrs/yr of operation per boiler, on an average the actual hours of operation per boiler did not exceed 808 hours/year.

#### Test Stands Firing Jet Fuel A:

UTC indicated in their SMOP application that the company does not intend to use more than 18,000 gallons of Jet Fuel A in a year. Test stands S-39, S-41 and S-64 are capable of combusting Jet Fuel A. Please note that source 41 combusts both solid propellants and Jet Fuel A. From Table II-A we can see that the jet fuel consumption at S-64 is twice that of S-39 and S-41. Part 1 of PC 20628 and Part 5 of PC 20663 limit the sulfur content of Jet Fuel A combusted in sources 39 & 64 and 41 to 0.5% by wt., respectively. Therefore, if we assume test stands 39 and 41 combust 4,500 gallons per test stand per year and test stand 64 combusts 9,000 gallons per year, the annual SO<sub>2</sub> emissions from the above sources assuming the previously derived SO<sub>2</sub> emission rate of 0.071 lb/gallon are 0.16 TPY for S-39 and S-41, and 0.32 TPY for S-64.

#### Emergency Standby Diesel Generators (ESDG):

UTC operates four ESDGs. Sources 517 through 520 are Loss of Exemption I.C. Engines, i.e., Sources that were previously exempt from permitting which were later required to obtain a Permit to Operate due to changes in the District's regulations. Part 1 of Permit Condition 19326 limits the sulfur content in the fuel to 0.5%. Emission factors used to estimate criteria pollutant emissions from the above sources was taken from US EPA AP-42, Table 3.3-1 "Emission Factors For Uncontrolled Gasoline and Diesel Industrial Engines", October 1996. The emission factor for SO<sub>2</sub> furnished in the above referenced table is 0.00205 lb/hp-hr. The PTE calculation using EPA's guidance memorandum entitled "Calculating Potential to Emit (PTE) for Emergency Generators" dated September 6, 1995 assumes ESDGs to be similar sources and states they are unlikely to run, even in a worst case scenario, for more than 500 hours per year. Therefore, the potential to emit calculation are based on 500 hours per year of ESDG operation. Please also note that sources 517, 518, 519 and 520 are rated at 228 hp, 355 hp, 355 hp and 207 hp. Please refer to Table II-A.

SO<sub>2</sub> PTE calculations are as follows:

S-517: (500 hr/yr) x (228 hp) x (0.00205 lb SO<sub>2</sub>/hp-hr) x (1 ton SO<sub>2</sub>/2000 lb S<sub>02</sub>) = 0.12 ton/yr

S-518: (500 hr/yr) x (355 hp) x (0.00205 lb SO<sub>2</sub>/hp-hr) x (1 ton SO<sub>2</sub>/2000 lb S<sub>02</sub>) = 0.18 ton/yr

S-519: (500 hr/yr) x (355 hp) x (0.00205 lb SO<sub>2</sub>/hp-hr) x (1 ton SO<sub>2</sub>/2000 lb S<sub>02</sub>) = 0.18 ton/yr

S-520: (500 hr/yr) x (207 hp) x (0.00205 lb SO<sub>2</sub>/hp-hr) x (1 ton SO<sub>2</sub>/2000 lb S<sub>02</sub>) = 0.11 ton/yr

Area monitoring to demonstrate compliance with the ground level SO<sub>2</sub> concentration requirements of Regulation 9-1-301 is at the discretion of the APCO (per BAAQMD Regulation 9-1-501). As discussed in the preceding paragraphs, UTC does not have equipment that emits large amounts of SO<sub>2</sub> and therefore is not required to have ground level monitoring by the

APCO. Moreover, the potential emissions of SO<sub>2</sub> are not concentrated in one point source, but rather in a number of small sources, spread out over a large geographical area (approximately 5,200 acres). For comparison, the refineries in the Bay Area have SO<sub>2</sub> emissions ranging from 760 TPY to 6900 TPY. These facilities have ground level monitors; yet they rarely exceed the 9-1-301 limits. Therefore, no periodic monitoring has been added to assure compliance with Reg. 9-1-301.

BAAQMD Regulation 9-1-304

Part 1 of PC 5619 limits the sulfur content in the diesel fuel combusted in the boilers to 0.5% by wt. Part 3 of PC 5619 requires UTC to request its fuel oil vendor to certify the sulfur content of the fuel oil and Part 4 requires UTC to maintain records on-site of all fuel oil vendor certifications. Compliance with the above conditions is a standard monitoring practice to demonstrate compliance with Regulation 9-1-304. Therefore, no additional periodic monitoring is required.

