Technical Support Document
Air Quality Construction Permit
Permit No. SYN-ON-5500900021-2014-01

This document sets forth the legal and factual bases for permit conditions, with references to applicable statutory and regulatory provisions, G&K including provisions under the federal tribal New Source Review program, 40 C.F.R. §§ 49.151 – 49.161.

1. GENERAL INFORMATION

a. Applicant and Stationary Source Information

Owner and Address	G&K Services, Inc. 5995 Opus Parkway Minnetonka, Minnesota 55343
Facility Name and Address	G&K Services, Inc. – Green Bay 800 Isbell Street Green Bay, Wisconsin 54303
County	Brown County
Reservation	Oneida Tribe of Indians of Wisconsin
SIC Code	7218, Industrial Laundry
NAICS Code	812332, Industrial Launderers

b. Contact Information

Facility Contact: Mr. Douglas Krysiak, General Manager
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Permit Contact: Mr. Brian Duffy, Environmental Engineer
Phone: (952) 912-5713
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c. Facility Description

G&K Services, Inc. – Green Bay (G&K Services or G&K) is a commercial/industrial laundry located within the exterior boundaries of the Oneida Tribe of Indians of Wisconsin's reservation in Green Bay, Wisconsin. The Oneida Tribe of Indians of Wisconsin is a federally-recognized Indian tribe. The EPA retains responsibility for implementing the Clean Air Act within Indian country in Wisconsin, including within the Oneida reservation.

G&K Services cleans and reconditions soiled industrial textiles such as towels, coveralls, uniforms, and other items for industrial customers. G&K Services operates five indoor-vented industrial washing machines, four stack-vented industrial washing

machines, six natural gas-burning industrial dryers, a natural gas-fired steam tunnel, a 10.46 MMBTU/hr natural gas-fired boiler, and other processes, such as textile sorting activities and comfort heating.

G&K Services' customers include businesses in the printing and woodworking industries as well as automotive shops. These businesses send their soiled industrial towels to G&K Services to be washed. The soiled industrial towels from these customers typically contain volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) that may be emitted from the facility as the towels are washed.

G&K Services classifies the soiled industrial towels into three categories based on the towel's source. The first category, soiled print towels or "inkers," includes soiled industrial towels from printing, woodworking, wood finishing, and other facilities which return towels containing VOCs. The second category, soiled shop towels, includes towels from automotive shops and other similar operations which return towels containing VOCs, oil and/or grease. The third category includes towels and textiles from other sources that do not use materials containing VOCs or HAPs.

G&K counts and sorts soiled industrial towels, and launders them using a conventional industrial (aqueous) washing step and a drying step. The washing process consists of loading soiled textiles into an industrial washer and adding water, detergent, and other cleaning additives. The soiled textiles proceed through a washing stage, wash water draining stage, rinsing stage, and a final draining stage. Once washed, the textiles are then transferred to an industrial dryer for drying.

d. Emission Units and Process Description

G&K Services currently operates the following emission units:

Emission Unit	EU ID	Process Group	Unit Description	Heat Input MMBTU/hr	Stack
Jensen #3	P36	P01	Industrial Washing Machine	N/A	Indoors
Braun #4	P37	P01	Industrial Washing Machine	N/A	Indoors
Ellis Split Pocket #5	P38	P01	Industrial Washing Machine	N/A	Indoors
Ellis Split Pocket #6	P39	P01	Industrial Washing Machine	N/A	Indoors
Unimac #1	P40	P01	Industrial Washing Machine	N/A	Indoors
Jensen #1	P34	P02	Industrial Washing Machine	N/A	S34
Jensen #2	P35	P02	Industrial Washing Machine	N/A	S34

Emission Unit	EU ID	Process Group	Unit Description	Heat Input MMBTU/hr	Stack
Unimac #2	P25	P02	Industrial Washing Machine	N/A	S34
Unimac #3	P18	P02	Industrial Washing Machine	N/A	S34
Challenge #3	P08	P03	Natural Gas Industrial Dryer	2.75	S08
Challenge #4	P09	P03	Natural Gas Industrial Dryer	2.75	S09
American #1	P30	P03	Natural Gas Industrial Dryer	3.5	S30
American #2	P31	P03	Natural Gas Industrial Dryer	3.5	S31
Cissell #1	P05	P03	Natural Gas Industrial Dryer	0.25	S06
Cissell #2	P06	P03	Natural Gas Industrial Dryer	0.25	S07
Boiler	B01	B01	Natural Gas Boiler	10.46	S01
Leonard 24-foot Steam Tunnel		Steam Tunnel	Steam Tunnel	0.8	

Table 1: Emission Units at G&K Services

G&K Services operates the following natural gas-fired emission units used for comfort heating:

Emission Unit	Heat Input (MMBTU/hr)
Gas Fired Unit Heater #1	0.15
Gas Fired Unit Heater #2	0.15
Gas Fired Unit Heater #3	0.075
Gas Fired Unit Heater #4	0.165
Gas Fired Unit Heater #5	0.165
Gas Fired Unit Heater #6	0.105
Gas Fired Unit Heater #7	0.105
Gas Fired Unit Heater #8	1.255
Heating, Ventilation, and Air Conditioning (HVAC) Units Roof #1	0.25
HVAC Units Roof #2	0.25
HVAC Units Roof #3	0.205
Makeup Air (MUA) Units Roof #1	3.575
MUA Units Roof #2	3.575

MUA Units Roof #3	0.865
Convenience Water Heater #1	0.038

Table 2: Miscellaneous Natural Gas-fired Units

G&K Services also operates the following processes, which either have no associated air emissions, have fugitive emissions, or are already accounted for in the emission factors set forth in the permit:

- Textile storage, staging, sorting, and counting areas;
- Equalization Tank;
- Continuous roll towel machine;
- Boiler, turbine, and HVAC system maintenance;
- Demineralization and oxygen scavenging of water for boilers;
- Fire control equipment;
- Fork trucks for material transport;
- Janitorial activities;
- Maintenance of grounds, equipment, and building;
- Office activities;
- Sanitary sewer and plumbing venting; and
- Wastewater treatment/handling system.

e. Area Classification

G&K Services is located within the exterior boundaries of the Oneida Tribe of Wisconsin's reservation. The EPA is responsible for issuing and enforcing any air quality permits for sources on the reservation unless or until the Oneida tribe obtains EPA approval to do so.

The facility is located in Brown County, which is designated attainment with National Ambient Air Quality Standards for all criteria pollutants.

There are no mandatory Prevention of Significant Deterioration (PSD) Class I areas within 100 kilometers of G&K Services or the Oneida reservation. The Forest County Potawatomi Class I area is within 100 km of the Oneida reservation. Since the facility is electing to take federally-enforceable synthetic minor limits in order to avoid PSD permitting requirements, consultation is not required.

2. PROJECT DESCRIPTION

a. Description of Permit Action

G&K Services is an existing facility located at 800 Isbell Street in Green Bay, Wisconsin. The facility is physically located within the exterior boundaries of the Oneida Tribe of Wisconsin's reservation. Since the facility is located within the

exterior boundary of an Indian reservation, EPA is the permitting authority responsible for issuing and enforcing air permits issued to G&K Services.

G&K Services operates five washing machines which vent inside the facility, four washing machines which vent to the ambient air through a single stack, six natural gas-fired dryers that vent to the ambient air through individual stacks, one natural gas-fired boiler that vents through a separate stack, one natural gas-fired steam tunnel venting through its own separate exhaust stack, and other emission units and processes that either do not create emissions or are used for comfort heating unrelated to the laundering processes at the facility. Absent any emission limitations, G&K has the potential to emit more than 250 tons per year (tpy) of VOCs, making the facility a major source of VOCs subject to major PSD requirements. Additionally, the facility has the potential to emit more than 10 tpy of a single HAP, and more than 25 tpy of all HAPs from washing soiled towels, which would make the facility a major source of HAPs subject to major source HAP requirements.

