TECHNICAL SUPPORT DOCUMENT

Air Discharge Permit 23-3578
Air Discharge Permit Application CO-1069

Issued: May 03, 2023

PacifiCorp
Lewis River Hydroelectric Projects

SWCAA ID – 1993

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Southwest Clean Air Agency

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ABBREVIATIONS

List of Acronyms

ADP	Air Discharge Permit
AP-42	Compilation of Emission Factors, AP-42, 5th Edition, Volume 1, Stationary Point and Area Sources – published by EPA
ASIL	Acceptable Source Impact Level
BACT	Best available control technology
CAS#	Chemical Abstracts Service registry number
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
EU	Emission Unit
LAER	Lowest achievable emission rate
MACT	Maximum Achievable Control Technologies
mfr	Manufacturer
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOV	Notice of Violation/
NSPS	New Source Performance Standard
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RCW	Revised Code of Washington
SCC	Source Classification Code
SDS	Safety Data Sheet
SQER	Small Quantity Emission Rate listed in WAC 173-460
Standard	Standard conditions at a temperature of 68°F (20°C) and a pressure of 29.92 in Hg (760 mm Hg)
SWCAA	Southwest Clean Air Agency
T-BACT	Best Available Control Technology for toxic air pollutants
WAC	Washington Administrative Code

List of Units and Measures

µg/m³	Micrograms per cubic meter
µm	Micrometer (10^{-6} meter)
acfm	Actual cubic foot per minute
bhp	Brake horsepower
dscfm	Dry Standard cubic foot per minute
g/dscm	Grams per dry Standard cubic meter
gpm	Gallon per minute
gr/dscf	Grain per dry standard cubic foot
hp	Horsepowerhp-hr Horsepower-hour
kW	Kilowatt
MMBtu	Million British thermal unit
ppm	Parts per million
ppmv	Parts per million by volume
ppmvd	Parts per million by volume, dry
ppmw	Parts per million by weight
rpm	Revolution per minute
scfm	Standard cubic foot per minute
tpy	Tons per year

List of Chemical Symbols, Formulas, and Pollutants

CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
HAP	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
O_2	Oxygen
O_3	Ozone
PM	Particulate Matter with an aerodynamic diameter 100 µm or less
PM_{10}	PM with an aerodynamic diameter 10 µm or less
$PM_{2.5}$	PM with an aerodynamic diameter 2.5 µm or less
SO_2	Sulfur dioxide
TAP	Toxic air pollutant pursuant to Chapter 173-460 WAC
TSP	Total Suspended Particulate
VOC	Volatile organic compound

Terms not otherwise defined have the meaning assigned to them in the referenced regulations or the dictionary definition, as appropriate.

1. FACILITY IDENTIFICATION

Applicant Name:	PacifiCorp Hydro Resources
Applicant Address:	825 NE Multnomah Street, Suite 1800 Portland, OR 97232
Facility Name:	PacifiCorp – Lewis River Hydroelectric Projects
Facility Address:	Multiple locations. See Section 5 equipment descriptions.
SWCAA Identification:	1993
Contact Person:	Hoa (Andy) Truong, Senior Environmental Analyst
Primary Process:	Hydroelectric Operation
SIC/NAICS Code:	4911 / Electric Services 221111 / Hydroelectric Power Generation
Facility Classification:	Natural Minor

2. FACILITY DESCRIPTION

PacifiCorp Hydro Resources (PacifiCorp) operates several emergency generator engines along the Lewis River and at the three dams for purposes of providing emergency power in the event of a power outage. All three dams are located on the north fork of the Lewis River. The Merwin Dam is located at River Mile (RM) 19.5 (Clark and Cowlitz Counties), the Yale Dam is located at RM 34.2 (Cowlitz County), and the Swift #1 Dam is located at RM 47.9 (Skamania County). A fourth dam, Swift #2 Dam, is owned by Cowlitz County Public Utilities District and operated by PacifiCorp. The Swift #2 Dam is located downstream of the Swift #1 Dam and upstream from Yale Lake; there are no emergency generator engines at Swift #2 Dam. PacifiCorp also operates prime-service engines at Swift Forest Campground wells, the Camp Creek Radio Tower, and the Marble Creek Radio Tower.

PacifiCorp funds operation of three fish hatcheries (Lewis River, Speelyai, Merwin). All of the hatcheries are operated by the Washington Department of Fish and Wildlife. Emergency generator engines are located at each hatchery. An ozone water treatment plant is located at the Merwin Hatchery.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit application number CO-1069 (ADP Application CO-1069) dated April 6, 2023. PacifiCorp submitted ADP Application CO-1069 requesting approval of the following:

- Approval for a second generator engine at the Swift Forest Camp recreation center. The generator is the same make and model as a previously approved generator engine at the same location.

The current permitting action provides approval for the proposed generator. ADP 23-3578 will supersede ADP 22-3516 in its entirety.

4. PROCESS DESCRIPTION

4.a Primary Power Generation. One prime-service generator will be installed at the Swift Forest Campground (Swift Forest Camp) to power water well pumps. This generator will supplement an existing generator at the same location. A prime-service generator is installed at each of two remote radio towers (Marble Creek Radio Tower and Camp Creek Radio Tower) to provide backup for associated off-grid solar power systems.

4.b Emergency Power Generation. Emergency generator sets are installed at each fish hatchery to power critical systems in the event of an interruption in grid power. Emergency generator sets are installed at each dam to power critical equipment in the event of a power interruption and at the Woodland Release Ponds.

4.c Ozone Generation. The Merwin Hatchery operates an ozone plant to disinfect incoming water, primarily to protect steelhead from whirling disease. Ozone is generated from compressed air and bubbled through the incoming water for disinfection in two parallel ozone contact systems. The headspace of the ozone contact areas is vented through a single ozone decomposer. Residual ozone is then stripped from the water to protect the fish.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a Lewis River Hatchery Downstream Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Cummins / 500FDR7018HHW (s/n MC-93901-3/12)
Generator Output:	300 kW
Engine Make / Model:	Cummins / HC3-5 (s/n 50182682)
Fuel:	Diesel
Engine Power:	465 bhp
Engine Built:	1994
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	None
Stack Description:	~6" dia horizontal exhaust, ~14' above ground level, 875°F

Cummins / HC3-5

Cummins / QSX15-G9

5.b Lewis River Hatchery Upstream Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Cummins / DFEK-5622934 (s/n F030515718)
Generator Output:	500 kW
Engine Make / Model:	Cummins / QSX15-G9 (s/n 79014388)
Fuel:	Diesel
Engine Power:	755 bhp
Engine Built:	1996
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	EPA Tier 1
Stack Description:	(2) ~4" dia horizontal exhaust, ~8' 10" above ground level, 938°F

5.c Merwin Dam Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Caterpillar / DM0635-02 (s/n SR47AFK00122)
Generator Output:	750 kW
Engine Make / Model:	Caterpillar / 3412 (s/n 1EZ01311)
Fuel:	Diesel
Engine Power:	1,109 bhp
Engine Built:	2000
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	None
Stack Description:	~12" dia vertical exhaust, ~8' 10" above ground level, 957°F