PM Sources

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
Steam Boilers: S-1, S-8, S-9, S-10, S-21, S-27, S-28, S-34, S-62, S-104, and S-108	BAAQMD Regulation 6-301	Ringelmann 1.0	None
	BAAQMD Regulation 6-310.3	0.15 gr/dscf at 6% O <sub>2</sub>	None
S-7 - 0210W04 Sandblasting Room	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S-115 - Sandblast Cabinet #1; Station 20	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S-502 – Ammonium Perchlorate Milling	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S-505 – HMX Grinding Station	BAAQMD Regulation 6-301	Ringelmann 1.0	None
	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S-506 - Hammer Grinder - Ammonium Perchlorate Milling	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S-516 - Sand Blast Machine, Station 21	BAAQMD Regulation 6-310	0.15 gr/dscf	None
	BAAQMD Regulation 6-311	4.10P <sup>0.67</sup> lb/hr, where P is process weight, ton/hr	None
S – 517 – ESDG  S – 518 – ESDG  S – 519 – ESDG  S – 520 – ESDG	BAAQMD Regulation 6-303	Ringelmann 2.0	None
	BAAQMD Regulation 6-310	0.15 gr/dscf	None
S-68 – Rocket Motor Test Stand	BAAQMD Permit Condition # 13438, Part 4	Ringelmann 0.5	None
S-88 - Compactor	BAAQMD Regulation 6-301	Ringelmann 1.0	None
S-106, S-109, S-110, S-111, S-112 and S- 113 – Propellant Mixers	BAAQMD Regulation 6-301	Ringelmann 1.0	None
S-116 – Walk-In Oven; Electric	BAAQMD Regulation 6-301	Ringelmann 1.0	None

## PM Discussion:

### Boilers:

The PM emission rate prescribed in US EPA AP-42, Table 1.3-1 “Criteria Pollutant Emission Factors for Fuel Oil Combustion”, September 1998 is 2 lb/1000 gallon. The above emission rate is converted to a grain loading rate to verify if periodic visible emission monitoring is warranted<sup>1</sup>. This is accomplished as follows:

$$= (2 \text{ lbs}/1000 \text{ gal diesel} * 141,000 \text{ BTU}/134 \text{ ft}^3 * 7000 \text{ gr}/\text{lb}) / (141,000 \text{ BTU}/1 \text{ gal diesel}) \\ = 0.10 \text{ gr}/\text{ft}^3$$

Visible emissions are not expected at such a low grain loading. Therefore, no periodic monitoring is required.

Regulation 6-310.3 limits Filterable PM (PM) emissions from “heat transfer operations” to 0.15 gr/dscf @ 6% O<sub>2</sub>. As previously discussed, the PM emission factor for boilers similar to sources 1, 8, 9, 10, 21, 27, 28, 34, 62, 104 and 108 prescribed in US EPA’s AP-42, Table 1.3-1 “Criteria Pollutant Emission Factors for Fuel Oil Combustion”, September 1998 is 2 lb/1000 gallon. In order to compare the standard emission rate prescribed in AP-42 to the Reg. 6-310.3 limit, we need to convert both emission rates to an emission rate with the same metric (lb/MM BTU).

We convert Reg. 6-310.3 as follows:

The F<sub>d</sub>-Factor for PM furnished in 40 CFR Part 60, Appendix A, Method 19 for Crude, Residual, or Residual Oil is 9,190 dscf/MM BTU. Please note that an “F” factor is the ratio of the gas volume of the products of combustion to the heat content of the fuel. Therefore, emission rate (E) using the oxygen-based F-factor, dry basis is equal to:

$$E = C_d * F_d * [20.9 / (20.9 - \%O_{2d})] = 0.15 * 9190 * [20.9 / (20.9 - 6)] = 1,934 \text{ gr}/\text{MMBTU};$$

where

C<sub>d</sub> – Pollutant Concentration, dry basis

F<sub>d</sub> – Oxygen-Based F-factor, dry basis

Converting the grains to lbs i.e. 1 lb = 7000 grains

$$E = 0.2762 \text{ lbs}/\text{MMBTU}$$

To convert the AP-42 emission factor (in lbs/1000 gallon) to lbs/MMBTU, divide the AP-42 factor by the heating value of the diesel fuel.

$$\text{Therefore, } (2 \text{ lbs}/1000 \text{ gallon}) / (141,000 \text{ BTU}/\text{gallon}) = \underline{0.01418 \text{ lbs}/\text{MMBTU}}$$

Since, the AP-42 emission rate is well below the Reg. 6-310.3 limit, it is concluded that periodic PM monitoring for boilers at UTC is not required.

### Sandblasting Operations:

Non-Chemical Depainting Operations are conducted at sources 7, 115 and 516 and the resulting particulate emissions are abated by baghouses A-512, A-115 and A-516 respectively. The above sources are required to demonstrate compliance with Reg. 6-310 and Reg. 6-311. The Total PM emission factor furnished in Table 13.2.6-1 of the US EPA AP-42 Chapter 13.2.6 “Abrasive Blasting”, September 1997 is 0.69 lb/1000 lb abrasive. This emission factor applies to abrasive blasting of unspecified metal parts, controlled with a fabric filter.

Parts 4, 3 and 3 of PC 13479, 9098 and 18833 respectively, limit the annual abrasive usage at sources 7, 115 and 516 to 100 TPY, 5 TPY and 6.5 TPY, respectively. The exhaust flow rate

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<sup>1</sup> HHV of Natural Gas = 1,050 BTU/scf; 1 gal of diesel = 141,000 BTU. Therefore, approximately 134 scf of natural gas equals 1 gal of diesel.

capacities through A-512, A-115 and A-516 are 30,800 CFM, 800 CFM and 6,400 CFM respectively. Please refer to Table II-B.