Previously, G&K had obtained from the Wisconsin Department of Natural Resources (WDNR) construction permit number 11-JJW-047 and operating permit number 405028690-P12, which purported to authorize G&K to replace Braun #4, American #1, American #2, and Cissell #1 and to operate the existing emission units listed in Tables 1 and 2. G&K has operated in conformance with its Wisconsin Operation Permit which established operating limits below major source thresholds. However, WDNR is not the permitting authority for G&K because the source is located within the external boundaries of the Oneida Tribe of Wisconsin's reservation. Therefore, G&K has applied for an after-the-fact federal synthetic minor construction permit in place of Wisconsin permit number 11-JJW-047. G&K is seeking a synthetic minor permit with limitations designed to restrict its potential to emit VOCs and HAPs to levels below the major source thresholds and thus avoid major PSD and HAP requirements. The permit application seeking a Part 49 synthetic minor permit was submitted on June 14, 2013.

G&K requested in a separate construction permit application, dated August 15, 2013, a permit to replace one indoor-venting washing machine, three dryers, and the steam tunnel. The authorization to replace the emission units is being included as part of this permitting action. A replaced unit will have the same EU ID as the unit it is replacing. Specifically, G&K Services has requested authorization to replace the following emission units with the indicated emission units:

Process Group	Emission Unit to be Replaced	Replacement Emission Unit	EU ID	Replacement Unit Input Capacity (lbs CDW/load)	Replacement Unit Heat Input Rate (MMBTU/hr)
P01	Braun #4	Jensen L-Tron 450 OPT-H	P37	450	N/A
P03	American #1	Jensen DTX 800 Dryer #1	P30	800	2.5
P03	American #2	Jensen DTX 800 Dryer #2	P31	800	2.5
P03	Cissell #1	WashTech DR-80 Dryer	P05	100	0.25
Steam Tunnel	Leonard 24-foot Steam Tunnel or similar unit with a rated capacity up to 3.0 MMBTU/hr	Leonard Automatics VPT24		N/A	3.0

Table 3: Replacement Units Authorized By This Permit

In the application submitted on August 15, 2013, G&K Services requested to replace the existing steam tunnel with a steam tunnel with a comparable heat input capacity. In its revised Part 49 application, submitted on March 5, 2014, G&K Services revised the estimated heat input capacity of the replacement steam tunnel upwards from 1.5 MMBTU/hr to 3.0 MMBTU/hr. This permit will authorize the construction of a steam tunnel with a heat input capacity of up to 3 MMBTU/hr.

In addition to these new units, G&K Services intends to install a heat recycling system (heat exchanger) on the stacks from each of the large industrial dryers. These stacks are designated as S08, S09, S30, and S31. To accommodate installation of the heat exchanger systems, the stack locations for each dryer may be relocated to within a 10-25 foot radius of the existing location. Operation of the heat exchanger would result in decreased natural gas usage of up to 25% and decreased particulate matter emissions in the form of lint.

b. Emission Factors and Sample Calculations

Emission factors used to determine HAP and VOC potential to emit (PTE) were determined through stack testing at the facility and other similar facilities owned by G&K Services, Inc. Emission factors listed for natural gas combustion units in AP-42, Fifth Edition, were used for determining the PTE of natural gas-fired emission units. Particulate matter (PM) emission factors were calculated using the available

exhaust particulate matter loading, exhaust temperatures, and exhaust flow rates. It is assumed that the emissions of particulate matter smaller than 10 microns (PM_{10}) and smaller than 2.5 microns ($PM_{2.5}$) are equivalent to the particulate matter (PM) emissions for the facility since separate PM_{10} and $PM_{2.5}$ emission factors are unavailable. This is a conservative estimate of potential PM_{10} and $PM_{2.5}$ emissions since all fractions of particulate matter are assumed to be emitted at the PM emission rate.

Calculations and the method used to calculate the emission potentials are included in spreadsheets as attachments to this technical support document.

c. Total Facility Potential to Emit Before Controls and Limits, Before Modifications

The following table lists the facility's PTE for criteria pollutants and HAPs before federally-enforceable air pollution controls and emission limits. These figures are for the emission units currently installed at the facility and include emissions from natural gas combustion and soiled towel processing, the only listed sources of emissions from the facility. The figures in the following table do not include emissions from the modifications requested in the permit application.

PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	VOC	Lead	Highest Single HAP (Toluene)	All HAPs
205.2	205.2	205.2	25.7	0.1	12.7	1510.0	0.0	118.0	272.5

Table 4: Facility Potential to Emit Before Synthetic Minor Permit Limits and Before Modifications (in tons per year)

The data in the table show that the facility has the potential to emit significant amounts of VOC before controls and federally enforceable limits. The facility also has the potential to emit major amounts of single and total HAPs.

d. Total Facility Potential to Emit Before Controls and Limits, After Modifications

In its permit application, G&K Services requested a permit to construct a new washer, three new dryers, and a new steam tunnel. The following table lists the facility's PTE for criteria pollutants and HAPs before federally-enforceable air pollution controls and emission limits, but after construction of replacement emission units authorized by the permit. The figures in the following table include emissions from natural gas combustion and soiled towel processing, the only sources of emissions from the facility.

PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	VOC	Lead	Highest Single HAP (Toluene)	All HAPs
195.4	195.4	195.4	25.8	0.1	12.7	1510.0	0	118.0	272.5

Table 5: Facility Potential to Emit Before Synthetic Minor Permit Limits After Modifications (in tons per year)

e. Facility Actual Emissions

G&K Services is an existing facility operating pursuant to the operating permit issued by WDNR, discussed above. As a result of a condition in that permit, the facility submits an annual emission inventory to WDNR. EPA has included as a part of the record for this permitting action the emissions inventory from 2012. Actual VOC, highest single HAP, and total HAP emissions for calendar year 2012 are included in the table below.

VOC	HAP – Toluene	Total HAPs
57.1	4.12	9.2

Table 6: VOC and HAP Actual Annual Emissions (in tons)

Actual emissions for calendar year 2012 for all other pollutants are included in the table below. Figures are presented in tons.

PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	Lead
2.99	2.99	2.99	1.79	0.01	0.88	0.02

Table 7: 2012 Actual Emissions (in tons)

f. Potential to Emit After Synthetic Minor Limits

In its permit application, G&K Services requested an emission limit to restrict VOC emissions to 234 tons per year. G&K Services also requested emission limits to restrict emissions of any single HAP to less than 10 tons per year and total HAPs to less than 25 tons per year. VOC and HAP emissions from this facility result primarily from washing and drying soiled shop and print towels, with a small amount of VOC and HAP emissions from natural gas combustion. In order to ensure that the synthetic minor limits are enforceable as a practical matter, this permit will restrict the amount of soiled print and soiled shop towels that the facility can process during each rolling 12 month period. Limiting the amount of towels washed by the facility can provide a verifiable way to limit facility emissions to no more than 234 tons of VOC per year, no more than 9.9 tons of any single HAP per year, and no more than 24.9 tons of all HAPs per year.

Print towel processing is the largest source of VOC emissions, and will be used to determine the processing limit for the facility. Print towel toluene emissions (CAS number 108883) and shop towel tetrachloroethene emissions (CAS number 127184)

are the HAPs that are emitted in the largest quantities, and will be used to determine the processing limits for the facility.

The potential of the facility to emit VOCs, toluene, and tetrachloroethene from each of the processes, before modifications, are listed in the following tables. Because G&K has projected that the potential to emit VOC and HAP should decrease slightly after it modifies the facility, EPA is not considering post-modification emissions in setting the soiled print and soiled shop towel processing.

