Georgia-Pacific

CONSUMER OPERATIONS LLC
401 NE Adams Street, Camas, WA 98607
Telephone: (360) 834-3021

March 29, 2018

Mr. James DeMay
Industrial Section
Washington Department of Ecology
300 Desmond Drive SE
Lacey, WA 98503

Dear Mr. DeMay,

Enclosed please find a Supplemental Letter to the Notice of Construction (NOC) application for the Georgia-Pacific Consumer Operations LLC (GP) submitted on January 12, 2018. GP Camas is a pulp and paper mill, currently operating under Air Operating Permit No. 0000256. GP Camas is proposing to install a new emergency diesel generator and a new skid-mounted diesel fire pump to replace its existing diesel fire system located at the Columbia River.

As described in the attached supplemental letter, prepared by Trinity Consultants (Kent, WA), the planned location of the Fire Pump and corresponding stack height has been changed, and the proposed hours of operation have been reduced from 400 to 300 hours. All other engine parameters are as they were reported in the NOC application submitted on January 12, 2018.

If you have any questions regarding this submittal, please contact Jeff Dambrun at (360) 834-8485 or jeff.dambrun@gapac.com, or Samantha Hutcheson at (360) 834-8439 or samantha.hutcheson@gapac.com.

Sincerely,

Shawn Wood
Vice President

Attachment

cc:
Ha Tran - WDOE Industrial Section (via electronic mail)

PROJECT REPORT
Georgia-Pacific > Camas Mill

Supplemental Application to Fire Pump Replacement at Camas Mill

Prepared By:

Hui Cheng – Senior Consultant

TRINITY CONSULTANTS
20819 72nd Avenue South
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March 2018

Project 174801.0074

Trinity Consultants

Environmental solutions delivered uncommonly well

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1. EXECUTIVE SUMMARY

Georgia-Pacific Consumer Operations LLC (GP) operates the pulp and paper mill located in Camas, Washington (Camas Mill). The Camas Mill operates under the Air Operating Permit (AOP) No. WA 000025-6, which will expire on July 1, 2019. GP submitted a Notice of Construction (NOC) application for the Fire Pump Replacement Project to Washington Department of Ecology (Ecology) on January 12, 2018. This letter serves as supplemental application to the submitted NOC application, and provides an updated air dispersion modeling analysis due to a recent design change. This supplemental application demonstrates compliance with the toxic air pollutant (TAP) program under Washington Administrative Code (WAC) Chapter 173-460 for the updated design. This supplemental application does not impact the determinations on regulatory applicability and best available control technology provided in the submitted NOC application.

2. BACKGROUND

As part of the Fire Pump Replacement Project, a Skid-Mounted Fire Pump will be installed, which will be powered by a 327 horsepower (hp) diesel engine. GP would like to keep the flexibility to operate the Skid-Mounted Fire Pump in case of failure of the primary pumps to maintain the necessary water pressure for the Camas Mill Fire System.[1] Being a non-emergency unit, the Skid-Mounted Fire Pump is subject to the new source review requirements under WAC Chapter 173-400. In the initial NOC application for the project, GP proposed a 400 hours per year operation limit for the Skid-Mounted Fire Pump, including maintenance, testing, and other times when other primary pumps are not able to maintain the necessary system pressure, but not including any operation during emergency situations (e.g., loss of grid power). With the proposed 400 hours per year operation limit, an AERMOD air dispersion modeling analysis was performed to demonstrate compliance to the TAP program for the Skid-Mounted Fire Pump for diesel engine exhaust particulate (DPM) and nitrogen dioxide (NO_2), per WAC Chapter 173-460.

Recently, a design change took place to change the location of the Skid-Mounted Fire Pump. The new location of the Skid-Mounted Fire Pump is provided in Appendix A. The proposed hours of operation have changed from 400 to 300 hours per year.

[1] The system pressure of the Camas Mill Fire System is primarily maintained by an electric pump, referred to as the Jockey Pump. The Jockey Pump is first backed up by another electric pump, the Auxiliary Pump, when system pressure can no longer be maintained. The Jockey Pump and the Auxiliary Pump are the primary pumps for the Camas Mill Fire System.

