Technical Support Document
Air Quality Construction Permit
Permit No. SYN-ON-5500900021-2014-02

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
Phone: (920) 497-2509
Fax: (920) 497-8498

Permit Contact: Ms. Sara Ethier, Senior Environmental Manager
Phone: (952) 912-5720

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.

On November 5, 2014, EPA issued an after-the-fact synthetic minor Air Quality Construction Permit, permit number SYN-ON-5500900021-2014-01, to G&K Services. The permit established synthetic minor emission limits for VOCs and HAPs. The permit also authorized the construction of a washer, three dryers, and a steam tunnel.

VOC emissions were limited to no more than 234 tons per year, single HAP emissions to no more than 9.9 tons per year, and total HAP emissions to no more than 24.9 tons per year. To ensure that the synthetic minor limits were practically enforceable, a source-wide soiled towel production limit was created, limiting the amount of soiled print towels processed per year to no more than 1,916 thousand pounds and the amount of soiled shop towels processed per year to no more than 9,217 thousand pounds. The amount of soiled shop towels that can be processed by the facility in a given 12-month period is smaller and varies with the amount of soiled print towels processed by the facility during the same period. The production limit ensures that the source-wide potential to emit does not exceed the major source threshold for HAPs and PSD.

d. 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.

e. Enforcement Issues

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

2. PROJECT DESCRIPTION

a. Description of Permit Action

This permit action is a revision of the after-the-fact Air Quality Construction Permit, permit number SYN-ON-5500900021-2014-01, issued to G&K Services, Inc. on November 5, 2014. G&K Services requested via letter dated February 18, 2015, the authorization to conduct a 90-day shakedown of the new steam tunnel authorized in permit number SYN-ON-5500900021-2014-01. During the shakedown period, G&K Services is requesting authorization to operate the new steam tunnel and the existing steam tunnel concurrently for no more than 6 hours per day.

In a March 26, 2015, email, G&K Services requested the flexibility to continue operating the existing steam tunnel in the event that the replacement steam tunnel is not adequately operational at the end of the 90-day shakedown period. In a phone call on April 21, 2015, G&K Services requested to authorize operation of both the existing steam tunnel and replacement steam tunnel for up to 6 hours per day without the 90-day limit would allow the flexibility G&K Services requested without disrupting operations at the facility in the event that the replacement steam tunnel does not operate adequately.

In this permit revision, EPA is proposing to approve G&K Services' request for the authorization of a shakedown period for the replacement steam tunnel. The proposed steam tunnel originally authorized in the previous permit is an innovative steam tunnel that represents the first of its kind for industrial laundries. An initial shakedown period will allow G&K Services to ensure that the steam tunnel will operate as expected. During the shakedown period, G&K may continue to use the existing steam tunnel. Concurrent operation of both the existing and new steam tunnel is limited to 6 hours per day, while independent operation of either the existing or replacement steam tunnel is unrestricted. The facility will continue to be a synthetic minor source for VOC and HAPs since the synthetic minor limits are established based on the soiled weight of towels processed by the facility. Concurrent operation of the steam tunnels will not affect the soiled weight of towels that the source is allowed to process.

If we proceed as proposed, EPA will issue revised permit with the authorization to operate both steam tunnels concurrently as permit number SYN-ON-5500900021-2014-02.

b. Affected Emissions Units

This permit revision authorizes the concurrent operation of the existing 0.8 MMBTU/hr Leonard 24 foot Steam Tunnel and the proposed 3.0 MMBTU/hr replacement steam tunnel.

c. 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.

d. Potential to Emit of the Permit Revision – Concurrent Operation of New and Existing Steam Tunnel

Since permit number SYN-ON-5500900021-2014-01 was issued, G&K Services completed construction of the washer and three dryers authorized for replacement in the permit. Construction of the new steam tunnel is all that remains in the original construction authorization of that permit.

The potential to emit of the facility, after taking into account all control devices and synthetic minor limits authorized in permit number SYN-ON-5500900021-2014-01, is shown in Table 1.