Caterpillar / 3412

Caterpillar / C18

5.d Swift #1 Dam FSC Caterpillar Emergency Generator Engine (*existing*). This unit serves as an emergency power source for the fish sorting collector (FSC) for Swift Dam. Equipment details are provided below:

Generator Set Make / Model:	Caterpillar / LC7 (Frame LC7024F) (s/n G7A02687)
Generator Output:	600 kW
Engine Make / Model:	Caterpillar / C18 (s/n EST00807)
Fuel:	Diesel
Engine Power:	900 bhp
Engine Built:	2009
NSPS/NESHAP/MACT:	40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	EPA Tier 2
Stack Description:	~12" dia vertical exhaust

5.e Woodland Release Ponds Emergency Generator Engine (*existing*). This unit serves as an emergency power source for the Woodland Release Ponds where young fish are held and acclimated before release to the North Fork of the Lewis River. Equipment details are provided below:

Generator Set Make / Model:	Caterpillar / D125-8 (s/n CAT0071HWG20024)
Generator Output:	125 kW
Engine Make / Model:	Caterpillar / C7.1 (s/n 45500792) *Perkins - Engine Family HPKXL07.0PW1*
Fuel:	Diesel
Engine Power:	171.2 kW (230 hp)
Engine Built:	July 2017
Installed:	September 2017
NSPS/NESHAP/MACT:	40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	EPA Tier 3 (for emergency use only)
Stack Description:	~4" dia horizontal exhaust, discharging 10' above ground level, 843°F, 1,056 cfm. ~ 45°55'34.42"N, 122°43'11.50"W

Caterpillar / C7.1


Generac Olympian / 76785

5.f Merwin Headquarters Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Generac Olympian / SG100 (s/n AD 209594 SRK)
Generator Model:	32868-1266C
Generator Output:	100 kW
Engine Make / Model:	Generac Olympian / 76785 (s/n 2023292)
Fuel:	Propane
Engine Power:	147 bhp
Engine Built:	1995
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	None
Stack Description:	(2) ~4" dia vertical exhausts, 6' 10" from ground level, 1,250°F (estimated)

5.g Speelyai Hatchery Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Make / Model:	Kohler / 1DDRZG-QS2 (s/n 0714664)
Generator Output:	90 kW
Engine Make / Model:	General Motors Industrial Powertrain Vortec 8.1L (s/n 8.1L-05589)
Fuel:	Propane
Engine Power:	162 bhp
Engine Built:	09/2001
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	None
Stack Description:	~3.5" dia vertical exhaust, 11' 2" from ground level, 1,250°F (estimated)

General Motors Industrial Powertrain Vortec 8.1L

5.h Yale Dam Emergency Generator Engine (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Generac Olympian / SG100 (s/n 0714664)
Generator Output:	100 kW
Engine Make / Model:	Generac 7.4L – Chevy / 76785 (type CG100-G367.4V16CBYYC)
Fuel:	Propane
Fuel Consumption:	4.08 gal/hr
Engine Power:	147 bhp
Engine Built:	09/2001
NSPS/NESHAP/MACT:	40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	None
Stack Description:	~3.5" dia vertical exhaust, 7' from ground level, 1,250°F (estimated)

5.i Swift #1 Dam Spillway Gate Emergency Generator Engine (*existing*). This engine set replaced a Ford powered generator set. Equipment details are provided below:

Generator Make / Model:	Caterpillar / DG60-2 Generator Set
Generator Output:	70 kW
Engine Make / Model:	Power Systems International / 5.7L V8, 4-cycle
Fuel:	Propane
Fuel Consumption:	3.14 gal/hr
Engine Power:	113 bhp
Engine Built:	2020
NSPS/NESHAP/MACT:	40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	EPA certification for emergency service
Stack Description:	~4.5" dia horizontal exhaust, 1319°F (estimated)

5.j Camp Creek Radio Tower Generator Engine (*existing*). The Camp Creek Radio Tower is powered by this engine when power from the solar array and battery system is not available. Equipment details are provided below:

Generator Set Make / Model:	Kohler / 45REZG (s/n SGM32J2NW)
Generator Output:	45 kW (standby)
Engine Make / Model:	GM Power Solutions International / 4.3 L Vortec Engine (s/n 43M0003214)
Fuel:	Propane
Fuel Consumption:	2.0 gal/hr
Engine Power:	72 bhp (standby)
Engine Built:	1/23/2017
Engine Installed:	5/15/2017
NSPS/NESHAP/MACT:	40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	40 CFR 60 certified for prime service – utilizing a 3-way catalyst
Stack Description:	~3" dia vertical exhaust, 100" from ground level, 272.7 acfm at 1,129.7°F 46°4'0.08"N, 122°3'12.43"W

5.k Marble Creek Radio Tower Generator Engine (*existing*). The Marble Creek Radio Tower is powered by this engine when power from the solar array and battery system is not available. Equipment details are provided below:

Generator Set Make / Model:	Kohler / 45REZG (s/n SGM32J2NX)
Generator Output:	45 kW (standby)
Engine Make / Model:	GM Power Solutions International / 4.3 L Vortec Engine (s/n 43M0003248)
Fuel:	Propane
Fuel Consumption:	2.0 gal/hr
Engine Power:	72 bhp (standby)
Engine Built:	1/23/2017
Engine Installed:	5/9/2017
NSPS/NESHAP/MACT:	40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ applicable
Engine Certification:	40 CFR 60 certified for prime service – utilizing a 3-way catalyst
Stack Description:	~3" dia vertical exhaust, 100" from ground level, 272.7 acfm at 1,129.7°F 45°58'44.43"N, 122°33'33.75"W

5.l Swift Forest Camp Generator Engine #1 (*existing*). Equipment details are provided below:

Generator Set Make / Model:	Generac MLG20IF4 - mobile
Engine Make and Model:	Isuzu / 4LE2TAGV-03
Engine ID Number:	4LE2-881076
Engine Rating:	40.2 hp
Fuel:	Diesel
Fuel Consumption:	2.1 gal/hr
Model Year:	2021
NSPS/NESHAP/MACT:	40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ applicable
EPA Certification:	EPA Tier 4 Final
Stack Description:	2" dia horizontal exhaust at 4' above ground

5.m Swift Forest Camp Generator Engine #2(*new*). Equipment details are provided below:

Generator Set Make / Model:	Generac MLG20IF4 - mobile
Engine Make and Model:	Isuzu / 4LE2TAGV-03
Engine ID Number:	4LE2-880808
Engine Rating:	40.2 hp
Fuel:	Diesel
Fuel Consumption:	2.1 gal/hr
Model Year:	2021
NSPS/NESHAP/MACT:	40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ applicable
EPA Certification:	EPA Tier 4 Final
Stack Description:	2" dia horizontal exhaust at 4' above ground

ADP Application CO-1069. PacifiCorp proposes to install the above-described engine driven generator to provide utility power to systems at the Swift Forest Camp. This will be the second of two units used for this purpose at the Swift Forest Camp Recreation Center.