Assuming the sandblasting operations are carried out 8 hr/day and the maximum amount of abrasives that can be used at any of the above sources is 5 tons per day, the outlet grain loading for A-512, for example, is derived as follows:

$$(0.69 \text{ lb}/1000 \text{ lb} * 5 \text{ tons}/\text{day} * 2000 \text{ lbs}/\text{ton} * 7000 \text{ gr}/\text{lb}) / (30800 \text{ ft}^3/\text{min} * 60 \text{ min}/\text{hr} * 8 \text{ hr}/\text{day}) \\ = 0.0033 \text{ gr}/\text{ft}^3$$

In similar fashion, the outlet grain loading for A-115 and A-516 using the above methodology is equal to 0.126 gr/ft<sup>3</sup> and 0.016 gr/ft<sup>3</sup> respectively.

The post-control hourly PM emissions from source 7 using the above derived outlet grain loading value for A-512 is equal to:

$$(0.0033 \text{ gr}/\text{ft}^3 * 30800 \text{ ft}^3/\text{min} * 60 \text{ min}/\text{hr}) / (7000 \text{ gr}/\text{lb}) = 0.87 \text{ lb}/\text{hr}$$

The post-control hourly PM emissions for sources 115 and 516 using the outlet grain loading values for A-115 and A-516 is equal to 0.86 lb/hr and 0.88 lb/hr respectively.

Since the outlet grain loading and hourly particulate matter emission rates from sandblasting sources at UTC are well below the limits prescribed in Reg. 6-310 and 6-311, it is concluded that periodic PM monitoring for the above operations at UTC is not required.

#### AP Milling & HMX Grinding Operations:

Source 502 receives 200 micron sized crystals of Ammonium Perchlorate (AP), a major ingredient of solid rocket fuel that provides the oxygen necessary for rapid combustion, where it is milled and/or reduced to approximately 2.8 microns in a Sturtevant Jet Mill. The resulting PM emissions are abated by three baghouses A-51 through A-53 that are in series. Source 506 is also used to mill AP and the resulting PM emissions are abated by baghouse A-506. HMX, a crystalline explosive that is dried in the HMX Dryer S-504 is pulverized with air streams in S-505, a 24" Sturtevant Jet Mill. The resulting emissions are abated by A-505.

Since the above operations are similar, in that they reduce the size of either AP and/or HMX they are discussed together in light of Reg. 6-310 and Reg. 6-311.

UTC indicated the exhaust capacities for sources S-502, S-505 and S-506 to be 1200 CFM, 1857 CFM and 3200 CFM, respectively. As previously discussed in the "Sandblasting Operations" section, we conservatively assume the outlet grain loading for baghouses A-51 through A-53, A-505 and A-506 to be equal to 0.08 gr/ft<sup>3</sup>. It is highly unlikely that the Ringelmann 1.0 limit will be exceeded at such a low outlet grain-loading rate. Therefore, no periodic visible emissions monitoring is required for S-505.

As an example, consider S-502. The hourly post-control hourly PM emissions from source 502 is equal to:

$$(0.08 \text{ gr}/\text{ft}^3 * 1200 \text{ ft}^3/\text{min} * 60 \text{ min}/\text{hr}) / (7000 \text{ gr}/\text{lb}) = 0.82 \text{ lb}/\text{hr}$$

Similarly, the post-control hourly PM emissions for sources 505 and 506 is equal to 1.27 lb/hr and 2.19 lb/hr respectively.

Since the outlet grain loading and hourly particulate matter emission rates from the AP Milling and HMX Grinding operations are well below the limits prescribed in Reg. 6-310 and 6-311, it is concluded that periodic PM monitoring for the above operations at UTC is not required.

Emergency Standby Diesel Generators (ESDG):

As previously discussed in the ESDG section of the "SO2 Discussion", UTC operates four ESDGs, sources 517 through 520 and the ESDG's are rated at 228 hp, 355 hp, 355 hp and 207 hp respectively.

Since it is highly unlikely that PM emissions from the above sources will exceed the Reg. 6-303 limit, no periodic monitoring for visible emissions is recommended.

Emission factors used to estimate criteria pollutant emissions from the above sources was taken from US EPA AP-42, Table 3.3-1 "Emission Factors For Uncontrolled Gasoline and Diesel Industrial Engines", October 1996. The emission factor for PM10 furnished in the above referenced table is 0.0022 lb/hp-hr. The PTE calculation using EPA's guidance memorandum entitled "Calculating Potential to Emit (PTE) for Emergency Generators" dated September 6, 1995 assumes ESDGs to be similar sources and states they are unlikely to run, even in a worst case scenario, for more than 500 hours per year. Therefore, the potential to emit calculation are based on 500 hours per year of ESDG operation.

Regulation 6-310 limits Filterable PM (PM) emissions to 0.15 gr/dscf. In order to compare the standard emission rate prescribed in AP-42 to the Reg. 6-310.3 limit, we need to convert both emission rates to an emission rate with the same metric (lb/MM BTU).