Operating Scenario	PM	PM_{10}	$PM_{2.5}$	NOx	SO_2	CO	VOC	Lead
Existing Steam Tunnel, Unrestricted	191.44	191.44	191.44	24.23	0.09	11.97	122.45	0.00
New Steam Tunnel, Unrestricted	195.40	195.40	195.40	25.83	0.09	12.76	122.50	0.00
Concurrent Steam Tunnel, 6 hr/day	201.22	201.22	201.22	25.98	0.09	12.84	122.51	0.00
Allowable Emissions Increase (Concurrent Operation)	5.82	5.82	5.82	0.15	0.00	0.07	0.00	0.00

Table 1: Sourcewide Potential to Emit based on steam tunnel configuration (in tons per year)

Three scenarios are presented in Table 1: source-wide potential to emit with the existing steam tunnel only, source-wide potential to emit with the new steam tunnel only, and the source-wide potential to emit with concurrent operation of the steam tunnels limited to 6 hours per day. The potential to emit of the 6 hours of concurrent operation per day scenario assumes that the new steam tunnel operates 24 hours per day while the existing steam tunnel operates for 6 hours per day.

In all cases, the source-wide potential to emit for all criteria pollutants will remain below the major source threshold as long as G&K maintains compliance with the limits on the weight of soiled towels it processes. Although not listed in Table 1, the source-wide potential to emit all HAPs will also remain below the major HAP source threshold since the synthetic minor HAP limit is based on monthly and annual soiled towel input, which will remain unchanged.

e. 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. PERMIT REQUIREMENTS

a. Federal Tribal Minor NSR Program

G&K Services requested a revision to its previously-issued synthetic minor permit, permit number SYN-ON-5500900021-2014-01, to accommodate concurrent operation of the existing and replacement steam tunnel. This permit is being revised

pursuant to 40 C.F.R. § 49.153(a)(2) since concurrent operation of the existing and replacement steam tunnel will result in an increased allowable emissions limit.

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.

VOCs are produced by the facility as it washes and dries soiled print and shop towels. The permit 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.

This permit revision does not affect the synthetic minor HAP or VOC emissions limits originally established in permit number SYN-ON-5500900021-2014-01.

c. New Source Performance Standards (NSPS)

This permit revision does not incorporate additional NSPS requirements.

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

This permit revision does not incorporate additional MACT standards.

4. OTHER REQUIREMENTS

a. 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.

For this analysis, EPA consulted the U.S. Fish and Wildlife Service's (USFWS) Section 7 Consultation Technical Assistance Website at http://www.fws.gov/midwest/endangered/section7/s7process/index.html. The webpage provides step-by-step instructions for completing the informal consultation process.

Based on the April 2015 Wisconsin County Distribution of Federally-listed Endangered, Threatened, Proposed and Candidate Species list, the northern long-eared bat, the rufa red knot, and the dwarf lake iris may be present in Brown County, Wisconsin.

The facility is located in a developed area. A developed area is an area that is already paved or supports structures and the only vegetation is limited to frequently mowed grass or conventional landscaping. The facility is located near other business, access roads, and an interstate highway. The project will not remove the removal of native vegetation near the source since construction will take place at the existing facility.

EPA has determined that this permit revision will have no effect on federally listed species. Since the facility is located in a developed area and will not involve removing native vegetation, the revision will not affect suitable habitat for listed species, no listed species or designated critical habitat is anticipated to be directly or indirectly affected by this action.

b. National Historic 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.

As part of the permitting process for the issuance of permit number SYN-ON-5500900021-2014-01, EPA determined that this project would have no potential effect on historic properties. This permit revision only authorizes concurrent operation of the steam tunnels at the facility. No other additional construction is being authorized. Further, the source is located in a developed area that includes, among other things, an interstate highway and other businesses in an area zoned as a business park.

For these reasons, EPA has determined the issuance of this revised 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.

5. REVISIONS TO THE PERMIT

Based on the February 18, 2015, letter, March 26, 2015, email, and April 21, 2015, phone discussion, EPA is revising permit number SYN-ON-5500900021-2014-01 to add several conditions authorizing concurrent operation of the existing and replacement steam tunnel. The permit will be reissued as permit number SYN-ON-5500900021-2014-02.

The following permit conditions have been revised based on the information provided by G&K Services, Inc. Additions are indicated in **BOLD** typeface while deletions are indicated by ~~strikethrough~~ text.

1.) Condition I (D) has been added to the permit to track the revision history of the permit. The permit condition reads as follows:

(D) Permit History

(1) Permit number SYN-ON-5500900021-2014-01 was issued on November 5, 2014, and became effective on December 5, 2014.

(2) The current permit, permit number SYN-ON-5500900021-2014-02, is a revision of SYN-ON-5500900021-2014-01. This revision authorizes concurrent operation of the existing and new steam tunnel originally authorized for construction in permit number SYN-ON-5500900021-2014-01. See Condition II(E)(6) for further information.