5.n Merwin Hatchery Ozone Plant (*existing*). The ozone plant is used to reduce pathogens from river water used for raising steelhead. The ozone plant operates two parallel water disinfection trains. The plant contains two ozone generator cells, one of which is in use at any one time. Compressed air rather than pure oxygen is fed to the ozone generation cells. Each cell consists of horizontal stainless steel tubes in which glass electrodes are inserted. Ozone is generated through an electrical discharge. It is estimate that approximately 2-3% by weight of the oxygen in the air is transformed to ozone. The air/oxygen mixture is bubbled using airstones through the incoming water. It is estimated that approximately 50% of the ozone is dissolved into the water, and 50% of the ozone ends up in the headspace over the flowing water. The headspace of each train is vented to a single ozone destruct unit (decomposer). The decomposer utilizes a catalyst to reduce ozone to oxygen gas. Because the catalyst is deactivated by liquid water, the catalyst is downstream of a water knockout utilizing plastic packing, and a 750 watt electric heater is used to keep the catalyst at 80°F, well above the dewpoint temperature of the inlet gas.

Two Kaeser model SM 8 compressors with a rating of 30 scfm at 110 psig provide the compressed air to the ozone cells.

The unreacted ozone in the river water is removed in a pair of stripping towers and vented to the ambient air.

Location:	111 Merwin Hatchery CT., Ariel, WA 98603-9727
Make / Model:	PCI Ozone and Control Systems / HT-85
Capacity (each unit):	100 lb/day ozone generation when using O_2 feed. 2-3% by weight output expected for compressed air
Oxygen Usage (each unit):	17 scfm typical at ~16 psig
Year Installed:	1993
Water Flow:	2,500 gpm total in two contact basins
Stripping Towers:	Two towers, unknown make/model, containing packing ~18' tall x 8' diameter.
Air Flow:	Unknown
Stripping Tower Exhausts:	~18" diameter vertical, ~28' above grade Located at: 45°57'21.17"N, 122°33'51.43"W
Decomposers Make / Model:	Ozone Water Systems, Inc. / Custom
Decomposer Flow:	100 cfm (design capacity)
Decomposer Catalyst:	Carulite (manganese dioxide/copper oxide catalyst)
Decomposer Exhaust:	Exhausts into the intake of the southern stripping tower
Decomposer Installed:	2013

5.o Other Equipment:

The two gasoline storage tanks are considered to have minor emissions as long as the total throughput is less than 60,000 gal/yr. If the operating hours for an individual engine exceeds 300 hr/yr or the throughput exceeds 60,000 gal/yr, then the Permittee may need to request a modification to the ADP.

- Emergency Engine – Merwin Dam. For opening a spill gate on the Merwin Dam if station power and the backup generator both fail.

  Engine Make / Model: Briggs & Stratton / 196437
  Engine Output Rating: ~ 8 hp (estimated)
  Date Built: Unknown
  Fuel: Unleaded gasoline

- Gasoline Dispensing – Merwin Dam. A 2,500-gal gasoline storage tank designed for submerged filling and equipped with coaxial vapor return is located at the Merwin Dam for refueling of facility vehicles. The maximum annual throughput is estimated at 50,000 gal.

- Gasoline Dispensing – Yale Dam. A 1,000-gal gasoline storage tank designed for submerged filling and equipped with coaxial vapor return is located at the Yale Dam for refueling of facility vehicles. The maximum annual throughput is estimated at 10,000 gal.

5.p Equipment/Activity Summary.

ID No.	Generating Equipment/Activity	Control Measure/Equipment
1	Lewis River Hatchery Downstream Emergency Generator Engine	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 100 hr/yr + emergency usage)
2	Lewis River Hatchery Upstream Emergency Generator Engine	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 100 hr/yr + emergency usage) EPA Tier 1
3	Merwin Dam Emergency Generator Engine	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 100 hr/yr + emergency usage)
4	Swift #1 Dam FSC Emergency Generator Engine	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 100 hr/yr + emergency usage) EPA Tier 2
5	Woodland Release Ponds Emergency Generator Engine	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 100 hr/yr + emergency usage) EPA Tier 3
6	Merwin Headquarters Emergency Generator Engine	Low ash fuel (propane) Limited operation - (≤ 100 hr/yr + emergency usage)
7	Speelyai Hatchery Emergency Generator Engine	Low ash fuel (propane) Limited operation - (≤ 100 hr/yr + emergency usage)
8	Yale Dam Emergency Generator Engine	Low ash fuel (propane) Limited operation - (≤ 100 hr/yr + emergency usage)

ID No.	Generating Equipment/Activity	Control Measure/Equipment
9	Swift #1 Dam Spillway Gate Emergency Generator Engine	Low ash fuel (propane) Limited operation - (≤ 100 hr/yr + emergency usage)
10	Camp Creek Radio Tower Generator Engine	Low ash fuel (propane) Limited operation - (≤ 1,200 hr/yr) EPA certification with 3-way catalyst
11	Marble Creek Radio Tower Generator Engine	Low ash fuel (propane) Limited operation - (≤ 1,200 hr/yr) EPA certification with 3-way catalyst
12	Swift Forest Camp Generator Engine #1	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 1,200 hr/yr) EPA Tier 4 Final
13	Swift Forest Camp Generator Engine #2	Ultra-low sulfur diesel (≤ 0.0015% S) Limited operation - (≤ 1,200 hr/yr) EPA Tier 4 Final
14	Merwin Hatchery Ozone Plant	1 ozone decomposer on headspace, 1 vertical stack from each of 2 stripping towers

6. EMISSIONS DETERMINATION

Emissions to the ambient atmosphere from the operations proposed in ADP Application CO-1069 consist of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) sulfur dioxide (SO_2), toxic air pollutants (TAPs), and hazardous air pollutants (HAPs).

Unless otherwise specified by SWCAA, actual emissions must be determined using the specified input parameter listed for each emission unit and the following hierarchy of methodologies:

(a) Continuous emissions monitoring system (CEMS) data;
(b) Source emissions test data (EPA reference method). When source emissions test data conflicts with CEMS data for the time period of a source test, source test data must be used;
(c) Source emissions test data (other test method); and
(d) Emission factors or methodology provided in this TSD.