Process or Emission Unit	VOC Emissions (tons per year)	Toluene Emissions (tons per year)	Total HAP Emissions (tons per year)
Boiler B01	0.25	3.40E-03	8.45E-02
Process P03	0.31	1.90E-04	1.05E-01
Steam Tunnel	0.02	1.17E-05	6.46E-03
Misc. Units	0.26	1.60E-04	8.83E-02
Total From Natural Gas Combustion	0.83	5.14E-04	0.28

Table 8: VOC and HAP Emissions from Natural Gas Combustion

Process or Emission Unit	VOC Emissions (tons per year)	Toluene Emissions (tons per year)	Tetrachloroethene Emissions (tons per year)	Total HAP Emissions (tons per year)
Process P01	172.48	22.279	25.15	65.33
Process P02	1183.72	81.84	13.95	175.13
Process P03	152.97	10.88	12.28	31.89
Total From Soiled Towel Processing	1509.17	114.99	51.38	272.35

Table 9: VOC and HAP Emissions from Soiled Towel Processing

The majority of VOC and HAP emissions result from processing soiled print and soiled shop towels. The facility requested in its permit application to restrict VOC PTE to 234 tons per year, any single HAP PTE to 9.9 tons per year, and total HAP PTE to 24.9 tons per year. Soiled print and soiled shop towel processing limits based on the requested synthetic minor limits will be included in the permit.

To determine the production limit, the difference between the requested synthetic minor limit and the emissions from combustion are divided by the emission factor for each pollutant. This yields the maximum soiled weight of print or shop towels that the facility can process without exceeding the requested synthetic minor limits for each pollutant. These values are included in the following table.

Pollutant	Maximum Soiled Print Towel Weight (1,000 pounds)	Maximum Soiled Shop Towel Weight (1,000 pounds)
VOC	3,671.95	38,861.49
Toluene	2,255.01	12,773.53
Tetrachloroethene	141,428.57	11,314.29
Total HAPs	2,620.08	10,843.91

Table 10: Maximum Soiled Weight of Towels To Meet Synthetic Minor Limit

Including production limits in the permit for each of the four pollutants in Table 10 for both soiled print and soiled shop towels may be confusing and cumbersome. To ensure permit clarity, the smallest soiled weight for each type of towel will be included in the permit as the synthetic minor limit. Based on the data from Table 10, above, soiled print towels will be limited based on toluene emissions, while soiled shop towels will be limited based on total HAP emissions.

During a call on March 14, 2014, EPA and the applicant discussed modifying the soiled towel processing limit by introducing a 15% margin of compliance. VOC and HAP emission factors used in this permit were chosen by taking the larger of the print and shop towel emission factors. Further, the applicant assumed that the facility would run continuously and did not account for the time that soiled print and soiled shop towels are loaded into the appropriate process. By incorporating an additional 15% margin of compliance, the facility will further ensure that VOC and HAP emissions remain below the major source threshold. The maximum soiled print and shop towel weights allowing the facility to maintain all three requested synthetic minor emission rate limits, after including an additional 15% margin of compliance, are included in the following table. Emissions after the synthetic minor limit are also included.

Soiled Towel Type	Soiled Towel Weight (1000 pounds)	VOC	Toluene	Tetrachloro-ethene	Total HAP
Print	1916	121.67	8.41	0.13	18.00
Shop	9217	55.30	7.14	8.06	20.92
Limited PTE	N/A	121.67	8.41	8.06	20.92

Table 11: Synthetic Minor Soiled Towel Processing Limit and Limited PTE (in tons per year)

The previous table lists the VOC and HAP emissions that would result, in tons per year, based on the listed maximum amount of a single type of soiled towel processed by the facility. If the facility processed 1,916 thousand pounds of soiled print towels, then the facility would emit 121.67 tons per year of VOC, 8.41 tons per year of the HAP toluene, 0.13 tons per year of the HAP tetrachloroethene, and 18.00 tons per year of HAPs. Similarly, if the facility processed 9,217 thousand pounds of soiled shop towels, then the facility would emit 55.3 tons per year of VOC, 7.14 tons per

year of the HAP toluene, 8.06 tons per year of the HAP tetrachloroethene, and 20.92 tons per year of HAPs.

The permit requires that the facility process no more than 1,916 thousand pounds of soiled print towels per rolling 12-month period or 9,217 thousand pounds of soiled shop towels per rolling 12-month period. The facility's VOC and HAP PTE, after permit issuance, will be based on the larger annual emissions from each type of towel. Therefore, the annual synthetic minor limits on emissions from processing soiled print and soiled shop towels will be 121.67 tons of VOC per year, 8.41 tons per year of single HAPs based on toluene emissions, and 20.92 tons per year of combined HAPs.

The previous calculations determined the maximum soiled weight of each type of towel that the facility could process to meet the requested synthetic minor limits. The facility noted during the March 14, 2014, call that they can and often will process different types of towels in a day. In order to ensure that the facility meets the synthetic minor limit while ensuring operational flexibility, the permit contains an additional requirement that reduces the allowable amount of soiled shop towels that can be processed based on the amount of soiled print towels processed. For every 1,000 pounds of soiled print towels processed by the facility in any 12-month period, the allowable amount of soiled shop towels process by the facility during the same 12-month period is reduced by 4,808 pounds. This was determined by dividing the maximum amount of soiled shop towels that can be processed by the facility in a 12-month period (9,217 thousand pounds) by the maximum amount of soiled print towels (1,916 thousand pounds). The tradeoff between processing soiled print and soiled shop towels ensures that VOC, single HAP, and total HAP emissions do not exceed the synthetic minor limits.

The synthetic minor emission and operating limits are included as facility-wide limits because processing the soiled print and soiled shop towels requires that the towels are first washed in a washing machine and then dried in a dryer. The process, referred to as the "industrial laundry process" within the permit, involves emission units in different process groups and is not restricted to a specific emission unit.

G&K will monitor compliance with the VOC and HAP synthetic minor limits by recording the soiled weight of both the print and shop towels on a monthly basis, calculating emissions using emission factors determined through several stack tests on a monthly basis, and by recording the total amount of print and shop towels processed by the facility in the preceding 12 months. This is sufficient to ensure compliance with the proposed synthetic minor limits since washing and drying soiled industrial towels is the only process at the facility which causes significant VOC and HAP emissions.

The potential to emit all other pollutants is less than the major PSD threshold. The facility has elected to include the installation and operation of lint filters (screens) for each dryer and steam tunnel at the facility. Compliance with the filter (screen)

requirements will be determined by requiring visual inspections of the lint filters (screens)to ensure proper installation.

For the currently existing emission units at the facility, the potential to emit after federally-enforceable limits and controls are included in the table below. The figures are presented in tons per year.

PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	VOC	Lead	Single HAP	Total HAP
205.2	205.2	205.2	25.7	0.1	12.7	122.5	0	8.4	21.2

Table 12: PTE After Synthetic Minor Permit Limits, Before Modifications (tpy)

The following table gives the facility-wide potential to emit after all federally-enforceable limits and controls and after all authorized emission unit replacements are completed. The figures are presented in tons per year.

PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	VOC	Lead	Single HAP	Total HAP
195.4	195.4	195.4	25.8	0.1	12.7	122.5	0	8.4	21.2

Table 13: PTE After Synthetic Minor Permit Limits, After Modifications (tpy)

g. Greenhouse Gas Potential to Emit

The facility is expected to emit greenhouse gases (GHGs) only through the combustion of natural gas. The facility does not use any chemical as part of the laundering process that is a GHG in itself. The laundering process and natural gas combustion are the only sources of emissions identified at the facility. The following tables provide the PTE for each GHG resulting from natural gas combustion and the total carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and carbon dioxide equivalent (CO_2e) for the facility before and after the modifications. CO_2e calculations utilize the global warming potential values published on November 29, 2013.