We convert Reg. 6-310 as follows:

The F<sub>d</sub>-Factor for PM furnished in 40 CFR Part 60, Appendix A, Method 19 for Crude, Residual, or Residual Oil is 9,190 dscf/MM BTU. Therefore, the emission rate "E"

$$= (9190 \text{ dscf/MMBTU} * 0.15 \text{ gr/dscf}) / (7000 \text{ gr/lb}) = \underline{0.1969 \text{ lb/MMBTU}}$$

As an example, for S-517, the AP-42 emission factor (in lbs/hp-hr) is converted to lbs/MMBTU as follows<sup>2</sup>:

$$[(0.0022 \text{ lb/hp-hr} * 228 \text{ hp} * 500 \text{ hr/yr}) / (20000 \text{ gal/yr} * 141000 \text{ BTU/gal})] * (10^6 \text{ BTU/MMBTU}) = \underline{0.09 \text{ lb/MMBTU}}$$

In similar fashion, the emission rates for S-518 through S-520 are 0.14 lb/MMBTU, 0.14 lb/MMBTU and 0.08 lb/MMBTU respectively.

Since, the AP-42 emission rate is well below the Reg. 6-310 limit, it is concluded that periodic PM monitoring for ESDGs at UTC is not required.

Rocket Motor Test Stands:

The duration of the static rocket motor tests conducted at all test stands at UTC is well below 3 minutes per test and no more than 1 test will be conducted in an hour. Therefore, it is safe to conclude the Ringelmann visible emissions limit prescribed in Regulation 6 will not be exceeded. Hence, no periodic monitoring to assure compliance with the visible emissions limit is required.

Compactor:

The compactor is used to crush drums with a volumetric storage capacity of 42 gallons. Particulate emissions stem from residual solid contents that could potentially be present in the drums. The compactor is abated by A-88, which has a particulate matter abatement efficiency of 90%. District staff estimated the particulate matter emissions from S-88 to be 0.1 lb/day. In light

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<sup>2</sup> Assumes a worst-case BSFC of 40 gallons per hour for each ESDG

of the duration, frequency and the negligible emissions from the crushing operation, no periodic monitoring for visible emissions is recommended.

Propellant Mixers:

Following is a summary of the typical mixing operations at the six propellant mixers at UTC: Ammonium Perchlorate is pneumatically introduced (closed system) into a mix bowl containing an antioxidant, curatives, and uncured polymeric resin materials. The mix bowl is covered with a lid that has an "O"-ring seal during the entire mixing operation. The propellant components are mixed together in remotely monitored and operated isolated buildings, for safety reasons, and the combined propellant product is allowed to cure over a period of 7 to 10 days. Due to the well-controlled nature of the operation the particulate matter emissions are negligible. Therefore, no periodic monitoring is required for the propellant mixers.

Walk-In Oven:

Parts 2 and 3 of PC 9712 limit the annual and daily quantities of propellant waste that can be processed through Grieve Oven S-116 to 50 lbs/yr and 10 lbs/day, respectively. At these throughput levels the particulate matter emissions are expected to be negligible, thereby not warranting periodic monitoring.

**POC Sources**

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
S-97 – G6470 Non-Retail Gasoline Dispensing Facility	BAAQMD 8-7-301.2	All Phase I Systems Shall Meet the Emission Limitations of the Applicable CARB Certification	None
S-116 – Walk-In Oven; Electric	BAAQMD 8-2-301	15 lb/day and 300 ppm (dry basis) total carbon	None

**POC Discussion:**

Non-Retail Gasoline Dispensing Facility:

Regulation 8-7-301.2 states:

“All Phase I vapor recovery systems at gasoline dispensing facilities shall be installed as per the most recent CARB certifications and shall meet the emission limitations of the applicable CARB certification. This standard shall apply to each stationary tank during each bulk gasoline delivery.”

The Phase I and Phase II systems at source 97 are governed by CARB Executive Orders G-70-97A and G-70-116F, respectively. Failure to comply with the above executive orders can result in the issuance of Notices of Violation (NOVs). Information contained in the District’s database does not indicate issuance of NOVs at S-97 in light of non-compliance with the above executive orders. Therefore, it is expected UTC will continue to comply Regulation 8-7-301.2. Hence, no periodic monitoring is required.

Walk-In Oven:

As previously discussed in the PM discussion section, emissions resulting from the quantity of propellant waste processed at S-116 is negligible. Therefore, no periodic monitoring is required.

**Lead Sources**

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
S-41 – 1810D1 Ramjet Test Stand	BAAQMD Regulation 11-1-301	15 lb/day	None
S-46 - 1720D1 Rocket Motor Test Stand	BAAQMD Regulation 11-1-301	15 lb/day	None
S-56 - 1311D1 Rocket Motor Test Stand			
S-68 - 1317 Rocket Motor Test Stand	BAAQMD Regulation 11-1-301	15 lb/day	None
S-69 – 1320B1 Rocket Motor Test Stand	BAAQMD Regulation 11-1-301	15 lb/day	None
S-70 - Station 1717 Pad 3, Rocket Motor Test Stand	BAAQMD Regulation 11-1-301	15 lb/day	None
S-71 - Station 1718 J1, 2” x 4” Rocket Motor Test Stand			
S-72 - Station 1760 J1, Rocket Motor Test Stand			
S-116 – Walk-In Oven; Electric	BAAQMD Regulation 11-1-301	15 lb/day	None

**Lead Discussion:**

The following discussion deals with sources 41, 46, 56, 68, 69, 70, 71, and 72 which combust solid propellants. The above test stands, except for 41, exclusively combust solid propellant. Source 41 combusts both Jet Fuel A and solid propellants. Emission factors for criteria and toxic air contaminant emissions associated with combusting solid propellants were provided by UTC in a Health Risk Assessment Report. The emission factors were used by the District to estimate emissions from S-68 under an application the company submitted to the District in November 1995.