3. UPDATED EMISSION CALCULATIONS

With the proposed operation limit reduced to 300 hours per year, the project emissions will decrease compared to the submitted NOC application. The updated project emissions are summarized in Table 3-1. Updated detailed emission calculations are provided in Appendix B.

Table 3-1. Updated Project Emissions Summary

Pollutant	Skid-Mounted Fire Pump Emissions[1] (tpy)
PM	1.19E-02
PM_{10}	1.19E-02
$PM_{2.5}$	1.19E-02
SO_2	0.10
NO_X	0.28
CO	0.08
VOC	1.08E-02

[1] GP proposes a 300 hours per year limit for the Skid-Mounted Fire Pump, including maintenance, testing, and other times when the Jockey Pump and the Auxiliary Pump are not able to maintain the system pressure, but not for any operations during emergency situations (e.g., loss of grid power).

4. UPDATED TAP ANALYSIS

With the operation limit reduced to 300 hours per year, the TAP emissions are also updated and compared to the de minimis levels and small quantity emission rate (SQER) established under WAC 173-460-150. As shown in Table 4-1, updated NO_2 and DPM emissions are above the respective SQER. Therefore, compliance with the ambient source impact level (ASIL) is required to be demonstrated using the AERMOD dispersion model. This section discusses the updated modeling analysis, which demonstrates compliance with the ASILs.

The same methodology presented in the submitted NOC application has been applied to this updated modeling analysis, except as noted in the following sections.

Table 4-1. Updated TAP Emission Summary

Pollutant	Averaging Period	SQER	De Minimis	Project Total [1]	Modeling Required?
		(lbs/averaging period)			
Acetaldehyde	year	71	3.55	0.47	De Minimis
Acrolein	24-hr	0.00789	0.000394	4.53E-03	No
Benzene	year	6.62	0.331	0.57	No
Benzo(a)anthracene	year	1.74	0.0872	1.03E-03	De Minimis
Benzo(a)pyrene	year	0.174	0.00872	1.15E-04	De Minimis
Benzo(b)fluoranthene	year	1.74	0.0872	6.07E-05	De Minimis
Benzo(k)fluoranthene	year	1.74	0.0872	9.50E-05	De Minimis
1,3-Butadiene	year	1.13	0.0564	0.02	De Minimis
Chrysene	year	17.4	0.872	2.16E-04	De Minimis
Dibenz(a,h)anthracene	year	0.16	0.00799	3.57E-04	De Minimis
Formaldehyde	year	32	1.6	0.72	De Minimis
Indeno(1,2,3-cd)pyrene	year	1.74	0.0872	2.30E-04	De Minimis
Naphthalene	year	5.64	0.282	0.05	De Minimis
Toluene	24-hr	657	32.9	0.02	De Minimis
Xylenes	24-hr	29	1.45	1.40E-02	De Minimis
SO_2	1-hr	1.45	0.457	0.67	No
CO	1-hr	50.4	1.14	0.50	De Minimis
NO_2	1-hr	1.03	0.457	1.87	Yes
Diesel Engine Exhaust, Particulate	year	0.639	0.032	23.79	Yes

[1] The emissions are calculated based on 300 hours per year of operation. Emission factors for CO, NO_X and diesel engine exhaust particulate are obtained from vendor specifications. Emission factors for other TAPs are obtained from Table 3.3-2 AP-42. It is conservatively assumed all NO_X is emitted as NO_2.

4.1. BUILDING DOWNWASH

The Skid-Mounted Fire Pump will be located in a building next to the Steam Plant. There is a tank approximately 50 ft from the proposed new location. Therefore, this tank is included in the model for building downwash purposes. The tank is 38 ft in diameter and 82 ft high. The ID for this tank is TANK in the attached model files (Appendix C). Other building structures remain unchanged.

4.2. SOURCE PARAMETERS

The source parameters are updated based on the recent design change. The Skid-Mounted Fire Pump will be located in a building next to the Steam Plant and the stack will be attached to the pipe-bridge above the building for structural support (see Appendix A).[2] The estimated stack height will be 45 ft from the ground. The updated stack location information are summarized in Table 4-2 and the modeled parameters are summarized in Table 4-3. A unit emission rate of 1 gram per second (g/s) is used to set up the model.