6.a Lewis River Hatchery Downstream Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year on ultra-low sulfur diesel (≤0.0015% sulfur by weight). Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Lewis River Hatchery Downstream Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	465	horsepower
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	21.0	gal/hr
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor lb/hp-hr	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	0.031	14.42	3.60	AP-42 Table 3.3-1 (10/96)
CO	0.00668	3.11	0.78	AP-42 Table 3.3-1 (10/96)
VOC	0.0025141	1.17	0.29	AP-42 Table 3.3-1 (10/96)
SO_X as SO_2		0.0045	0.0011	Mass Balance
PM	0.0022	1.02	0.26	AP-42 Table 3.3-1 (10/96)
PM_{10}	0.0022	1.02	0.26	AP-42 Table 3.3-1 (10/96)
$PM_{2.5}$	0.0022	1.02	0.26	AP-42 Table 3.3-1 (10/96)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	73.96	1	163.05	22.50	118.13	40 CFR 98
CH_4	0.003	25	0.17	0.023	0.12	40 CFR 98
N_2O	0.0006	298	0.39	0.054	0.29	40 CFR 98
Total GHG - CO_2e			163.61	22.58	118.54	

6.b Lewis River Hatchery Upstream Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year on ultra-low sulfur diesel (≤0.0015% sulfur by weight). Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Lewis River Hatchery Upstream Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	755	horsepower
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	38.3	gal/hr (estimated)
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor g/hp-hr	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	6.86	11.42	2.85	Tier 1 Limit
CO	8.50	14.15	3.54	Tier 1 Limit
VOC	0.97	1.61	0.40	Tier 1 Limit
SO_X as SO_2		0.0083	0.0021	Mass Balance
PM	0.40	0.67	0.17	Tier 1 Limit
PM_{10}	0.40	0.67	0.17	Tier 1 Limit
$PM_{2.5}$	0.40	0.67	0.17	Tier 1 Limit

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	73.96	1	163.05	22.50	215.43	40 CFR 98
CH_4	0.003	25	0.17	0.023	0.22	40 CFR 98
N_2O	0.0006	298	0.39	0.054	0.52	40 CFR 98
Total GHG - CO_2e			163.61	22.58	216.17	

6.c Merwin Dam Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year on ultra-low sulfur diesel (≤0.0015% sulfur by weight). Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Merwin Dam Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	1,109	horsepower
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	56.3	gal/hr (estimated)
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	17.53	4.38	Caterpillar
CO	3.24	0.81	Caterpillar
VOC	0.60	0.15	Caterpillar
SO_X as SO_2	0.0122	0.0030	Mass Balance
PM	0.52	0.13	Caterpillar
PM_{10}	0.52	0.13	Caterpillar
$PM_{2.5}$	0.52	0.13	Caterpillar

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	73.96	1	163.05	22.50	316.45	40 CFR 98
CH_4	0.003	25	0.17	0.023	0.32	40 CFR 98
N_2O	0.0006	298	0.39	0.054	0.77	40 CFR 98
Total GHG - CO_2e			163.61	22.58	317.53	

6.d Swift #1 Dam FSC Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year on ultra-low sulfur diesel (≤0.0015% sulfur by weight). Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Swift #1 Dam FSC Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	900	horsepower
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	42.7	gal/hr (Caterpillar)
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor lb/hp-hr	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	0.0129	11.59	2.90	Caterpillar
CO	0.0011	0.95	0.24	Caterpillar
VOC	2.2E-05	0.020	0.0050	Caterpillar
SO_X as SO_2		0.0092	0.0023	Mass Balance
PM	7.7E-05	0.069	0.017	Caterpillar
PM_{10}	7.7E-05	0.069	0.017	Caterpillar
$PM_{2.5}$	7.7E-05	0.069	0.017	Caterpillar

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	73.96	1	163.05	22.50	240.20	40 CFR 98
CH_4	0.003	25	0.17	0.023	0.24	40 CFR 98
N_2O	0.0006	298	0.39	0.054	0.58	40 CFR 98
Total GHG - CO_2e			163.61	22.58	241.03	

6.e Woodland Release Ponds Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 200 hours per year on ultra-low sulfur diesel (≤0.0015% sulfur by weight). Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Woodland Release Ponds Emergency Generator Engine

Hours of Operation =	200	hours
Power Output =	188	horsepower (estimate at full standby load - engine capable of 230 hp)
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	10.0	gal/hr (Caterpillar)
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor lb/hp-hr	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	0.0066	1.23	0.12	Caterpillar
CO	0.0016	0.31	0.031	Caterpillar
VOC	0.0025141	0.47	0.047	AP-42 Table 3.3-1 (10/96)
SO_X as SO_2		0.0022	0.00022	Mass Balance
PM	0.0003	0.062	0.0062	Caterpillar
PM_{10}	0.0003	0.062	0.0062	Caterpillar
$PM_{2.5}$	0.0003	0.062	0.0062	Caterpillar

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	73.96	1	163.05	22.50	22.50	40 CFR 98
CH_4	0.003	25	0.17	0.023	0.02	40 CFR 98
N_2O	0.0006	298	0.39	0.054	0.05	40 CFR 98
Total GHG - CO_2e			163.61	22.58	22.58	

6.f Merwin Headquarters Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Merwin Headquarters Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	147	bhp
Fuel Consumption Rate =	12.7	gallons per hour
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	6,350	gallons per year

Pollutant	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	4.08	373.32	4.74	1.19	AP-42 Sec 3.2 (7/00) - 4 stroke LB
CO	0.317	29.01	0.37	0.092	AP-42 Sec 3.2 (7/00) - 4 stroke LB
VOC	0.118	10.80	0.14	0.034	AP-42 Sec 3.2 (7/00) - 4 stroke LB
SO_X as SO_2	0.01715	1.57	0.020	0.0050	Mass Balance
PM	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
PM_{10}	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
Acetaldehyde	0.00836	7.6E-01	9.7E-03	2.4E-03	AP-42 Sec 3.2 (7/00)
Acrolein	0.00514	4.7E-01	6.0E-03	1.5E-03	AP-42 Sec 3.2 (7/00)
Benzene	0.00044	4.0E-02	5.1E-04	1.3E-04	AP-42 Sec 3.2 (7/00)
Ethylbenzene	0.0000397	3.6E-03	4.6E-05	1.2E-05	AP-42 Sec 3.2 (7/00)
Methanol	0.0025	2.3E-01	2.9E-03	7.3E-04	AP-42 Sec 3.2 (7/00)
Toluene	0.00041	3.7E-02	4.7E-04	1.2E-04	AP-42 Sec 3.2 (7/00)
Xylene	0.00018	1.7E-02	2.1E-04	5.3E-05	AP-42 Sec 3.2 (7/00)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.05	12.52	39.74	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.048	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.12	40 CFR 98
Total GHG - CO_2e			136.61	12.57	39.90	

6.g Speelyai Hatchery Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Speelyai Hatchery Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	162	bhp
Fuel Consumption Rate =	14.0	gallons per hour
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	7,000	gallons per year

Pollutant	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	4.08	373.32	5.23	1.31	AP-42 Sec 3.2 (7/00) - 4 stroke LB
CO	0.317	29.01	0.41	0.10	AP-42 Sec 3.2 (7/00) - 4 stroke LB
VOC	0.118	10.80	0.15	0.038	AP-42 Sec 3.2 (7/00) - 4 stroke LB
SO_X as SO_2	0.01715	1.57	0.022	0.0055	Mass Balance
PM	0.00999	0.91	0.013	0.0032	AP-42 Sec 3.2 (7/00)
PM_{10}	0.00999	0.91	0.013	0.0032	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$	0.00999	0.91	0.013	0.0032	AP-42 Sec 3.2 (7/00)
Acetaldehyde	0.00836	7.6E-01	1.1E-02	2.7E-03	AP-42 Sec 3.2 (7/00)
Acrolein	0.00514	4.7E-01	6.6E-03	1.6E-03	AP-42 Sec 3.2 (7/00)
Benzene	0.00044	4.0E-02	5.6E-04	1.4E-04	AP-42 Sec 3.2 (7/00)
Ethylbenzene	0.0000397	3.6E-03	5.1E-05	1.3E-05	AP-42 Sec 3.2 (7/00)
Methanol	0.0025	2.3E-01	3.2E-03	8.0E-04	AP-42 Sec 3.2 (7/00)
Toluene	0.00041	3.7E-02	5.2E-04	1.3E-04	AP-42 Sec 3.2 (7/00)
Xylene	0.00018	1.7E-02	2.4E-04	5.9E-05	AP-42 Sec 3.2 (7/00)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.05	12.52	43.81	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.053	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.13	40 CFR 98
Total GHG - CO_2e			136.61	12.57	43.99	