The emission factor used to estimate lead emissions under App. 15015 was 2 E-6 g/g. Therefore, assuming 60,000 lbs of propellant would be combusted at S-68 annually, that would translate to 0.12 lb of lead/year. Part 2 of PC 13438 limits the maximum quantity of propellant combusted in S-68 to 33,000 lbs/day. This translates to 0.07 lb/day of lead emissions. This daily and annual emission rates are well below the Reg. 11-1 limit of 15 lbs/day and the District’s Toxic Trigger Levels (TTL) outlined under Table 2-1-316, in Regulation 2, Rule 1 of 16 lbs/year. It can be seen from Table II-A that S-68 is the largest test stand in terms of its maximum firing rate and the quantity of propellant it combusts. Therefore, it is safe to conclude that an emissions estimate below the District’s TTL for S-68 would ensure the remaining 7 test stands would comply with the requirements of Reg. 11-1-301. Therefore, in light of the above facts no further periodic lead monitoring is required for the test stands at UTC.

Grieve Oven S-116 is used to decompose solid rocket propellant adhered to various tooling. Typically, the tooling is scraped and weighed before and after processing at the oven. The oven is electrically powered and is equipped with a nitrogen purging system and an exhaust blower. It can be seen from Table II-A that S-116 is not permitted to process more than 50 lb/year of waste propellant material. An emission factor for lead similar to the one previously used to estimate the emissions from the test stands i.e.  $2 \text{ E-6 g/g}$  was used to estimate emissions from the oven under App. 11103 in April 1993. It can be seen that the highest daily lead emissions, assuming 50 lbs of propellant waste is processed per day, is 0.0001 lb/day, which is well below the TTL for lead. Therefore, no periodic lead monitoring is required for S-116.

### **Beryllium Sources**

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
S-116 – Walk-In Oven; Electric	BAAQMD Regulation 11-3-301	10 grams over 24-hour period	None

### **Beryllium Discussion:**

Sources of beryllium emissions at UTC in addition to S-116 include solid propellant test stands 41, 46, 56, 68, 69, 70, 71, and 72. The test stands are not subject to the requirements of Reg. 11-3, Reg. 11-4 and 40 CFR 61 Subpart C, because the solid propellant formulations do not contain beryllium as an ingredient. However, beryllium is present as a trace contaminant of the aluminum component of the rocket motor casing. In addition, PC 295 (part 4), PC 13438 (part 5), PC 20663 (part 2) and PC 20675 (part 4) preclude the inclusion of beryllium in the propellant formulation.

The emission factor used to estimate beryllium emissions under App. 11103 for S-116 was  $2 \text{ E-6 g/g}$ . Part 2 of PC 9712 limits the annual quantity of propellant waste processed in S-116 to 50 lbs. This translates to 0.0001 lb of beryllium/year for S-116. Assuming all the 50 lbs of beryllium permitted under PC 9712 is processed in S-116 in a single day, worst-case scenario, the resulting emissions would be equal to 0.05 grams. Therefore, since this worst-case emission rate is well below the Reg. 11-3 limit of 10 grams, no periodic beryllium monitoring is warranted.

Please also note that S-116 is not subject to Regulation 11-3-302 “Burning Beryllium By Incineration”, because the maximum possible temperature S-116 is capable of achieving is 750°F. Beryllium cannot undergo thermal oxidation at this temperature.

**Mercury Sources**

<b>S# &amp; Description</b>	<b>Emission Limit Citation</b>	<b>Federally Enforceable Emission Limit</b>	<b>Monitoring</b>
S-41 – 1810D1 Ramjet Test Stand	BAAQMD Regulation 11-5-301	2.3 kg over a 24 hour period	None
S-46 - 1720D1 Rocket Motor Test Stand	BAAQMD Regulation 11-5-301	2.3 kg over a 24 hour period	None
S-56 - 1311D1 Rocket Motor Test Stand			
S-68 - 1317 Rocket Motor Test Stand	BAAQMD Regulation 11-5-301	2.3 kg over a 24 hour period	None
S-69 – 1320B1 Rocket Motor Test Stand	BAAQMD Regulation 11-5-301	2.3 kg over a 24 hour period	None
S-70 - Station 1717 Pad 3, Rocket Motor Test Stand	BAAQMD Regulation 11-5-301	2.3 kg over a 24 hour period	None
S-71 - Station 1718 J1, 2" x 4" Rocket Motor Test Stand			
S-72 - Station 1760 J1, Rocket Motor Test Stand			

**Mercury Discussion:**

Reg. 11-5-301 limits mercury emissions to 2.3 kg over a 24 hour period which translates to approximately 5.07 lbs over a 24 hour period. In their Health Risk Assessment Report, UTC provided an emission factor of 2 E –8 g/g of mercury. In order to be in non-compliance with this limit the solid propellant test stands at UTC would have to combust at least 126,652 tons of solid propellants on any given day. From Table II-A it can be seen that none of the test stands at UTC are capable of combusting propellants at such a high level. Therefore, no periodic monitoring for mercury is recommended.