Process or Emission Unit	CO_2	CH_4	N_2O	CO_2e
Boiler B01	5359.3	0.10	0.01	5364.8
Process P01	0	0	0	0
Process P02	0	0	0	0
Process P03	6660.7	0.13	0.013	6667.6
Steam Tunnel	409.9	0.01	0.001	410.3
Miscellaneous	5943.4	0.11	0.011	5949.5
TOTAL	18373.2	0.35	0.035	18392.2

Table 14: GHG PTE Before Modifications (tpy)

Process or Emission Unit	CO_2	CH_4	N_2O	CO_2e
Boiler B01	5359.3	0.10	0.010	5364.8
Process P01	0	0	0	0
Process P02	0	0	0	0
Process P03	5636.0	0.11	0.01	5641.8
Steam Tunnel	1537.08	0.03	0.003	1538.7
Miscellaneous	5943.4	0.11	0.01	5949.5
TOTAL	18,475.7	0.35	0.035	18,494.78

Table 15: GHG PTE After Modifications (tpy)

Based on the information in Tables 14 and 15, the facility is not a major source of GHGs.

h. Enforcement Issues

There are no known active or pending enforcement issues against G&K Services—Green Bay.

i. Pollution Control Equipment

Compliance with PM emission limits is ensured through the use of lint filters (screens) on the exhaust points for the dryers and the use of lint filters (screens) within the steam tunnel or on its exhaust points at the facility.

3. APPLICABLE REQUIREMENTS

a. Prevention of Significant Deterioration

G&K Services is not subject to the PSD requirements under 40 C.F.R. § 52.21 because it does not have the potential to emit any regulated pollutant, except VOCs, at a rate above 250 tpy. G&K has requested federally-enforceable emission limits be placed into the permit to avoid PSD applicability for VOC emissions. Since the facility is located within the exterior boundaries of the Oneida Tribe of Indians of Wisconsin's reservation, EPA is issuing the synthetic minor permit in accordance with the Federal Minor New Source Review Program in Indian Country, codified at 40 C.F.R. § 49.151, *et. seq.*

b. Restrictions on Potential to Emit

Potential to emit is defined in 40 C.F.R. § 52.21 as "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design." Physical or operational limitations on the capacity of a source to emit a pollutant are treated as part of its design if the limitation, or the effect it would have on emissions, is federally enforceable or legally and practicably enforceable by a state or local air pollution control agency.

G&K Services has requested limits on its facility-wide potential to emit VOCs in order to avoid PSD permitting requirements. VOCs are produced by the facility as it washes and dries soiled print and shop towels. EPA has established a monthly average VOC emission limit so that annual VOC emissions are less than 234 tons per year. In order to demonstrate compliance with this limit, the facility will record the weight of soiled print and shop towels washed per month and will calculate the amount of VOCs emitted during washing using emission factors determined through previous stack testing.

Additionally, the facility has elected to take synthetic minor limits on its potential to emit HAPs. The facility has the potential to emit any single HAP at a rate greater than 10 tons per year and the potential to emit total HAPs at a rate of greater than 25 tons per year. HAP emissions at these rates would classify the facility as a major source of HAPs. However, after taking the requested synthetic minor limits, the facility will be limited to no more than 9.9 tons per year of any single HAP and no more than 24.9 tons per year of total HAPs. In order to demonstrate compliance with this limit, the facility will record the weight of soiled print and shop towels washed per month and will calculate the amount of HAPs emitted during washing using emission factors determined through previous stack testing.

c. New Source Performance Standards (NSPS)

G&K Services operates a 10.46 MMBTU natural gas-fired industrial boiler installed in 1982. The boiler has not been modified or reconstructed since it was first installed. This boiler is not subject to 40 C.F.R. Part 60, Subpart D, Da, or Db because it burns natural gas and has a capacity smaller than 100 MMBTU. This boiler is not subject to 40 C.F.R. Part 60, Subpart Dc because it was constructed prior to June 9, 1989.

There are currently no new source performance standards for industrial washing machines, dryers, or steam tunnels.

d. National Emission Standards for Hazardous Air Pollutants (NESHAP)

G&K Services has requested federally-enforceable HAP emission limits designed to limit the source to no more than 9.9 tpy of any single HAP and no more than 24.9 tpy of total HAPs. As a result, G&K Services will be considered an area source for HAP emissions. Since G&K Services is an area source for HAP emissions, the facility is not subject to any major source NESHAPs.

G&K Services is not subject to 40 C.F.R. Part 63, Subpart JJJJJJ: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources, because the boiler is a natural gas-fired boiler. Pursuant to 40 C.F.R. § 63.11195(e), gas-fired boilers are not subject to Subpart JJJJJJ.

e. Endangered Species Act (ESA)

Section 7 of the ESA requires the EPA, as a federal agency, to use its authority to conserve listed endangered and threatened species. To support this requirement, section 7(a)(2) of the ESA requires EPA to insure that an agency action, such as the issuance of construction air permits, is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat for such species. In order to demonstrate whether an agency action will affect endangered or threatened species or critical habitat, EPA must determine whether one or more listed species or critical habitat is present in the action area, whether authorized activities within the action area will affect any listed species or critical habitat, and whether the effect, if any, will have an adverse effect on any listed species or critical habitat. If an agency action may adversely affect any listed species or critical habitat, further consultation may be required.

EPA has determined this permitting action will have "no effect" on any critical or endangered species since there is no critical habitat of any threatened or endangered species at or within 3 miles of the facility. Additionally, the facility is located in a developed area and the project authorized in the permit does not involve removing native vegetation near the source. Since EPA has determined that there is "no effect" on threatened or endangered species or listed or proposed critical habitat, further ESA consultation is not required.

f. National Historical Preservation Act (NHPA)

Section 106 of the NHPA requires the EPA to take into account the effect of any action undertaken by the EPA, such as issuing air construction permits, on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. EPA is required to consult with the state historical preservation officer (SHPO), the tribal historical preservation officer (THPO), and members of the public to receive and consider their views and concerns about historic preservation when making a final permit decision.

The facility, originally constructed in 1981, is located in a developed area that has been zoned as a business park by the city of Green Bay. Many other businesses and access roads, including an interstate highway, have been built in the area. Since 2003, the facility has also been operating in accordance with state-issued construction and operating permits that contain similar requirements that are proposed in this permit. Although EPA is the permitting authority for the facility, the facility has operated under the assumption that Wisconsin-issued permits were valid. The permit establishes federally-enforceable emission limits and authorizes the construction of replacement emission units that emit fewer pollutants into the ambient air. Construction of the replacement units will not require changing the footprint of the facility and construction will not directly affect historic properties.

For these reasons, EPA has determined the issuance of this construction permit will have "no potential effect on historic properties". Pursuant to NHPA section 106's implementing regulations at 36 C.F.R. § 800.3(a)(1), EPA has no further consultation obligation under section 106 of the NHPA.