6.h Yale Dam Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Yale Dam Emergency Generator Engine

Hours of Operation =	500	hours
Power Output =	147	bhp
Fuel Consumption Rate =	12.8	gallons per hour
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	6,400	gallons per year

Pollutant	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	4.08	373.32	4.78	1.19	AP-42 Sec 3.2 (7/00) - 4 stroke LB
CO	0.317	29.01	0.37	0.093	AP-42 Sec 3.2 (7/00) - 4 stroke LB
VOC	0.118	10.80	0.14	0.035	AP-42 Sec 3.2 (7/00) - 4 stroke LB
SO_X as SO_2	0.01715	1.57	0.020	0.0050	Mass Balance
PM	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
PM_{10}	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$	0.00999	0.91	0.012	0.0029	AP-42 Sec 3.2 (7/00)
Acetaldehyde	0.00836	7.6E-01	9.8E-03	2.4E-03	AP-42 Sec 3.2 (7/00)
Acrolein	0.00514	4.7E-01	6.0E-03	1.5E-03	AP-42 Sec 3.2 (7/00)
Benzene	0.00044	4.0E-02	5.2E-04	1.3E-04	AP-42 Sec 3.2 (7/00)
Ethylbenzene	0.0000397	3.6E-03	4.6E-05	1.2E-05	AP-42 Sec 3.2 (7/00)
Methanol	0.0025	2.3E-01	2.9E-03	7.3E-04	AP-42 Sec 3.2 (7/00)
Toluene	0.00041	3.7E-02	4.8E-04	1.2E-04	AP-42 Sec 3.2 (7/00)
Xylene	0.00018	1.7E-02	2.2E-04	5.4E-05	AP-42 Sec 3.2 (7/00)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.05	12.52	40.05	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.049	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.116	40 CFR 98
Total GHG - CO_2e			136.61	12.57	40.22	

6.i Swift #1 Dam Spillway Gate Emergency Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 500 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Swift #1 Spillway Gate Emergency Generator

Hours of Operation =	500	hours
Power Output =	113	bhp
Fuel Consumption Rate	3.1	gallons per hour
Propane Heat Content	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	1,571	gallons per year

Pollutant	Emission Factor g/KW-hr	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	8.33	5.37	490.94	1.54	0.39	Power Systems International
CO	29.61	19.07	1745.09	5.48	1.37	Power Systems International
VOC	1.330	0.857	78.38	0.25	0.06	Power Systems International
SO_X as SO_2		0.01715	1.57	0.00	0.0012	Mass Balance
PM		0.00999	0.91	0.0029	0.0007	AP-42 Sec 3.2 (7/00)
PM_{10}		0.00999	0.91	0.0029	0.0007	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$		0.00999	0.92	0.0029	0.0007	AP-42 Sec 3.2 (7/00)
Acetaldehyde		0.00836	7.6E-01	2.4E-03	6.0E-04	AP-42 Sec 3.2 (7/00)
Acrolein		0.00514	4.7E-01	1.5E-03	3.7E-04	AP-42 Sec 3.2 (7/00)
Benzene		0.00044	4.0E-02	1.3E-04	3.2E-05	AP-42 Sec 3.2 (7/00)
Ethylbenzene		0.0000397	3.6E-03	1.1E-05	2.9E-06	AP-42 Sec 3.2 (7/00)
Methanol		0.0025	2.3E-01	7.2E-04	1.8E-04	AP-42 Sec 3.2 (7/00)
Toluene		0.00041	3.7E-02	1.2E-04	2.9E-05	AP-42 Sec 3.2 (7/00)
Xylene		0.00018	1.7E-02	5.3E-05	1.3E-05	AP-42 Sec 3.2 (7/00)
			HAP/TAP Total =	4.9E-03		

Greenhouse	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	
CO_2	61.71	1	136.05	12.52	9.83	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.012	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.028	40 CFR 98
Total GHG - CO_2e			136.61	12.57	9.87	

6.j Camp Creek Radio Tower Generator Engine (*existing*). Potential annual emissions from engine operation are calculated based on operation at full load for up to 1,200 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Camp Creek Radio Tower Generator Engine 4-stroke rich-burn engine

Hours of Operation =	1,200	hours
Power Output =	72	bhp
Fuel Consumption Rate =	6.76	gallons per hour (246 scfh - Kohler)
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	8,110	gallons per year

Pollutant	Emission Factor g/kW-hr	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	0.07	0.01	1.23	0.0083	0.0050	Kohler
CO	0.59	0.11	10.33	0.070	0.042	Kohler
VOC	0.07	0.01	1.23	0.008	0.0050	Kohler
SO_X as SO_2		0.01715	1.57	0.011	0.0064	Mass Balance
PM		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
PM_{10}		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
1,1,2,2-Tetrachloroethane		0.0000253	2.3E-03	1.6E-05	9.4E-06	AP-42 Sec 3.2 (7/00)
Acetaldehyde		0.00279	2.6E-01	1.7E-03	1.0E-03	AP-42 Sec 3.2 (7/00)
Acrolein		0.00263	2.4E-01	1.6E-03	9.8E-04	AP-42 Sec 3.2 (7/00)
Benzene		0.00158	1.4E-01	9.8E-04	5.9E-04	AP-42 Sec 3.2 (7/00)
Formaldehyde		0.0205000	1.9E+00	1.3E-02	7.6E-03	AP-42 Sec 3.2 (7/00)
Methylene Chloride		0.0000412	3.8E-03	2.5E-05	1.5E-05	AP-42 Sec 3.2 (7/00)
Toluene		0.000558	5.1E-02	3.5E-04	2.1E-04	AP-42 Sec 3.2 (7/00)
Xylene		0.000195	1.8E-02	1.2E-04	7.2E-05	AP-42 Sec 3.2 (7/00)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.05	12.52	50.75	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.062	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.147	40 CFR 98
Total GHG - CO_2e			136.61	12.57	50.96	

6.k Marble Creek Radio Tower Generator Engine (*existing*). Potential emissions from engine operation are calculated based on operation at full load for up to 1,200 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Marble Creek Radio Tower Generator Engine 4-stroke rich-burn engine

Hours of Operation =	1,200	hours
Power Output =	72	bhp
Fuel Consumption Rate =	6.76	gallons per hour (246 scfh - Kohler)
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	185	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	8,110	gallons per year