**VIII. Test Methods**

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not applicable requirements.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section IV of the permit.

**IX. Permit Shield:**

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA’s White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program. The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District’s program does not allow other types of streamlining in Title V permits.

This facility has the first type of permit shield.

This permit has no streamlining.

Following is the detail of the permit shields that were requested by the applicant.

**S-7 - 0210W04 SANDBLASTING ROOM  
 S-115 - SANDBLAST CABINET #1; STATION 20  
 S-516 - SAND BLAST MACHINE, STATION 21**

Citation	Title or Description (Reason not applicable)
40 CFR 63 Subpart GG: 63.746 (a)(3)(ii)	National Emission Standards for Aerospace Manufacturing and Rework Facilities (The standard does not apply to the non-chemical depainting operations because the aerospace parts, subassemblies, and assemblies are normally removed from the primary aircraft structure before depainting)

**S-90 – AIR STRIPPER; CONTAMINATED GROUNDWATER  
 S-100 – AIR STRIPPER; CONTAMINATED GROUNDWATER**

Citation	Title or Description (Reason not applicable)
Regulation 8, Rule 47: 8-47-113	Organic Compounds – Air Stripping and Soil Vapor Extraction Operations (The standard does not apply to the above sources because the total emissions from the operation of each individual source is less than 1 pound per day of benzene, vinyl chloride, perchloroethylene, methylene chloride and/or trichloroethylene)

**S-509 – SVE; CONTAMINATED SOIL REMEDIATION**  
**S-510 – SVE; CONTAMINATED SOIL REMEDIATION**

Citation	Title or Description (Reason not applicable)
BAAQMD Regulation 11, Rule 8 Incorporates By Reference the ARB Hexavalent Chromium Airborne Toxic Control Measure: Section 93102	Hexavalent Chromium Airborne Toxic Control Measure for Chrome Plating and Chromic Acid Anodizing Operations (This regulation applies to each chromium electroplating or chromic acid anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromic acid anodizing. Therefore, the hexavalent chromium emissions from S-90 and S-100 are not subject to Regulation 11, Rule 8 and/or Section 93102)

**D. Alternate Operating Scenarios:**

No alternate operating scenario has been requested for this facility.

**E. Compliance Status:**

A May 13, 2003 office memorandum from the Director of Compliance and Enforcement, to the Director of Permit Services, presents a review of the compliance record of United Technologies Corporation (Site #: A0710). The Compliance and Enforcement Division staff has reviewed the records for United Technologies Corporation for the period between 5/1/02 through 4/30/03. This review was initiated as part of the District evaluation of an application by United Technologies Corporation for a Title V permit. During the period subject to review, activities known to the District include:

- There were no Notices of Violation issued during this review period.
- The District did not receive any alleged complaints.
- The facility is not operating under a Variance or an Order of Abatement from the District Board.
- There were no monitor excesses or equipment breakdowns reported or documented by District staff.

The owner certified that all equipment was operating in compliance on October 24, 1995. No non-compliance issues have been identified to date.

**F. Differences between the Application and the Proposed Permit:**

The Title V permit application was originally submitted on July 24, 1996. This version is the basis for constructing the proposed Title V permit.

Table 2 summarizes the list of sources that were part of the original permit application.

<b>Table 2</b>	
<b>Sources Included In The Original Application (# 16478)</b>	
<b>Source #</b>	<b>Source Description<sup>3</sup></b>
1	Boiler
2	Paint Spray Booth
5	Liner, Spray Booth
6	Oven, Liner Curing
7	Sandblast Booth
8	Boiler
9	Boiler
10	Boiler
15	Paint Booth
16	Machine Tools-Wood
20	Paint Booth
21	Boiler
22	Machine Tools-Wood/Metal
24	Boiler
25	Paint Booth
26	Cleaning Booth
27	Boiler
28	Boiler
29	Boiler
30	Degreaser, Cold Cleaner
32	Degreaser, Vapor
34	Boiler
35	Machine Tools-Metal
39	Test Stand (Ramjet)
40	Fuel Tank
41	Test Stand (Ramjet)
42	Fuel Tank
46	Test Stand
50	NG Sparge
56	Test Stand (ST-1 thru ST-5)
57	Test Stand (ST-9)
61	Degreaser, Vapor
62	Boiler
64	Test Stand (Ramjet)