Emission Overview for G&K Services

PTE Before Modification, Before Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Boiler B01	0.341365	0.341365	0.341365	7.6358	0.02695	3.772984	0.247041	2.24582E-05	8.08E-02	8.45E-02
Process P01	0	0	0	0	0	0	172.4809	0	25.153464	65.327139
Process P02	9.984731	9.984731	9.984731	0	0	0	1183.721	0	81.8352192	175.13483
Process P03	171.2868	171.2868	171.2868	9.49	0.033494	4.689176	153.2785	2.79118E-05	10.875978	31.891174
Steam Tunnel	23.26643	23.26643	23.26643	0.584	0.002061	0.288565	0.018894	1.71765E-06	6.18E-03	6.46E-03
Miscellaneous	0.356638	0.356638	0.356638	7.97744	0.028156	3.941794	0.258094	2.34631E-05	8.45E-02	8.83E-02
TOTAL	205.2359	205.2359	205.2359	25.68724	0.090661	12.69252	1510.005	7.55507E-05	118.0361614	272.53242
PTE Before Modification, After Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Total	205.2359	205.2359	205.2359	25.68724	0.090661	12.69252	122.4971	7.55507E-05	8.411753745	21.204648

PTE After Modification, Before Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Boiler B01	0.341365	0.341365	0.341365	7.6358	0.02695	3.772984	0.247041	2.24582E-05	0.080849647	0.0845193
Process P01	0	0	0	0	0	0	172.4809	0	25.153464	65.327139
Process P02	9.984731	9.984731	9.984731	0	0	0	1183.721	0	81.8352192	175.13483
Process P03	157.487	157.487	157.487	8.03	0.028341	3.967765	153.2313	2.36176E-05	10.875978	31.891174
Steam Tunnel	27.23322	27.23322	27.23322	2.19	0.007729	1.082118	0.070853	6.44118E-06	4.38E-05	2.42E-02
Miscellaneous	0.356638	0.356638	0.356638	7.97744	0.028156	3.941794	0.258094	2.34631E-05	0.084467012	0.0883009
TOTAL	195.4029	195.4029	195.4029	25.83324	0.091176	12.76466	1510.009	7.59801E-05	118.0300217	272.5502
Emission Increase/Decrease	-9.833006	-9.833006	-9.833006	0.146	0.000515	0.072141	0.004724	4.29412E-07	-0.006139729	0.0177765
PTE After Modification, After Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Total	195.4029	195.4029	195.4029	25.83324	0.091176	12.76466	122.5018	7.59801E-05	8.411756665	21.206264

GHG Overview for G&K Services								
	GHG Before Modification				GHG After Modification			
Process or Emission Unit	CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
Boiler B01	5359.284	0.101004	0.0101	5364.819	5359.284	0.101004	0.0101	5364.819177
Process P01	0	0	0	0	0	0	0	0
Process P02	0	0	0	0	0	0	0	0
Process P03	6660.678	0.125531	0.012553	6667.557	5635.958	0.106219	0.010622	5641.779249
Steam Tunnel	409.8879	0.007725	0.000772	410.3112	1537.08	0.028969	0.002897	1538.667068
Miscellaneous	5943.374	0.112012	0.011201	5949.513	5943.374	0.112012	0.011201	5949.512663
TOTAL	18373.22	0.346273	0.034627	18392.2	18475.7	0.348204	0.03482	18494.77816

Combustion Potential Emissions by Process/Emission Unit (in tons per year)

Process	VOC	Single HAP (Toluene)	Single HAP (Tetrachloroethene)	Total HAP
B01	0.247040588	1.53E-04	0	8.45E-02
P01	0	0	0	0
P02	0	0	0	0
P03 (Before Mod)	0.307029412	1.90E-04	0	1.05E-01
P03 (After Mod)	0.259794118	1.61E-04	0	8.89E-02
Steam Tunnel (Before Mod)	0.018894118	1.17E-05	0	6.46E-03
Steam Tunnel (After Mod)	0.070852941	4.38E-05	0	2.42E-02
Misc Units	0.258093647	1.60E-04	0	8.83E-02
TOTAL (Before Mod)	0.831057765	0.000513745	0	0.284327527
Total (After Mod)	0.835781294	0.000516665	0	0.285943575

Industrial Laundering Process Emissions by Process/Emission Unit (in tons per year)

Process	VOC	Single HAP (Toluene)	Single HAP (Tetrachloroethene)	Total HAP
Process P01	172.480896	22.2787824	25.153464	65.32713936
Process P02	1183.72128	81.8352192	13.9503	175.1348256
Process P03	152.9715	10.875978	12.27933	31.8911742
Total	1509.173676	114.9899796	51.383094	272.3531392

	VOC	Single HAP (Toluene)	Single HAP (Tetrachloroethene)	Total HAP
Requested Emission Limit (tons/year)	234	9.9	9.9	24.9
Emissions Available for SynMinor Source (Before Mod)	233.1689422	9.899486255	9.9	24.61567247
Emissions Available for SynMinor Source (After mod)	233.1642187	9.899483335	9.9	24.61405643
Minimum Emissions Available	233.1642187	9.899483335	9.9	24.61405643

Emission Factors (lb/1000 lbs soiled towels)	Print Towel	Shop Towel
VOC	127	12
HAP Toluene	8.78	1.55
HAP Tetrachloroethene	0.14	1.75
Total HAPs	18.79	4.54

Weight of Towels by SynMinor Pollutant (1000 lbs)	Print	Shop
VOC	3671.87746	38860.70312
HAP Toluene	2255.007593	12773.52688
HAP Tetrachloroethene	141428.5714	11314.28571
Total HAPs	2619.91021	10843.19666
Synthetic Minor Limit, Based on minimum amount processed for each pollutant per towel type	2255.007593	10843.19666
Based on the following pollutant:	HAP Toluene	Total HAPs

Production Limit After Margin from 3/14/14 Call

Type of Towel	Margin	Production Limit Rounded to Nearest 1000 lbs (in 1000 lbs)	Limited VOC Emissions (Tons/Year)	Limited Toluene Emissions (Tons/Year)	Limited Tetrachloroethene Emissions (Tons/Year)	Limited Single HAP Emissions (Tons/Year)	Limited Total HAP Emissions (Tons/Year)
Print	15%	1916	121.666	8.41124	0.13412	8.41124	18.00082
Total Emissions, Print, Before Mod			122.4970578	8.411753745	0.13412	8.411753745	18.28514753
Total Emissions, Print, After Mod			122.5017813	8.411756665	0.13412	8.411756665	18.28676357
Shop	15%	9216	55.296	7.1424	8.064	8.064	20.92032
Total Emissions, Shop, Before Mod			56.12705776	7.142913745	8.064	8.064	21.20464753
Total Emissions, Shop, After Mod			56.13178129	7.142916665	8.064	8.064	21.20626357
PTE, Before Mod			122.4970578	8.411753745	8.064	8.411753745	21.20464753
PTE, After Mod			122.5017813	8.411756665	8.064	8.411756665	21.20626357

Shop/Print Tradeoff	P	S	VOC Emissions	Toluene Emission	Tetrachloroethene Emissions	Total HAP Emissions
4.810020877	0	9216	55.296	7.1424	8.064	20.92032
	500	6810.989562	72.61593737	7.47351691	5.994615866	20.1584463
	1000	4405.979123	89.93587474	7.80463382	3.925231733	19.39657261
	1500	2000.968685	107.2558121	8.135750731	1.855847599	18.63469891
	1900	76.96033403	121.111762	8.400644259	0.200340292	18.02519996
	1916	0	121.666	8.41124	0.13412	18.00082

Pollutant Potential to Emit Calculations and Methodology - Boiler B01

Emission Unit	Heat Input Rate	Units
B01	10.46	MMBTU/hr
Natural Gas Heating Value	1020	MMBTU/MMSCF

Unit	Potential NG Throughput MMSCF/yr
Boiler B01	89.83294118

Pollutant PTE - Combustion								
	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead
Pollutant Emission Factor lb/MMSCF	7.6	7.6	7.6	170	0.6	84	5.5	0.0005
Potential Emissions in tons/yr	0.3413652	0.341365176	0.3413652	7.6358	0.026949882	3.77298	0.247041	2.24582E-05

HAP PTE - Combustion						
Pollutant	Benzene	Dicholrobenzene	Formaldehyd	Hexane	Toluene	Total
Pollutant Emission Factor lb/MMSCF	2.10E-03	1.20E-03	7.50E-02	1.80E+00	3.40E-03	1.88E+00
Potential to Emit in tons/yr	9.43E-05	5.39E-05	3.37E-03	8.08E-02	1.53E-04	8.45E-02

Notes
MMBTU = 1,000,000 British Thermal Units, MMSCF = 1,000,000 standard cubic feet of natural gas
All PTE emissions assumed to be produced from combustion of natural gas.
Potential NG Throughput (MMSCF/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hours/yr x 1 MMSCF / 1020 MMBTU
PTE (tons/yr) = Potential NG Throughput (MMSCF/yr) x Emission Factor (lb/MMSCF) / 2000 lbs/ton
Combustion emission factors are from AP-42, Volume 1, Fifth Edition, Chapter 1.4, Tables 1.4-1 and 1.4-2.
HAP emission factors are from AP-42, Chapter 1.4, Tables 1.4-3.
5 Highest HAPs are displayed for calculation purposes.