Pollutant	Emission Factor g/kW-hr	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	0.07	0.013	1.23	0.008	0.0050	Kohler
CO	0.59	0.11	10.33	0.070	0.0419	Kohler
VOC	0.07	0.013	1.23	0.008	0.0050	Kohler
SO_X as SO_2		0.01715	1.57	0.011	0.0064	Mass Balance
PM		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
PM_{10}		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$		0.0194	1.78	0.012	0.0072	AP-42 Sec 3.2 (7/00)
1,1,2,2-Tetrachloroethane		0.0000253	2.3E-03	1.6E-05	9.4E-06	AP-42 Sec 3.2 (7/00)
Acetaldehyde		0.00279	2.6E-01	1.7E-03	1.0E-03	AP-42 Sec 3.2 (7/00)
Acrolein		0.00263	2.4E-01	1.6E-03	9.8E-04	AP-42 Sec 3.2 (7/00)
Benzene		0.00158	1.4E-01	9.8E-04	5.9E-04	AP-42 Sec 3.2 (7/00)
Formaldehyde		0.0205000	1.9E+00	1.3E-02	7.6E-03	AP-42 Sec 3.2 (7/00)
Methylene Chloride		0.0000412	3.8E-03	2.5E-05	1.5E-05	AP-42 Sec 3.2 (7/00)
Toluene		0.000558	5.1E-02	3.5E-04	2.1E-04	AP-42 Sec 3.2 (7/00)
Xylene		0.000195	1.8E-02	1.2E-04	7.2E-05	AP-42 Sec 3.2 (7/00)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.05	12.52	50.75	40 CFR 98
CH_4	0.003	25	0.17	0.015	0.062	40 CFR 98
N_2O	0.0006	298	0.39	0.036	0.15	40 CFR 98
Total GHG - CO_2e			136.61	12.57	50.96	

6.l Swift Forest Camp Generator Engine #1 (*existing*). Potential emissions from engine operation are calculated based on operation at full load for up to 1,200 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Swift Forest Camp Generator

Hours of Operation =	1200	hours
Power Output =	40.2	bhp
Fuel Consumption Rate =	2.1	gallons per hour
Diesel Density	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Heat Content =	0.2898	MMBtu/hr
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor g/kW-hr	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NOX	3.39	0.773	0.000107	0.224	0.134	GENERAC
CO	0.02	0.005	0.000001	0.001	0.001	GENERAC
VOC	0.03	0.007	0.000001	0.002	0.001	GENERAC
SOX as SO_2		0.0016	0.0000002	0.0005	0.0003	Mass Balance
PM	0.03	0.007	0.000001	0.002	0.001	GENERAC
PM_{10}	0.03	0.007	0.000001	0.002	0.001	GENERAC
$PM_{2.5}$	0.03	0.007	0.000001	0.002	0.001	GENERAC

Greenhouse	kg/MMBtu	GWP	CO2e lb/MMBtu	CO2e lb/gallon	tpy, CO2e	Emission Factor Source
CO_2	73.96	1	163.054	22.501	28.352	40 CFR 98
CH_4	0.003	25	0.165	0.023	0.029	40 CFR 98
N_2O	0.0006	298	0.394	0.054	0.069	40 CFR 98
Total GHG - CO2e			163.613	22.579	28.45	

6.m Swift Forest Camp Generator Engine #2 (*new*). Potential emissions from engine operation are calculated based on operation at full load for up to 1,200 hours per year. Actual emissions will be calculated based on actual hours of operation and the emission factors identified below unless new emission factors are provided by the manufacturer or developed through source testing.

Swift Forest Camp Generator

Hours of Operation =	1200	hours
Power Output =	40.2	bhp
Fuel Consumption Rate =	2.1	gallons per hour
Diesel Density	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Heat Content =	0.2898	MMBtu/hr
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor g/kW-hr	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NOX	3.39	0.773	0.000107	0.224	0.134	GENERAC
CO	0.02	0.005	0.000001	0.001	0.001	GENERAC
VOC	0.03	0.007	0.000001	0.002	0.001	GENERAC
SOX as SO_2		0.0016	0.0000002	0.0005	0.0003	Mass Balance
PM	0.03	0.007	0.000001	0.002	0.001	GENERAC
PM_{10}	0.03	0.007	0.000001	0.002	0.001	GENERAC
$PM_{2.5}$	0.03	0.007	0.000001	0.002	0.001	GENERAC

Greenhouse	kg/MMBtu	GWP	CO2e lb/MMBtu	CO2e lb/gallon	tpy, CO2e	Emission Factor Source
CO_2	73.96	1	163.054	22.501	28.352	40 CFR 98
CH_4	0.003	25	0.165	0.023	0.029	40 CFR 98
N_2O	0.0006	298	0.394	0.054	0.069	40 CFR 98
Total GHG - CO2e			163.613	22.579	28.45	

6.n Merwin Hatchery Ozone Plant (*existing*). Ozone is emitted from the two decomposer stacks and the stacks of the two stripping towers. The plant is online and operating except when it is necessary to take it off-line for maintenance. After disinfection, all residual ozone is stripped from the water. WDFW operators indicate that they target a residual ozone concentration upstream of the stripping towers between 0.04 and 0.08 ppm 0 ppm downstream of the stripping towers. For the purposes of calculating maximum potential emissions, a residual concentration of 0.17 ppm was assumed because this was the original design target. Ozone emissions from the stripping towers are calculated using a straight mass balance.

Maximum potential emissions were calculated using the assumption that ozone is produced at the full rated capacity of 100 pounds per day, 50% of the ozone generated is adsorbed into the water, and an estimated O_2 to O_3 conversion efficiency of 3% (an estimated range of 2% - 3% for compressed air systems was provided during a phone conversation with an industry expert in 2012).

Merwin Ozone Plant (each of two identical O_3 generators, each rated at 100 lbs/day)		
Maximum Air Usage =	133	scfm
Maximum Oxygen Usage =	27.9	scfm
	2.3	lb/min
	139	lb/hr
	3,333	lb/day
O_2 to O_3 Conversion Efficiency =	3.0%	(2% - 3% estimated)
Maximum O_3 Production =	100	lb/day
Maximum O_3 Production =	4.17	lb/hr
Fraction of Ozone Adsorbed into Water =	50%	
Max. Ozone Residual Before Stripping Towers =	0.17	ppm (runs 0.04 to 0.08 typically)
Water Flow =	2,500	gallons per minute
Annual Quantity of Water Treated =	1,314,000,000	gallons
Annual Quantity of Air Used =	70,038,377	ft^3 air
Decomposer Efficiency =	95%	
Maximum Ozone Emissions From Decomosers =	0.10	lb/hr (assumes no reaction in water)
Ozone Emissions From Decomosers =	**913**	lb/yr
Maximum Ozone Emissions From Stripping Towers =	0.21	lb/hr
Ozone Emissions From Stripping Towers =	**1,863**	lb/yr
Total Ozone Emissions =	**2,775**	lb/yr

Emissions must be calculated using the emission factors identified above unless new emission factors from a manufacturer or vendor are provided or new emission factors are developed through source testing.