<sup>3</sup> Consistent with source descriptions included in the App. 16478

<b>Table 2</b>	
<b>Sources Included In The Original Application (# 16478)</b>	
<b>Source #</b>	<b>Source Description<sup>3</sup></b>
66	Paint Booth
67	Cleaning Booth
68	Test Stand (ST-7 & ST-7A)
69	Test Stand (ST-8)
70	Test Stand (Pad 3)
71	Test Stand
72	Test Stand
74	Paint Booth
75	Paint Booth
76	Silicone Application
77	Air Stripper
79	Machine Tools-Metal
81	Paint Booth
82	Paint Booth
83	Paint Booth
85	Wipe Cleaning
86	Sand Blasting
87	Sand Blasting
88	Drum Crusher
89	Paint Booth
90	Air Stripper
91	Sparge Tank
92	Sparge Tank
93	Sparge Tank
94	Sparge Tank
95	Sparge Tank
97	Gasoline Pumps
100	Air Stripper
101	Paint Booth
103	Fungicide Room
104	Boiler
105	Washcoat, D-5
106	Mixer, Propellant – 400 gal
107	Mixer, Propellant – Continuous
108	Boiler
109	Mixer, Propellant – 750 gal
110	Fuel Reactors, Titan
111	Fuel Reactors, IUS
112	Mixer, Propellant – 600 gal
113	Mixer, Propellant – 600 gal
114	Sandblast Room, Custom
115	Sandblast Cabinet

<b>Table 2</b>	
<b>Sources Included In The Original Application (# 16478)</b>	
<b>Source #</b>	<b>Source Description<sup>3</sup></b>
116	Oven, Grieve Walk-In
119	Liner, Spray Booth (A/C)
401	Open Burn Facility
402	Open Burn Facility
403	Open Burn Facility
404	Open Burn Facility
405	Open Burn Facility
406	Open Burn Facility
411	Open Burn Facility
412	Open Burn Facility
502	AP Grinder
503	Vapor Degreaser
504	HMX Dryer
505	HMX Grind/Feed System
506	AP Grind
507	AP Grind
508	AP Grind
509	Soil Vapor Extraction Operation
510	Soil Vapor Extraction Operation

Table 3 summarizes the list of sources that are part of the proposed permit application.

<b>Table 3</b>	
<b>Sources Included In Proposed Permit</b>	
<b>Source #</b>	<b>Source Description<sup>4</sup></b>
1	211R1 Package Steam Boiler; Firing Diesel
5	0210K03 Liner Adhesive Spray Booth
7	0210W04 Sandblasting Room
8	070R1 Package Steam Boiler; Firing Diesel
9	070R2 Package Steam Boiler; Firing Diesel
10	070R3 Package Steam Boiler; Firing Diesel
20	0711K01 Paint Spray Booth
21	0710R2 Package Steam Boiler; Firing Diesel
25	1230K02 Paint Spray Booth (Non Aerospace Metal Parts)
27	010R1 Hot Water Boiler; Firing Diesel
28	010R2 Hot Water Boiler; Firing Diesel
34	1810R1 Steam Boiler; Firing Diesel
39	1811D1 Ramjet Test Stand; Firing Jet Fuel A
41	1810D1 Ramjet Test Stand; Firing Multi-fuel
46	1720D1 Rocket Motor Test Bay and Stand; Firing Solid propellant
56	1311D1 Rocket Motor Test Bay; Firing Solid propellant
62	0020K01 Steam Boiler; Firing Diesel
64	1810K05 Ramjet Test Stand (RT-2); Firing Jet Fuel A
68	Rocket Motor Test Stand 1317 AB; Firing Solid fuel
69	Rocket Motor Test Stand 1320B1; Firing Solid fuel
70	Rocket Motor Test Stand, Station 1717 Pad 3; Firing Solid fuel
71	Test Stand – 2” x 4” Motor Testing; Station 1718 J1; Firing Solid fuel
72	Test Stand, Station 1760 J1; Firing Solid fuel
74	1860JMI Paint Spray Booth; Station 20
75	0210J06 Aerospace Paint Spray Booth
76	Spray Booth; Silicone Application Operation T-211
81	Paint Spray Booth; Building 1715
82	Station 710 Paint Spray Booth with Heat Exchange Type Air Supply Unit
83	Aerospace Paint Spray Booth With Steam Heater Curing Oven and Electric Curing Oven, Station 1810
85	Wipe Cleaning Operation (Site-Wide)
88	Compactor (2233JMI)
89	0485J01 Aerospace Paint Spray Booth
90	Air Stripper; Contaminated Groundwater
97	G6470 Non-retail Gasoline Dispensing Facility
100	Air Stripper; Contaminated Groundwater
101	1810J01 Paint Spray Booth

<sup>4</sup> Source descriptions may vary from source description in original application