Table 4-2. Updated Point Source Location

EPN	POINT	UTM East (m)	UTM North (m)	Elevation[1] (m)
PUMP	POINT	546,090	5,048,015	16.15
[1] Elevation is determined by AERMAP.				

Table 4-3. Updated Point Source Parameters

EPN	Height[1] (m)	Temperature (°F)	(K)	Flow Rate (acfm)	Exit Velocity (m/s)	Diameter (in)	(m)
PUMP	13.72	842	723.15	1867	48.30	6	0.15
[1] The stack will be 45 ft. from the ground, and will be secured to the pipe-bridge above the building.							

4.3. MODEL RESULTS

The model was run with a unit emission rate of 1 g/s, since the Skid-Mounted Fire Pump is the only modeled source. The model results are scaled based on the g/s emission rates to obtain the model results for DPM and NO_2. The g/s emission rates are summarized in Table 4-4.

Table 4-4. TAP Emission Rate

TAP	Calculated Emissions		Model Emission Rate	
DPM[1]	1.19E-02	tpy	3.422E-04	g/s
NO_2[2]	1.87	lb/hr	2.362E-01	g/s
[1] DPM has an annual averaging period. Therefore, the model emission rate is converted using the annual emission rate in tpy and 8,760 hrs/yr. [2] NO_2 has a 1-hour averaging period. Therefore, the model emission rate is converted based on the lb/hr rate. It is conservatively assumed all NO_X is emitted as NO_2.				

The averaging periods for DPM and NO_2 are annual and 1-hour, respectively. Therefore, the maximum annual and 1-hour result from the five meteorological years using the unit emission rate is scaled based on the g/s emission rate to obtain the model results for diesel engine exhaust particulate and NO_2. The model results are summarized in Table 4-5. As shown in Table 4-5, the model results are below the respective ASIL, thus demonstrating compliance with WAC Chapter 173-460.

[2] Latitude 45°35'2.94"N and longitude 122°24'33.06"W.

Table 4-5. Model Results Summary

Maximum Year	TAP	Averaging Period	Modeling Results with Unit Emission Rate (µg/m³/(g/s))	Model Result for the TAP (µg/m³)	ASIL (µg/m³)	Percent of ASIL
2012	DPM	Annual	8.68	0.00297	0.00333	89%
2016	NO_2	1-hr	450.56	106	470	23%

Annual DPM model results isopleth plot for year 2012 is presented in Figure 4-1, and 1-hour NO_2 model results isopleth plot for year 2016 is presented in Figure 4-2. Note that the isopleths are overlaid with Google Earth aerial imagery, and the Camas Mill is outlined by the white polygon. The legends in both figures show the modeled concentrations in µg/m³ with unit emission rate, as well as the percentage of the respective ASIL corresponding to each contour.