6.o Emissions Summary/Facility-wide Potential to Emit. Facility-wide potential to emit as calculated in the sections above is summarized below.

Pollutant	Potential Emissions (tpy)	Project Increase (tpy)
NO_X	18.31	+0.13
CO	7.14	0.00
VOC	1.08	0.00
SO_2	0.04	0.00
Lead	0.00	0.00
PM	0.60	0.00
PM_{10}	0.60	0.00
$PM_{2.5}$	0.60	0.00
O_3	1.39	0.00
TAP	0.04	0.00
HAP	0.04	0.00
CO_2e	1,212	+131

Pollutant	CAS Number	Category	Facility-wide Emissions (lb/yr)	Project Increase (lb/yr)	WAC 173-460 SQER (lb/yr)
1,1,2,2-Tetrachloroethane	79-34-5	HAP/TAP B	0.04	0.0	1,750
Acetaldehyde	75-07-0	HAP/TAP A	20.9	0.0	50
Acrolein	107-02-8	HAP/TAP B	14.2	0.0	175
Benzene	71-43-2	HAP/TAP A	3.2	0.0	20
Ethylbenzene	100-41-4	HAP/TAP B	0.08	0.0	43,748
Formaldehyde	50-00-0	HAP/TAP A	30.4	0.0	20
Methanol	67-56-1	HAP/TAP B	5.0	0.0	43,748
Methylene Chloride	75-09-2	HAP/TAP A	0.06	0.0	50
Toluene	108-88-3	HAP/TAP B	1.6	0.0	43,748
Xylene	1330-20-7	HAP/TAP B	0.6	0.0	43,748

7. REGULATIONS AND EMISSION STANDARDS

Regulations that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the regulations, codes, or requirements listed below.

7.a 40 CFR 60 Subpart IIII "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" applies to each compression ignition (CI) internal combustion engine (ICE) that commences construction after July 11, 2005, and is manufactured after April 1, 2006, or that is modified or reconstructed after July 11, 2005. This regulation is applicable to the Swift #1 Dam FSC Caterpillar Emergency Generator Engine, the Woodland Release Ponds Emergency Generator Engine, and the Swift Camp Generator Engines.

7.b 40 CFR 60 Subpart JJJJ "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines" established point of manufacture and operating requirements for stationary spark ignition engines. This regulation applies to spark ignition engines that commence construction or modification after June 12, 2006 or were manufactured on or after various dates as early as July 1, 2007. The applicable

date depends on whether the engine is rich-burn or lean-burn, the engine horsepower, the type of fuel, and whether the manufacturer participated in a voluntary certification program. This regulation is applicable to the Swift #1 Dam FSC Caterpillar Emergency Generator Engine, Camp Creek Radio Tower Generator Engine, and the Marble Creek Radio Tower Generator Engine.

7.c 40 CFR 63 Subpart ZZZZ "National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines" establishes national emission limitations and operating limitations for HAP emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This regulation is applicable to all stationary engines at the facility. The Swift #1 Dam Caterpillar Emergency Generator Engine and the Woodland Release Ponds Emergency Generator Engine are "new" diesel engines at an area source. They comply by complying with 40 CFR 60 Subpart IIII. The Camp Creek Radio Tower Generator Engine, the Marble Creek Radio Tower Generator Engine, and the Swift Camp Generator Engines are classified as new spark ignition engines at an area source. They comply by complying with 40 CFR 60 Subpart JJJJ. The remainder of the engines are classified as existing engines at an area source. They comply by complying with applicable provisions of 40 CFR 63 Subpart ZZZZ.

7.d Revised Code of Washington (RCW) 70A.15.2040 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess.

7.e RCW 70A.15.2210 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an Air Discharge Permit for installation and establishment of an air contaminant source.

7.f WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" requires Best Available Control Technology for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety. SWCAA implements WAC 173-460.

7.g WAC 173-476 "Ambient Air Quality Standards" establishes ambient air quality standards for PM_{10}, $PM_{2.5}$, lead, sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide in the ambient air, which shall not be exceeded.

7.h SWCAA 400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust.

7.i SWCAA 400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of SWCAA 400-040 be met and that no person shall cause or permit the emission of particulate matter from any combustion or incineration unit in excess of 0.23 grams per dry cubic meter (0.1 grains per dry standard cubic foot) of exhaust gas at standard conditions.

7.j SWCAA 400-060 "Emission Standards for General Process Units" prohibits particulate matter emissions from all new and existing process units in excess of 0.1 grains per dry standard cubic foot of exhaust gas.

7.k SWCAA 400-109 "Air Discharge Permit Applications" requires that an Air Discharge Permit application be submitted for all new installations, modifications, changes, or alterations to process and emission control equipment consistent with the definition of "new source". Sources wishing to modify existing permit terms may submit an Air Discharge Permit application to request such changes. An Air Discharge Permit must be issued, or written confirmation of exempt status must be received, before beginning any actual construction, or implementing any other modification, change, or alteration of existing equipment, processes, or permits.

7.l SWCAA 400-110 "New Source Review" requires that SWCAA issue an Air Discharge Permit in response to an Air Discharge Permit application prior to establishment of the new source, emission unit, or modification.

7.m SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source shall be granted unless it is evidenced that:

(1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
(2) Best Available Control Technology will be employed for all air contaminants to be emitted by the proposed equipment;
(3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
(4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate Best Available Control Technology (BACT) for the types and amounts of air contaminants emitted by the processes as described below:

New BACT Determinations

8.a BACT Determination – Swift Forest Camp Generator Engines. The proposed use of an EPA Tier certified engine design and ultra-low sulfur distillate fuel (less than 0.0015% sulfur by weight) has been determined to meet the requirements of BACT for the generator engines at this facility.

Previous BACT Determinations

8.b BACT Determination – Swift #1 Spillway Gate Dam Emergency Generator Engine (ADP 21-3453). SWCAA expects that the most cost-effective means of emission control for propane-fired generator engines in this size range is to purchase EPA certified engines. The proposed engine is EPA part 90 Phase 1 certified and potential emissions are relatively minor (< 2.0 tons per year of all air pollutants combined), therefore SWCAA determined that no additional controls are necessary to meet the requirements of BACT.

8.c BACT Determination – Camp Creek and Marble Creek Generator Engines (ADP 18-3309). SWCAA expects that the most cost-effective means of emission control for propane-fired generator engines in this size range is to purchase EPA certified engines. The Camp Creek Radio Tower Emergency Generator

Engine and the Marble Creek Radio Tower Emergency Generator Engine are EPA certified for prime service and potential emissions are relatively minor (< 0.1 tons per year of all air pollutants, both units combined), therefore SWCAA determined that no additional controls are necessary to meet the requirements of BACT.

8.d BACT Determination – Woodland Release Ponds Emergency Generator Engine (ADP 18-3309). Available control measures for new diesel engines include engine design, the use of ultra-low sulfur fuel, and add-on control equipment such as selective catalytic reduction (SCR) units and oxidation catalysts. SWCAA believes that SCR is not feasible for this unit based on a combination of cost and practicality (most operation will be short-term and intermittent). SWCAA determined that an oxidation catalyst is not a cost-effective control for CO, VOC, and PM for new or relatively small emergency engines.