Pollutant Potential to Emit Calculations and Methodology - Process P01

Shop Towel Feed Rate (lbs/hr)	4688
Shop Towel Feed Rate (1000 lbs/yr)	41066.88

Shop Towel Wash Time	70%

Pollutant	Shop Towel Emission Factor (lb/1000 lb)	Process P01 PTE (tons/yr)
VOC	12	172.480896
1,2-Dichloroethane	0.04	0.57493632
Cumene	0.01	0.14373408
Ethylbenzene	0.07	1.00613856
Methanol	0.05	0.7186704
Methyl Isobutyl Ketone	0.06	0.86240448
Methylene Chloride	0.01	0.14373408
Napthalene	0.01	0.14373408
n-Hexane	0.005	0.07186704
Tetrachloroethene	1.75	25.153464
Toluene	1.55	22.2787824
Trichloroethene	0.21	3.01841568
Xylene (isomers and mixture)	0.78	11.21125824
m-Xylene	0.355	5.10255984
o-Xylene	0.07	1.00613856
p-Xylene	0.355	5.10255984
Total HAP	4.545	65.32713936

Notes
Process P01 has a maximum feed rate of 4,688 pounds of soiled towels per hour.

Process P01 is not designed to wash soiled shop towels. Therefore, only shop towel PTE is considered in calculations.

Shop towel emission factors are based on source-specific testing and combines both washing and drying time.
Shop towels spend 70% of the time in the washing process.

Process P01 contains only washing machines. Therefore, drying emissions are excluded.
Shop Towel Feed Rate (1000 lb/yr) = feed rate (lbs/hr) * 8760 (hr/yr) / 1000
PTE = feed rate (1000 lb/yr) * emission factor (lb/1000 lb) * 0.7/2000 (lb/ton)
Feed rate assumes that all units within this process are operated at their maximum load capacity. In actual practice, this may not occur.

Pollutant Potential to Emit Calculations and Methodology - Process P02

	Print Towel	Shop Towel
Feed Rate (lbs/hr)	2240	2600
Feed Rate (1000 lbs/yr)	19622.4	22776

	Print	Shop
Cycle Time (%)	95%	70%

Emission Unit	Emission Rate (gr/dscf)	Stack Flow Rate (acfm)	Stack Temp (°F)	Calculated Emission Factor (lb/hr)	PM PTE (tons/yr)
Jensen #1	0.1	680	80	0.5699048	2.496182857
Jensen #2	0.1	680	80	0.5699048	2.496182857
Unimac #2	0.1	680	80	0.5699048	2.496182857
Unimac #3	0.1	680	80	0.5699048	2.496182857
Total					9.984731429

Pollutants measured during stack test	Print Towel Emission Factors (lb/1000 lb)	Shop Towel Emission Factors (lb/1000 lb)	Print Towel PTE (tons/yr)	Shop Towel PTE (tons/yr)	PTE Max of Print and Shop Towels (tons/yr)
VOC	127	12	1183.721	95.6592	1183.72128
1,2-Dichloroethane	0.01	0.04	0.093206	0.318864	0.318864
Cumene	0.48	0.01	4.473907	0.079716	4.4739072
Ethylbenzene	1.88	0.07	17.5228	0.558012	17.5228032
Methanol	0.56	0.05	5.219558	0.39858	5.2195584
Methyl Isobutyl Ketone	0.24	0.06	2.236954	0.478296	2.2369536
Methylene Chloride	0.05	0.01	0.466032	0.079716	0.466032
Napthalene	0.01	0.01	0.093206	0.079716	0.0932064
n-Hexane	0.07	0.005	0.652445	0.039858	0.6524448
Tetrachloroethene	0.14	1.75	1.30489	13.9503	13.9503
Toluene	8.78	1.55	81.83522	12.35598	81.8352192
Trichloroethene	0.25	0.21	2.33016	1.674036	2.33016
Xylene (isomers and mixture)	6.32	0.78	58.90644	6.217848	58.9064448
m-Xylene	2.53	0.355	23.58122	2.829918	23.5812192
o-Xylene	1.26	0.07	11.74401	0.558012	11.7440064
p-Xylene	2.53	0.355	23.58122	2.829918	23.5812192
Total HAP	18.79	4.545	175.1348	36.230922	175.1348256

Notes:
Proces P02 contains only washers. Therefore, only washing emissions are considered.
PM EF (lb/hr) = emission rate (gr/dscf) * 60 min/hr * (460 + 68) / (460 + Stack Temp °F) / 7000 gr/lb
PM PTE (tons/yr) = Emission Factor (lb/hr) * 8760 (hr/yr) / 2000 (lb/ton)
Based on best information available, PM10 and PM2.5 PTE are the same as PM PTE.
HAP & VOC PTE (tons/yr) = Emission factor (lb/1000 lb) * Feed Rate (lb/1000 lb) * cycle time (%) / 2000
Facility PTE is based on the maximum of either print towel PTE or shop towel PTE.
The units within this process group do not combust natural gas.
Feed rate assumes that all units within this process are operated at their maximum load capacity. In actual practice, this may not occur.

Pollutant Potential to Emit Calculations and Methodology - Process P03

	Print Towel	Shop Towel
Feed Rate (lbs/hr)	5500	5340
Feed Rate (1000 lbs/yr)	48180	46778.4

	Print	Shop
Cycle Time (%)	5%	30%

	Before Modification	After Modification
Total Heat Input Rate (MMBTU/hr)	13	11
Potential NG Throughput (MMSCF/yr)	111.6470588	94.47058824

Natural Gas Heating Factor (MMBTU/MMSCF)	1020

Pollutant PTE - Combustion

	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead
Natural Gas Emission Factors (lb/MMSCF)	7.6	7.6	7.6	170	0.6	84	5.5	0.0005
Potential Emissions Before Modification (tons/yr)	0.424258824	0.424258824	0.424258824	9.49	0.033494118	4.689176471	0.307029412	2.79E-05
Potential Emissions After Modification (tons/yr)	0.358988235	0.358988235	0.358988235	8.03	0.028341176	3.967764706	0.259794118	2.36E-05

HAP PTE - Combustion

Pollutant	Benzene	Dicholrobenzene	Formaldehyde	Hexane	Toluene	Total
Pollutant Emission Factor lb/MMSCF	2.10E-03	1.20E-03	7.50E-02	1.80E+00	3.40E-03	1.88E+00
Potential Emissions Before Modification (tons/yr)	1.17E-04	6.70E-05	4.19E-03	1.00E-01	1.90E-04	1.05E-01
Potential Emissions After Modification (tons/yr)	9.92E-05	5.67E-05	3.54E-03	8.50E-02	1.61E-04	8.89E-02

PM PTE - Other Than Combustion

Emission Unit	Emission Rate (gr/dscf)	Stack Flow Rate (acfm)	Stack Temp (°F)	Emission Factor (lb/hr)	PM PTE (tons/yr)
Cissell #1	0.1	2160	136	1.640191755	7.184039885
Cissell #2	0.1	2160	136	1.640191755	7.184039885
Challenge #3	0.1	9000	110	7.145864662	31.29888722
Challenge #4	0.1	9000	110	7.145864662	31.29888722
American #1	0.1	13500	110	10.71879699	46.94833083
American #2	0.1	13500	110	10.71879699	46.94833083
Jensen L-Tron Dryer #1	0.1	12000	120	9.363546798	41.01233498
Jensen L-Tron Dryer #2	0.1	12000	120	9.363546798	41.01233498
WashTech DR-80 Dryer	0.1	1600	136	1.214956855	5.321511026
Total Before Modification					170.8625159
Total After Modification					157.1279953