Figure 4-1. 2012 Annual Model Results (Showing % of ASIL) for DPM

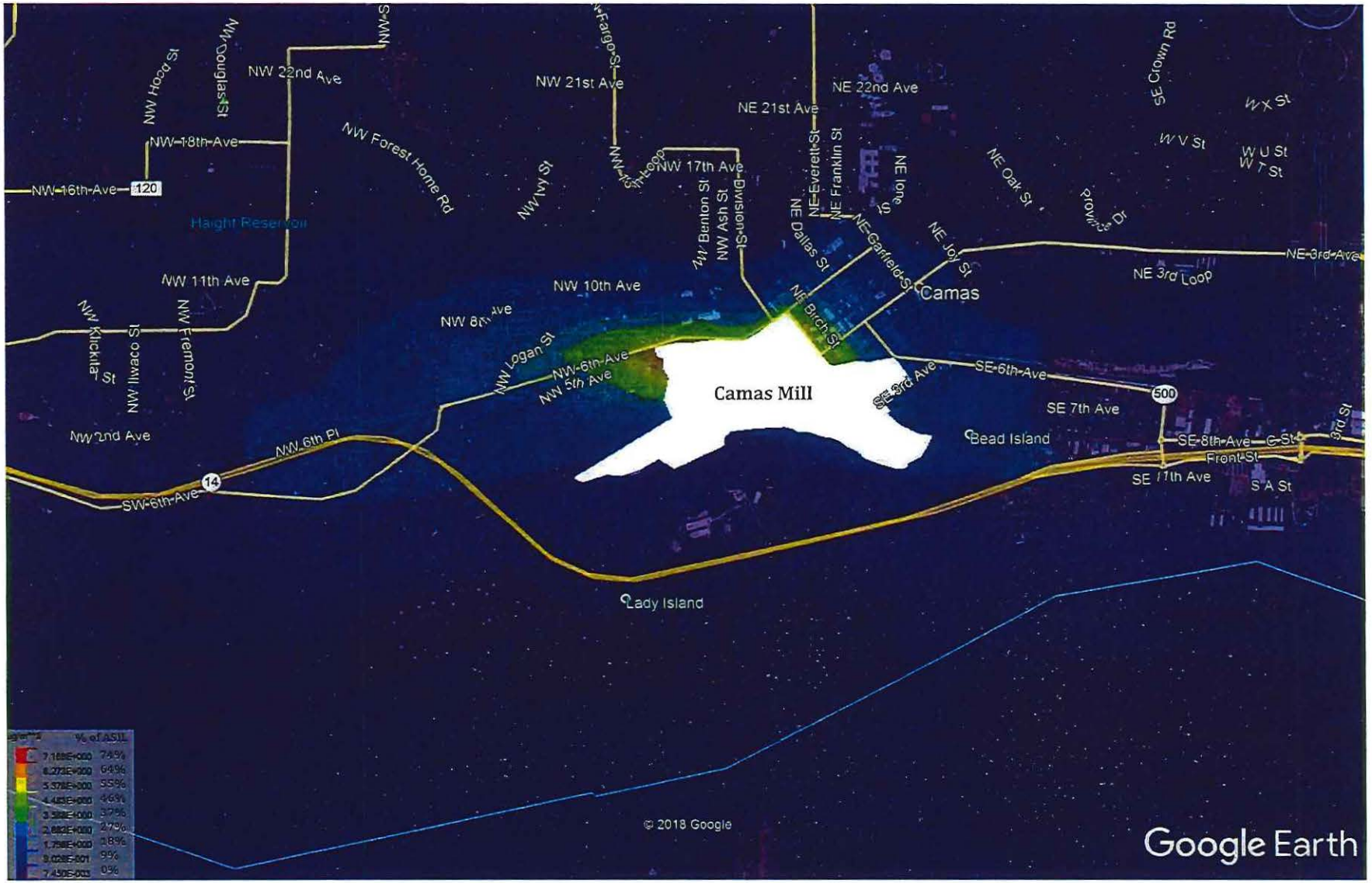
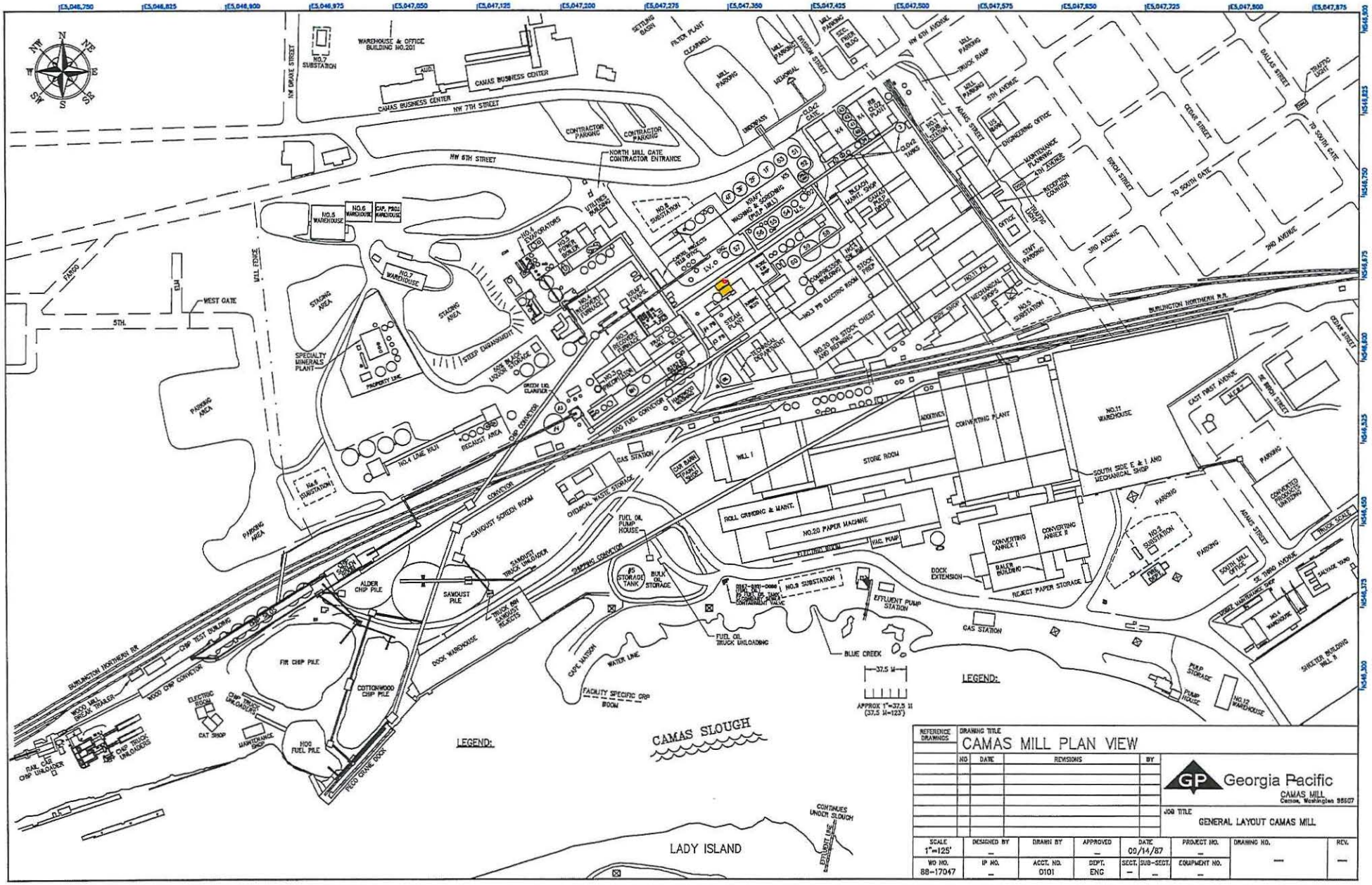