2.) Condition II (E)(6) has been added to the permit. This condition authorizes concurrent operation of the new and existing steam tunnel as requested by G&K Services in its

February 18, 2015, permit modification request and March 26, 2015, email. The permit condition reads as follows:

[...]

(6) Replacement Unit Concurrent Operation Authorization [40 C.F.R. § 49.155]

(a) The Permittee may concurrently operate the existing Leonard 24-foot Steam Tunnel and the authorized replacement steam tunnel.

(b) Concurrent operation of the existing steam tunnel and the replacement steam tunnel shall not exceed 6 hours per day.

(c) The Permittee may operate either the existing Leonard 24-foot Steam Tunnel or the authorized replacement steam tunnel independently with no restriction on daily hours of operation.

(d) The Permittee shall maintain the following records:

(i) The date construction of the replacement steam tunnel is completed.

(ii) The date that shakedown operations of the replacement steam tunnel is completed.

(iii) Hours of operation of each steam tunnel on a daily basis.

(iv) The number of hours of operation both steam tunnels were operating concurrently, on a daily basis.

(v) The throughput of the existing and replacement steam tunnel on a daily basis, in pounds soiled weight.

(vi) Documentation evaluating the replacement steam tunnel's performance as it relates to the new unit's commissioning and acceptance. This documentation includes, but is not limited to, parameters used to determine acceptable performance of the new steam tunnel, assessment of the replacement unit's performance, and any changes made to the steam tunnel as a result of the shakedown operations.

(vii) The date that the existing steam tunnel is decommissioned.

(e) The Permittee shall submit, within 30 days of the event, a notification to EPA, in writing, of the following. This notification may be sent concurrently with any notification required by this or other permits:

(i) The date shakedown and production testing of the replacement steam tunnel begins.

(ii) The date shakedown operation of the replacement steam tunnel ends. This notification shall also include the heat input, maximum throughput, and updated description of the replacement steam tunnel accepted as a result of shakedown and production testing operations.

[...]

In addition to the previously listed revisions, the following changes have been made to the permit:

1.) The cover page has been modified to remove a sentence regarding the definition of terms and conditions within the permit. This sentence is redundant since Condition 4.0(A) defines the terms and conditions within the permit.

The cover page, in part, now reads as follows:

[...]

~~Terms and conditions in this permit have the meaning assigned to them in 40 C.F.R. § 49.152 unless other regulations or statutes are referenced or applicable.~~ All terms and conditions of the permit are enforceable by the U.S. Environmental Protection Agency and citizens under the Clean Air Act.

[...]

2.) The numbering of Condition 4.0(A), (C), (F), (H), (J), and (K) has been modified by removing the individual condition numbering. The requirements of each permit condition has not changed as a result of this revision.

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	0.34	0.34	0.34	7.64	0.03	3.77	0.25	0.00	0.08	0.08
Process P01	0.00	0.00	0.00	0.00	0.00	0.00	172.48	0.00	25.15	65.33
Process P02	9.98	9.98	9.98	0.00	0.00	0.00	1183.72	0.00	81.84	175.13
Process P03	171.29	171.29	171.29	9.49	0.03	4.69	153.28	0.00	10.88	31.89
Steam Tunnel	23.27	23.27	23.27	0.58	0.00	0.29	0.02	0.00	0.01	0.01
Miscellaneous	0.36	0.36	0.36	7.98	0.03	3.94	0.26	0.00	0.08	0.09
TOTAL	205.24	205.24	205.24	25.69	0.09	12.69	1510.00	0.00	118.04	272.53
PTE Before Modification, After Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Total	205.24	205.24	205.24	25.69	0.09	12.69	122.50	0.00	8.41	21.20

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	0.34	0.34	0.34	7.64	0.03	3.77	0.25	0.00	0.08	0.08
Process P01	0.00	0.00	0.00	0.00	0.00	0.00	172.48	0.00	25.15	65.33
Process P02	9.98	9.98	9.98	0.00	0.00	0.00	1183.72	0.00	81.84	175.13
Process P03	157.49	157.49	157.49	8.03	0.03	3.97	153.23	0.00	10.88	31.89
Steam Tunnel	27.23	27.23	27.23	2.19	0.01	1.08	0.07	0.00	0.00	0.02
Miscellaneous	0.36	0.36	0.36	7.98	0.03	3.94	0.26	0.00	0.08	0.09
TOTAL	195.40	195.40	195.40	25.83	0.09	12.76	1510.01	0.00	118.03	272.55
Emission Increase/Decrease	-9.83	-9.83	-9.83	0.15	0.00	0.07	0.00	0.00	-0.01	0.02
PTE After Modification, After Limits										
Process or Emission Unit	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP
Total (New Steam Tunnel Only)	195.40	195.40	195.40	25.83	0.09	12.76	122.50	0.00	8.41	21.21
Concurrent Steam Tunnel Operation (6 hours/day)	201.22	201.22	201.22	25.98	0.09	12.84	122.51	0.00	8.41	21.21