	Combustion (tons/yr)	Other Than Combustion (tons/yr)	PM PTE
PM PTE - Combustion and Other Sources Before Modification	0.424258824	170.8625159	171.2867747
PM PTE - Combustion and Other Sources After Modification	0.358988235	157.1279953	157.4869835

Pollutants Measured During Stack Test	Print Towel Emission Factors (lb/1000 lb)	Shop Towel Emission Factors (lb/1000 lb)	Print Towel PTE (tons/yr)	Shop Towel PTE (tons/yr)	PTE Max of Print and Shop Towels (tons/yr)	PTE Before Modification (Towel and Combustion)	PTE After Modification (Towel and Combustion)
VOC	127	12	152.9715	84.20112	152.9715	153.2785	153.2313
1,2-Dichloroethane	0.01	0.04	0.012045	0.2806704	0.2806704	0.2807	0.2807
Cumene	0.48	0.01	0.57816	0.0701676	0.57816	0.5782	0.5782
Ethylbenzene	1.88	0.07	2.26446	0.4911732	2.26446	2.2645	2.2645
Methanol	0.56	0.05	0.67452	0.350838	0.67452	0.6745	0.6745
Methyl Isobutyl Ketone	0.24	0.06	0.28908	0.4210056	0.4210056	0.4210	0.4210
Methylene Chloride	0.05	0.01	0.060225	0.0701676	0.0701676	0.0702	0.0702
Napthalene	0.01	0.01	0.012045	0.0701676	0.0701676	0.0702	0.0702
n-Hexane	0.07	0.005	0.084315	0.0350838	0.084315	0.1848	0.1693
Tetrachloroethene	0.14	1.75	0.16863	12.27933	12.27933	12.2793	12.2793
Toluene	8.78	1.55	10.57551	10.875978	10.875978	10.8762	10.8761
Trichloroethene	0.25	0.21	0.301125	1.4735196	1.4735196	1.4735	1.4735
Xylene (isomers and mixture)	6.32	0.78	7.61244	5.4730728	7.61244	7.6124	7.6124
m-Xylene	2.53	0.355	3.047385	2.4909498	3.047385	3.0474	3.0474
o-Xylene	1.26	0.07	1.51767	0.4911732	1.51767	1.5177	1.5177
p-Xylene	2.53	0.355	3.047385	2.4909498	3.047385	3.0474	3.0474
Total HAP	18.79	4.545	22.632555	31.8911742	31.8911742	31.9918	31.9764

Notes:
PM EF (lb/hr) = emission rate (gr/dscf) * 60 min/hr * (460 + 68) / (460 + Stack Temp °F) / 7000 gr/lb
PM PTE (tons/yr) = Emission Factor (lb/hr) * 8760 (hr/yr) / 2000 (lb/ton)
HAP & VOC PTE (tons/yr) = Emission factor (lb/1000 lb) * Feed Rate (lb/1000 lb) * cycle time (%) / 2000
Facility PTE is based on the maximum of either print towel PTE or shop towel PTE.

Feed rate assumes that all units within this process are operated at their maximum load capacity. In actual practice, this may not occur.
Combustion emission factors are from AP-42, Volume 1, Fifth Edition, Chapter 1.4, Tables 1.4-1 and 1.4-2.

Pollutant Potential to Emit Calculations and Methodology - Steam Tunnels

Emission Unit	Heat Input (MMBTU/hr)
Leonard 24-foot Steam Tunnel	0.8
Leonard VPT24 Steam Tunnel	3

Emission Unit	Heat Input Rate	Units
Existing: 24-foot	0.8	MMBTU/hr
Replacement: VPT24	3	MMBTU/hr
Natural Gas Heating Value	1020	MMBTU/MMSCF

Unit	Potential NG Throughput MMSCF/yr
Existing: 24-foot	6.870588235
Replacement: VPT24	25.76470588

Pollutant PTE - Combustion								
	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead
Pollutant Emission Factor lb/MMSCF	7.6	7.6	7.6	170	0.6	84	5.5	0.0005
PTE Before Modification in tons/yr	0.026108235	0.026108235	0.02610824	0.584	0.002061176	0.28856	0.018894	1.72E-06
PTE After Modification in tons/yr	0.097905882	0.097905882	0.09790588	2.19	0.007729412	1.08212	0.070853	6.44E-06

HAP PTE - Combustion						
Pollutant	Benzene	Dicholrobenzene	Formaldehyd	Hexane	Toluene	Total
Pollutant Emission Factor lb/MMSCF	2.10E-03	1.20E-03	7.50E-02	1.80E+00	3.40E-03	1.88E+00
PTE Before Modification in tons/yr	7.21E-06	4.12E-06	2.58E-04	6.18E-03	1.17E-05	6.46E-03
PTE After Modification in tons/yr	2.71E-05	1.55E-05	9.66E-04	2.32E-02	4.38E-05	2.42E-02

PM PTE - Other Than Combustion					
Emission Unit	Emission Rate (gr/dscf)	Stack Flow Rate (acfm)	Stack Temp (°F)	Emission Factor (lb/hr)	PM PTE (tons/yr)
Leonard 24-foot Steam Tunnel - Exh	0.1	6800	120	5.306009852	23.24032315
Leonard VPT24 Steam Tunnel - Exh 1	0.1	3790	120	2.957320197	12.95306246
Leonard VPT24 Steam Tunnel - Exh 2	0.1	3790	120	2.957320197	12.95306246
Leonard VPT24 Steam Tunnel - Combustion Unit	0.1	471.27	300	0.28063597	1.229185548
TOTAL for VPT24					27.13531047

Total PM PTE, 24-foot Steam Tunnel)	23.26643139
Total PM PTE, VPT24	27.23321636

Notes
MMBTU = 1,000,000 British Thermal Units, MMSCF = 1,000,000 standard cubic feet of natural gas
All PTE emissions assumed to be produced from combustion of natural gas.
Potential NG Throughput (MMSCF/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hours/yr x 1 MMSCF / 1020 MMBTU
PTE (tons/yr) = Potential NG Throughput (MMSCF/yr) x Emission Factor (lb/MMSCF) / 2000 lbs/ton
Combustion emission factors are from AP-42, Volume 1, Fifth Edition, Chapter 1.4, Tables 1.4-1 and 1.4-2.
HAP emission factors are from AP-42, Chapter 1.4, Tables 1.4-3.
5 Highest Combustion HAPs are displayed for calculation purposes.
PM EF (lb/hr) = emission rate (gr/dscf) * 60 min/hr * (460 + 68) / (460 + Stack Temp °F) / 7000 gr/lb
PM PTE (tons/yr) = Emission Factor (lb/hr) * 8760 (hr/yr) / 2000 (lb/ton)
HAP emissions are assumed to only come from natural gas combustion since most of the HAPs are removed from the washed towels during the laundering process.