Figure 4-2. 2016 Maximum 1-Hour Model Results (Showing % of ASIL) for NO_2

APPENDIX A: UPDATED DESIGN LOCATION



REFERENCE DRAWINGS	DRAWING TITLE: CAMAS MILL PLAN VIEW						
	NO	DATE	REVISIONS	BY	GP Georgia Pacific		
					CAMAS MILL, Camas, Washington 98607		
					JOB TITLE: GENERAL LAYOUT CAMAS MILL		
SCALE 1"=125'	DESIGNED BY –	DRAWN BY –	APPROVED –	DATE 09/14/87	PROJECT NO. –	DRAWING NO. —	REV. —
WO NO. 88-17047	IP NO. –	ACCT. NO. 0101	DEPT. ENG	SECT. –	SUB-SECT. –	EQUIPMENT NO. –	

APPENDIX B: UPDATED EMISSION CALCULATIONS

Georgia Pacific Camas Mill

Unit ID:	Skid-Mounted Fire Pump		
Fuel:	#2 Diesel		
Maximum Hours of Operation (hr/yr):	300		
Maximum Rating (hp):	327	Engine Manufacturer:	John Deere
Maximum Fuel Use (gal/hr):	14.8	Engine Model:	JW6H-UFADF0

Pollutant	Emissions (lb/hr)	Emissions (tpy)	Emission Factor	Emission Factor Units	Emission Factor Source	Notes
Criteria:						
Particulate Matter (PM)	0.079	1.19E-02	0.11	g/hp-hr	Vendor specifications	
Particulate Matter <10 microns (PM_{10})	0.079	1.19E-02	0.11	g/hp-hr	Vendor specifications	Assume is equal to PM.
Particulate Matter < 2.5 microns ($PM_{2.5}$)	0.079	1.19E-02	0.11	g/hp-hr	Vendor specifications	Assume is equal to PM.
Sulfur Dioxide (SO_2)	0.670	0.10	2.05E-03	lb/hp-hr	AP-42 Table 3.3-1	
Carbon Monoxide (CO)	0.505	0.08	0.7	g/hp-hr	Vendor specifications	
Nitrogen Oxides (NO_X)	1.874	0.28	2.60	g/hp-hr	Vendor specifications	
Volatile Organic Compounds (VOC)	0.072	1.08E-02	0.10	g/hp-hr	Vendor specifications	Assume all hydrocarbons are VOC.
HAP:	7.91E-03	1.19E-03	(See Table Below)			
TAP:	7.75E-03	4.70E-01	(See Table Below)			
GHG:						
Carbon Dioxide (CO_2)	---	49.95	73.96	kg/MMBtu	40 CFR 98, Table C-1	
Methane (CH_4)	---	2.03E-03	0.003	kg/MMBtu	40 CFR 98, Table C-2	
Nitrous Oxide (N_2O)	---	4.05E-04	0.0006	kg/MMBtu	40 CFR 98, Table C-2	
Total Carbon Dioxide Equivalent (CO_2e)		**50.12**				

1. #2 Diesel heat input (MMBtu/gallon) 40 CFR 98 Table C-1: 0.138
2. Emissions factors were obtained from vendor specifications, AP-42, Section 3.3 - Gasoline and Diesel Industrial Engines, 40 CFR 89 Subpart B, and 40 CFR 98 Subpart C.
3. CO_2 emissions calculated in accordance with Equation C-1 (Tier 1 approach for units <250 mmbtu/hr where no monthly data is available of the actual HHV) of 40 CFR Part 98, Subpart C.
4. CH_4 and N_2O emissions calculated in accordance with Equation C-9 of 40 CFR Part 98, Subpart C.
5. The Global Warming Potential for CO_2 is 1, CH_4 is 25 and N_2O is 298 per 40 CFR 98 Table A-1.