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	5359.28	0.10	0.01	5364.82	5359.28	0.10	0.01	5364.82
Process P01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Process P02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Process P03	6660.68	0.13	0.01	6667.56	5635.96	0.11	0.01	5641.78
Steam Tunnel	409.89	0.01	0.00	410.31	1537.08	0.03	0.00	1538.67
Miscellaneous	5943.37	0.11	0.01	5949.51	5943.37	0.11	0.01	5949.51
TOTAL (New Steam Tunnel Only)	18373.22	0.35	0.03	18392.20	18475.70	0.35	0.03	18494.78

Permit Revision - Authorization to Concurrently Operate Steam Tunnels for Shakedown

Steam Tunnel Potential to Emit (tons/year)											
Steam Tunnel PTE, with Limits	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP	GHG CO2e
Existing (0.8 MMBTU/hr)	23.27	23.27	23.27	0.58	0.00	0.29	0.02	0.00	0.01	0.01	410.31
Replacement (3 MMBTU/hr)	27.23	27.23	27.23	2.19	0.01	1.08	0.07	0.00	0.00	0.02	1538.67

Sourcewide Potential to Emit, after control and synthetic minor limits (tons/year)											
Operating Scenario	PM	PM10	PM2.5	NOx	SO2	CO	VOC	Lead	Highest Single HAP	Total HAP	GHG CO2e
Existing Steam Tunnel Only	191.44	191.44	191.44	24.23	0.09	11.97	122.45	0.00	8.42	21.19	17366.42
New Steam Tunnel Only	195.40	195.40	195.40	25.83	0.09	12.76	122.50	0.00	8.41	21.21	18494.78
Concurrent Steam Tunnel, 6 hr/day	201.22	201.22	201.22	25.98	0.09	12.84	122.51	0.00	8.41	21.21	18597.36
Concurrent Steam Tunnel, Unrestricted	218.67	218.67	218.67	26.42	0.09	13.05	122.52	0.00	8.42	21.21	18905.09
Allowable Emissions Increase (Concurrent Operation)	5.82	5.82	5.82	0.15	0.00	0.07	0.00	0.00	0.00	0.00	102.58

Notes

PTE for existing steam tunnel only includes emissions from replacement emission units already installed at the source (i.e., washer and 3 dryers).

PTE for new steam tunnel only scenaior is the sourcewide potential to emit after all modifications are completed, i.e., after installation of replacement steam tunnel.

[Concurrent steam tunnel operations limited to 6 hours per day] = [Emissions from operating new steam tunnel only] + [PTE of existing steam tunnel]* [6 hours/day] * [365 days/year] / [8760 hours/year]

[Unrestricted concurrent steam tunnel operations] = [Emissions from existing steam tunnel operation only] + [Replacement Steam Tunnel PTE]

The permit will only authorize concurrent operation of both steam tunnels for up to 6 hours per day. The unrestricted scenario is included to show that the sourcewide PTE will not exceed the major source threshold.

Concurrent operation of both steam tunnels will increase sourcewide VOC and HAP PTE very slightly (0.02 tpy or less) due to additional incremental consumption of natural gas. The source will remain a synthetic minor source of VOC and HAP emissions.

Allowable increase due to revision is the difference in emissions between the "New Steam Tunnel Only" and the "Concurrent Steam Tunnel, 6 hr/day" operating scenarios.

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

Notes
P = Soiled Print Towels in 1000 pounds
S = Soiled Shop Towels in 1000 pounds
Operational limit, in pounds per 1000 pounds of soiled towels, is determined using emission factors provided by applicant.
Operational limit is based on the smallest soiled weight of towels that yields the requested emission limits for the source.
Operational limit is adjusted downward to provide at least a 15% buffer between the HAP major source thresholds (10 tpy for single HAP and 25 tpy for total HAPs)

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 or equivalent	3	MMBTU/hr
Natural Gas Heating Value	1020	MMBTU/MMSCF

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