<b>Table 3</b>	
<b>Sources Included In Proposed Permit</b>	
<b>Source #</b>	<b>Source Description<sup>4</sup></b>
104	Boiler; Firing Diesel, Station 1920
106	Propellant Mixer With Enclosed Vibratory Screen and Detachable Mobile Hopper; Station 571
108	Space Heat Boiler; Station 15; Firing Diesel
109	Propellant Mixer With Enclosed Vibratory Screen and Detachable Mobile Hopper; Station 531
110	Propellant Mixer and Indoor Storage Hopper
111	Propellant Mixer and Indoor Storage Hopper
112	Propellant Mixer and Indoor Storage Hopper; Station 581
113	Propellant Mixer and Indoor Storage Hopper; Station 582
115	Sandblast Cabinet #1; Station 20
116	Walk-In Oven; Electrically Powered Nitrogen Purging System and Exhaust Blower
122	Reaction Tumbler at Base Hydrolysis Treatment Facility; Solid fuel
123	Digester Tank at Base Hydrolysis Treatment Facility; Solid fuel
124	Wave Solder Machine
125	Fungicide Application Operation; Brush Application
502	Ammonium Perchlorate Milling
504	HMX/RDX Vacuum Dryer
505	HMX/RDX Grinding Station
506	Hammer Grinder -Ammonium Perchlorate Milling
509	Soil Vapor Extraction Operation; Contaminated soil remediation
510	Soil Vapor Extraction Operation; Contaminated soil remediation
516	Sand Blast Machine, Station 21
517	Emergency Standby Generator; Firing Diesel
518	Emergency Standby Generator; Firing Diesel
519	Emergency Standby Generator; Firing Diesel
520	Emergency Standby Generator; Firing Diesel
521	Enclosed Coating Operation

MACT Applicability:

The National Emission Standards for Aerospace Manufacturing and Rework Facilities - 40 CFR Part 63, Subpart GG (MACT GG) came into effect after the original application was received by the District. As previously discussed in the “Complex Applicability Determination” section, MACT GG is applicable to facilities such as UTC that are engaged in part or in whole, in the manufacture or rework of commercial, civil, or military aerospace vehicles or components. In addition, since UTC is a major source for HAPs as defined in Section 63.2 of 40 CFR Part 63, Subpart A it is required to comply with the MACT rule. Sources that are affected by the above rule are the Aerospace Paint Booths (Sources 5, 20, 74, 75, 76, 81, 82, 83, 89, 101, 125 and 521), and the Site Wide Wipe Cleaning Operation (Source 85).

APPENDIX A  
BAAQMD COMPLIANCE REPORT

## APPENDIX B

### GLOSSARY

**ACT**

Federal Clean Air Act

**APCO**

Air Pollution Control Officer

**ARB**

Air Resources Board

**BAAQMD**

Bay Area Air Quality Management District

**BACT**

Best Available Control Technology

**Basis**

The underlying authority which allows the District to impose requirements.

**CAA**

The federal Clean Air Act

**CAAQS**

California Ambient Air Quality Standards

**CAPCOA**

California Air Pollution Control Officers Association

**CEQA**

California Environmental Quality Act

**CFR**

The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

**CO**

Carbon Monoxide

**Cumulative Increase**

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Cumulative increase is used to determine whether threshold-based requirements are triggered.

**District**

The Bay Area Air Quality Management District

**dscf**

Dry Standard Cubic Feet

**EPA**

The federal Environmental Protection Agency.

**Excluded**

Not subject to any District regulations.

**E 6, E 9, E 12**

Very large or very small number values are commonly expressed in a form called scientific notation, which consists of a decimal part multiplied by 10 raised to some power. For example, 4.53 E 6 equals  $(4.53) \times (10^6) = (4.53) \times (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 4,530,000$ . Scientific notation is used to express large or small numbers without writing out long strings of zeros.

**Federally Enforceable, FE**

All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (MACT), and Part 72 (Permits Regulation, Acid Rain), including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

**FP**

Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

**HAP**

Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by 40 CFR Part 63.

**Major Facility**

A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

**MFR**

Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Federal Clean Air Act and implemented by District Regulation 2, Rule 6.

**MOP**

The District's Manual of Procedures.

**NAAQS**

National Ambient Air Quality Standards

**NESHAPS**

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

**NMHC**

Non-methane Hydrocarbons (Same as NMOC)

**NMOC**

Non-methane Organic Compounds (Same as NMHC)

**NO<sub>x</sub>**

Oxides of nitrogen.

**NSPS**

Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Federal Clean Air Act, and implemented by 40 CFR Part 60 and District Regulation 10.

**NSR**

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of pollutants for which criteria have been established in accordance with Section 108 of the Federal Clean Air Act. Mandated by Title I of the Federal Clean Air Act and implemented by 40 CFR Parts 51 and 52 and District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

**Offset Requirement**

A New Source Review requirement to provide federally enforceable emission offsets for the emissions from a new or modified source. Applies to emissions of POC, NO<sub>x</sub>, PM<sub>10</sub>, and SO<sub>2</sub>.

**Phase II Acid Rain Facility**

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

**POC**

Precursor Organic Compounds

**PM**

Particulate Matter

**PM<sub>10</sub>**

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

**PSD**

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of those air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

**SIP**

State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

**SO<sub>2</sub>**

Sulfur dioxide

**THC**

Total Hydrocarbons (NMHC + Methane)

**Title V**

Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

**TOC**

Total Organic Compounds (NMOC + Methane, Same as THC)

**TPH**

Total Petroleum Hydrocarbons

**TRMP**

Toxic Risk Management Plan

**TSP**

Total Suspended Particulate

**VOC**

Volatile Organic Compounds

**Units of Measure:**

bhp	=	brake-horsepower
btu	=	British Thermal Unit
cfm	=	cubic feet per minute
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inches
max	=	maximum
m <sup>2</sup>	=	square meter
min	=	minute
mm	=	million
MMbtu	=	million btu
MMcf	=	million cubic feet
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
yr	=	year