Diesel Internal Combustion Engine HAP/TAP Emissions

Pollutant	CAS Number	HAP?	TAP?	Diesel Fired Industrial Engines[1] (lb/MMBtu)	Emissions (lb/hr)	HAP Emissions[2] (tpy)	TAP Emissions[3] (tpy)	Averaging Period[3]	Small Quantity Emission Rate[3] (lb/avg. period)	De Minimis (lb/avg. period)	Project Emissions (lb/avg. period)	Modeling Required?[6]
Acenaphthene[4]	83-32-9	Yes	No	1.42E-06	2.90E-06	4.35E-07	--	--	--	--	--	--
Acenaphthylene[4]	208-96-8	Yes	No	5.06E-06	1.03E-05	1.55E-06	--	--	--	--	--	--
Acetaldehyde[4]	75-07-0	Yes	Yes	7.67E-04	1.57E-03	2.35E-04	2.35E-04	year	71	3.55	0.47	De Minimis
Acrolein	107-02-8	Yes	Yes	9.25E-05	1.89E-04	2.83E-05	2.83E-05	24-hr	0.00789	0.000394	4.53E-03	No
Anthracene[4]	120-12-7	Yes	No	1.87E-06	3.82E-06	5.73E-07	--	--	--	--	--	--
Benzene	71-43-2	Yes	Yes	9.33E-04	1.91E-03	2.86E-04	2.86E-04	year	6.62	0.331	0.57	No
Benzo(a)anthracene[4]	56-55-3	Yes	Yes	1.68E-06	3.43E-06	5.15E-07	5.15E-07	year	1.74	0.0872	1.03E-03	De Minimis
Benzo(a)pyrene[4]	50-32-8	Yes	Yes	1.88E-07	3.84E-07	5.76E-08	5.76E-08	year	0.174	0.00872	1.15E-04	De Minimis
Benzo(b)fluoranthene[4]	205-99-2	Yes	Yes	9.91E-08	2.02E-07	3.04E-08	3.04E-08	year	1.74	0.0872	6.07E-05	De Minimis
Benzo(g,h,l)perylene[4]	--	Yes	No	4.89E-07	9.99E-07	1.50E-07	--	--	--	--	--	--
Benzo(k)fluoranthene[4]	207-08-9	Yes	Yes	1.55E-07	3.17E-07	4.75E-08	4.75E-08	year	1.74	0.0872	9.50E-05	De Minimis
1,3-Butadiene	106-99-0	Yes	Yes	3.91E-05	7.99E-05	1.20E-05	1.20E-05	year	1.13	0.0564	0.02	De Minimis
Chrysene[4]	218-01-9	Yes	Yes	3.53E-07	7.21E-07	1.08E-07	1.08E-07	year	17.4	0.872	2.16E-04	De Minimis
Dibenz(a,h)anthracene[4]	53-70-3	Yes	Yes	5.83E-07	1.19E-06	1.79E-07	1.79E-07	year	0.16	0.00799	3.57E-04	De Minimis
Fluoranthene[4]	206-44-0	Yes	No	7.61E-06	1.55E-05	2.33E-06	--	--	--	--	--	--
Fluorene[4]	86-73-7	Yes	No	2.92E-05	5.96E-05	8.95E-06	--	--	--	--	--	--
Formaldehyde	50-00-0	Yes	Yes	1.18E-03	2.41E-03	3.62E-04	3.62E-04	year	32	1.6	0.72	De Minimis
Indeno(1,2,3-cd)pyrene[4]	193-39-5	Yes	Yes	3.75E-07	7.66E-07	1.15E-07	1.15E-07	year	1.74	0.0872	2.30E-04	De Minimis
Naphthalene	91-20-3	Yes	Yes	8.48E-05	1.73E-04	2.60E-05	2.60E-05	year	5.64	0.282	0.05	De Minimis
Phenanthrene[4]	85-01-8	Yes	No	2.94E-05	6.00E-05	9.01E-06	--	--	--	--	--	--
Pyrene[4]	129-00-0	Yes	No	4.78E-06	9.76E-06	1.46E-06	--	--	--	--	--	--
Toluene	108-88-3	Yes	Yes	4.09E-04	8.35E-04	1.25E-04	1.25E-04	24-hr	657	32.9	0.02	De Minimis
Xylenes	1330-20-7	Yes	Yes	2.85E-04	5.82E-04	8.73E-05	8.73E-05	24-hr	29	1.45	1.40E-02	De Minimis
SO_2	7446-09-05	No	Yes	See Previous Table	0.67	--	0.10	1-hr	1.45	0.457	0.67	No
CO	630-08-0	No	Yes	See Previous Table	0.50	--	0.08	1-hr	50.4	1.14	0.50	De Minimis
NO_2[5]	10102-44-0	No	Yes	See Previous Table	1.87	--	0.28	1-hr	1.03	0.457	1.87	**Yes**
Diesel Engine Exhaust, Particulate	NA	No	Yes	See Previous Table	0.08	--	0.01	year	0.639	0.032	23.79	**Yes**
Total					7.91E-03	1.19E-03	0.47					

1. Emission factors are from Table 3.3-2 AP-42.

2. List of HAP established by 42 U.S.C. 7412(b)(1).

3. List of TAPs, Small Quantity Emission Rates and De Minimis Levels are based on Washington Administrative Code 173-460-150.

4. These are categorized as polycyclic organic matter (POM), which is a HAP.

5. It is conservatively assumed that all NO_x are emitted in the form of NO_2.

6. Modeling is required if the project emissions are greater than the respective Small Quantity Emission Rate.

APPENDIX C: UPDATED MODELING FILES

Modeling Files Directory

File Name	Description
TTCxx.ami	AERMOD input file for modeled year xx.
TTCxx.aml	AERMOD output file for modeled year xx.
Other_all_1-hr_1st_high.plt	Plot file for 1-hr result, year 2016
Other_all_annual.plt	Plot file for annual result, year 2012
Aermap map parameters file	AERMAP NED data parameters
Aermap source file	AERMAP output for buildings and sources
Bpip input file	BPIP input file for this modeling analysis
Bpip output file	BPIP output file for this modeling analysis