Pollutant Potential to Emit Calculations and Methodology - Miscellaneous Natural Gas Emission units

Emission Unit	Heat Input (BTU/hr)
Gas Fired Unit Heater #1	150,000
Gas Fired Unit Heater #2	150000
Gas Fired Unit Heater #3	75000
Gas Fired Unit Heater #4	165000
Gas Fired Unit Heater #5	165000
Gas Fired Unit Heater #6	105000
Gas Fired Unit Heater #7	105000
Gas Fired Unit Heater #8	1255000
HVAC Units #1	250000
HVAC Units #2	250000
HVAC Units #3	205000
MUA Units Roof #1	3575000
MUA Units Roof #2	3575000
MUA Units Roof #3	865000
Convenience Water Heater #1	38000
TOTAL	10,928,000
Total (MMBTU/hr)	10.928

Emission Unit	Heat Input Rate	Units
Total	10.928	MMBTU/hr
Natural Gas Heating Value	1020	MMBTU/MMSCF

Unit	Potential NG Throughput MMSCF/yr
Total	93.85223529

Pollutant PTE - Combustion								
	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead
Pollutant Emission Factor lb/MMSCF	7.6	7.6	7.6	170	0.6	84	5.5	0.0005
Potential Emissions in tons/yr	0.3566385	0.356638494	0.3566385	7.97744	0.028155671	3.94179	0.258094	2.35E-05

HAP PTE						
Pollutant	Benzene	Dicholrobenzene	Formaldehyd	Hexane	Toluene	Total
Pollutant Emission Factor lb/MMSCF	2.10E-03	1.20E-03	7.50E-02	1.80E+00	3.40E-03	1.88E+00
Potential to Emit in tons/yr	9.85E-05	5.63E-05	3.52E-03	8.45E-02	1.60E-04	8.83E-02

Notes
MMBTU = 1,000,000 British Thermal Units, MMSCF = 1,000,000 standard cubic feet of natural gas
All PTE emissions assumed to be produced from combustion of natural gas.
Potential NG Throughput (MMSCF/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hours/yr x 1 MMSCF / 1020 MMBTU
PTE (tons/yr) = Potential NG Throughput (MMSCF/yr) x Emission Factor (lb/MMSCF) / 2000 lbs/ton
Combustion emission factors are from AP-42, Volume 1, Fifth Edition, Chapter 1.4, Tables 1.4-1 and 1.4-2.
HAP emission factors are from AP-42, Chapter 1.4, Tables 1.4-3.
5 Highest HAPs are displayed for calculation purposes.

Greenhouse Gas Potential to Emit Calculations and Methodology - Boiler B01

Heat Input Capacity 10.46 MMBTU/hr

	Greenhouse Gas		
GHG Species	CO2	CH4	N2O
Emission Factor in kg/MMBTU	53.06	1.00E-03	1.00E-04
Potential Emission in tons/yr	5359.284	0.101004	0.0101
Global Warming Potential	1	25	298
CO2e Per GHG Species in tons/yr	5359.284	2.525106	3.009926
Total Potential CO2e in tons/yr	5364.819177		

Notes
1 MMBTU = 1,000,000 British Thermal Units
GHG PTE (tons/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hr/yr x Emission Factor (kg/MMBTU) x 2.20462 lb/kg / 2000 lbs/ton
CO2e (tons/yr) = CO2 PTE (tons/yr) x CO2 GWP (1) + CH4 PTE (tons/yr) x CH4 GWP (21) + N2O PTE (tons/yr) x N2O GWP (310)
GHG Emission Factors and GWP from 40 CFR 98, Table A-1, C-1, and C-2 for natural gas combustion.
GHG Values based on November 29, 2013, GWP and Default Values

Greenhouse Gas Potential to Emit Calculations and Methodology - Process P03

Emission Unit	Heat Input Capacity (MMBTU/hr)
Cissell #1	0.25
Cissell #2	0.25
Challenge #3	2.75
Challenge #4	2.75
American #1	3.5
American #2	3.5
Jensen L-Tron Dryer #1	2.5
Jensen L-Tron Dryer #2	2.5
WashTech DR-80 Dryer	0.25
Total (Before Modification)	13
Total (After Modification)	11

	Greenhouse Gas Emissions Before Modification			Greenhouse Gas Emissions After Modification		
GHG Species	CO2	CH4	N2O	CO2	CH4	N2O
Emission Factor in kg/MMBTU	53.06	1.00E-03	1.00E-04	53.06	1.00E-03	1.00E-04
Potential Emission in tons/yr	6660.678192	0.125531063	0.012553106	5635.95847	0.106218592	0.010621859
Global Warming Potential	1	25	298	1	25	298
CO2e Per GHG Species in tons/yr	6660.678192	3.13827657	3.740825671	5635.95847	2.65546479	3.16531403
Total Potential CO2e in tons/yr	6667.557294			5641.779249		

Notes
1 MMBTU = 1,000,000 British Thermal Units
Total Before Modification is the sum of Cissell #1 and #2, #3, #4, and American #1 and #2 Heat Input Capacity.
Total After Modification is the sum of Cissell #2, Challenge #3 and #4, Jensen #1 and #2, and WashTech Dryer Heat Input Capacity.
GHG PTE (tons/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hr/yr x Emission Factor (kg/MMBTU) x 2.20462 lb/kg / 2000 lbs/ton
CO2e (tons/yr) = CO2 PTE (tons/yr) x CO2 GWP (1) + CH4 PTE (tons/yr) x CH4 GWP (21) + N2O PTE (tons/yr) x N2O GWP (310)
GHG Emission Factors and GWP from 40 CFR 98, Table A-1, C-1, and C-2 for natural gas combustion.
GHG Values based on November 29, 2013, GWP and Default Values

Greenhouse Gas Potential to Emit Calculations and Methodology - Steam Tunnel

Emission Unit	Heat Input Capacity (MMBTU/hr)
Leonard 24-foot Steam Tunnel	0.8
Leonard Automatics Model VPT24 Steam Tunnel	3

	Greenhouse Gas Emissions Before Modification			Greenhouse Gas Emissions After Modification		
GHG Species	CO2	CH4	N2O	CO2	CH4	N2O
Emission Factor in kg/MMBTU	53.06	1.00E-03	1.00E-04	53.06	1.00E-03	1.00E-04
Potential Emission in tons/yr	409.8878887	0.007725	0.000772499	1537.08	0.028969	0.002896871
Global Warming Potential	1	25	298	1	25	298
CO2e Per GHG Species in tons/yr	409.8878887	0.193125	0.230204657	1537.08	0.724218	0.863267463
Total Potential CO2e in tons/yr	410.3112181			1538.667068		

Notes
1 MMBTU = 1,000,000 British Thermal Units
Greenhouse gas emissions before modification based on 0.8 MMBTU/hr heat input rate.
Greenhouse gas emissions after modification based on 1.5 MMBTU/hr heat input rate.
GHG PTE (tons/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hr/yr x Emission Factor (kg/MMBTU) x 2.20462 lb/kg / 2000 lbs/ton
CO2e (tons/yr) = CO2 PTE (tons/yr) x CO2 GWP (1) + CH4 PTE (tons/yr) x CH4 GWP (21) + N2O PTE (tons/yr) x N2O GWP (310)
GHG Emission Factors and GWP from 40 CFR 98, Table A-1, C-1, and C-2 for natural gas combustion.
GHG Values based on November 29, 2013, GWP and Default Values

Greenhouse Gas Potential to Emit Calculations and Methodology - Miscellaneous Natural Gas Sources

Heat Input Capacity 11.6 MMBTU/hr

	Greenhouse Gas		
GHG Species	CO2	CH4	N2O
Emission Factor in kg/MMBTU	53.06	1.00E-03	1.00E-04
Potential Emission in tons/yr	5943.374	0.112012	0.011201
Global Warming Potential	1	25	298
CO2e Per GHG Species in tons/yr	5943.374	2.800308	3.337968
Total Potential CO2e in tons/yr	5949.512663		

Notes
1 MMBTU = 1,000,000 British Thermal Units
GHG PTE (tons/yr) = Heat Input Capacity (MMBTU/hr) x 8760 hr/yr x Emission Factor (kg/MMBTU) x 2.20462 lb/kg / 2000 lbs/ton
CO2e (tons/yr) = CO2 PTE (tons/yr) x CO2 GWP (1) + CH4 PTE (tons/yr) x CH4 GWP (21) + N2O PTE (tons/yr) x N2O GWP (310)
GHG Emission Factors and GWP from 40 CFR 98, Table A-1, C-1, and C-2 for natural gas combustion.
GHG Values based on November 29, 2013, GWP and Default Values