The use of modern diesel-fired engine design meeting the relevant EPA emission standard for the new engine as applicable, the use of ultra-low sulfur diesel fuel (≤ 0.0015% sulfur by weight), limitation of visible emissions to 5% opacity or less, and limitation of engine operation to maintenance checks, readiness testing, and emergency use was determined to meet the requirements of BACT for the types and quantities of air contaminants emitted. The use of ultra-low sulfur fuel is also required by 40 CFR 60 Subpart IIII for "new" engines.

8.e BACT Determination – Merwin Hatchery Ozone Plant (SWCAA 15-3125). The primary source of uncontrolled emissions is the venting of the headspace over the ozone contactor. The ozone decomposer used to control emissions from this area represents the highest level of control available and therefore meets the requirements of BACT.

The remaining ozone emissions come from stripping residual ozone from the treated water prior to use. The primary method of minimizing these emissions is to maintain the lowest safe level of residual ozone in the water. This facility already monitors the residual ozone and uses these values to regulate the amount of ozone produced.

The residual ozone must be stripped to protect the fish being raised at the hatchery. SWCAA was not able to find any examples of ozone emission control being used on stripping tower exhausts at a hatchery. Commercial/industrial scale ozone destruction units utilize a metal-based catalyst that is inactivated by liquid water. For this reason, the gas would need to be heated slightly before contact with the catalyst to assure the relatively humidity is safely below 100%. Enercon's ozone decomposers were reviewed for this application but were eliminated from the analysis because they are not designed for wet gas streams or outside use. The only commercial/industrial scale ozone decomposers SWCAA found reference to are manufactured by Ozone Solutions.

The airflow through the towers is unknown, but assuming a relatively modest stack exhaust velocity of 12 feet per second, SWCAA estimated that this application would require 10 of the largest units (450 cfm capacity at a cost of $11,500 each). Based on EPA's Control Cost Manual (January 2002), the total capital cost of a baghouse system (the most analogous type of control equipment), the total capital investment is expected to be 2.19 times the purchased equipment costs. Assuming that the delivered cost of new units, including sales tax, is $115,000, then the total capital cost would be $251,850. Assuming an 8% cost of capital, a 20-year equipment life, a $10,000 per year maintenance cost, maximum potential emissions, and an aggregate control efficiency of 90%, the cost of control is $38,000 per ton of ozone controlled. Considering the fact that SWCAA is unaware of any other hatchery controlling ozone emissions from

water stripping and the relatively high cost of control, SWCAA has determined that no additional controls represent BACT for this source.

8.f BACT Determination – Emergency Generator Engines (SWCAA 10-2939). Limited hours of operation (500 hr/yr for the two Lewis River Hatchery engines, the Merwin Headquarters engine, and the diesel-fired Swift #1 Dam engine) and the use of ultra-low sulfur (≤15 ppmw) diesel fuel was determined to meet the requirements of BACT for the types and quantities of air contaminants emitted from the emergency generator engines.

8.g BACT Determination – Emergency Generator Engines – Propane (SWCAA 10-2939). Limited hours of operation (500 hr/yr) and the use of propane, a low-sulfur fuel (15 gr/100 ft^3 or approximately 180 ppmw) was determined to meet the requirements of BACT for all of the proposed propane-fired emergency generator engines.

8.h BACT Determination – Emergency Generator Engine – Diesel (SWCAA 02-2401). Limited hours of operation (1,200 hr/yr) and the use of low-sulfur (≤500 ppmw) diesel fuel was determined to meet the requirements of BACT for the types and quantities of air contaminants emitted from the Merwin Dam emergency generator engine.

Other Determinations

8.i Prevention of Significant Deterioration (PSD) Applicability Determination: The potential to emit of this facility is less than applicable PSD applicability thresholds. Likewise, this permitting action will not result in a potential increase in emissions equal to or greater than the PSD thresholds. Therefore, PSD review is not applicable to this action.

8.j Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is not applicable to any emission unit at this facility because it is not a major source and is not required to obtain a Part 70 permit.

9. AMBIENT IMPACT ANALYSIS

9.a TAP Small Quantity Review. The new equipment and modifications proposed in ADP Application CO-1069 will not affect the type or quantity of TAP emissions from permitted operations at this facility.

Conclusions

9.b Installation of a new generator, as proposed in ADP Application CO-1069, will not cause the ambient air quality requirements of Title 40 Code of Federal Regulations (CFR) Part 50 "National Primary and Secondary Ambient Air Quality Standards" to be violated.

9.c Installation of a new generator, as proposed in ADP Application CO-1069, will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" or WAC 173-476 "Ambient Air Quality Standards" to be violated.

9.d Installation of a new generator, as proposed in ADP Application CO-1069, will not cause a violation of emission standards for sources as established under SWCAA General Regulations Sections 400-040

"General Standards for Maximum Emissions," 400-050 "Emission Standards for Combustion and Incineration Units," and 400-060 "Emission Standards for General Process Units."

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue ADP 23-3578 in response to ADP Application CO-1069. ADP 23-3578 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

10.a Supersession of Previous Permits. ADP 23-3578 supersedes ADP 22-3516 in its entirety.

10.b General Basis. Permit requirements for equipment affected by this permitting action incorporate the operating schemes proposed by the applicant in ADP Application CO-1069. Permit requirements established by this action are intended to implement BACT, minimize emissions, and assure compliance with applicable requirements on a continuous basis. Emission limits for approved equipment are based on the maximum potential emissions calculated in Section 6 of this Technical Support Document.

10.c Monitoring and Recordkeeping Requirements. ADP 23-3578 establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements. Specific requirements are established for hours of engine operation, the sulfur content of diesel fuel, and operating parameters of the Merwin Hatchery ozone plant.

10.d Reporting Requirements. ADP 23-3578 establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for hours of engine operation and operating parameters of the Merwin Hatchery ozone plant. Reports are to be submitted on an annual basis.

10.e Generator Engines (*existing/new*). Annual emission limits for the Camp Creek Radio Tower, Marble Creek Radio Tower, and the Swift Camp Generator engines were established with the assumption that each engine could operate at maximum load for up to 1,200 hours per year. Emissions inventory reports indicate that actual engine operation has been approximately 100 – 600 hours per year in recent years.

Visual emissions from diesel fired emergency generator engines were limited to 5% opacity and visual emissions from the propane fired generator engines were limited to 0% opacity because greater opacity levels would only be expected from a unit in need of servicing. The opacity limit for diesel fired engines applies only after the engine has reached normal operating temperature, or after 15 minutes of operation, whichever is sooner.

BACT for the diesel engines requires the use of ultra-low sulfur ($\leq$ 0.0015% S by weight) diesel. The permit allows the use of "#2 diesel or better." In this case "or better" includes road-grade diesel fuel with lower sulfur content, biodiesel, and mixtures of biodiesel and road-grade diesel that meet the definition of "diesel" and contain no more than 0.0015% sulfur by weight.

10.f Merwin Hatchery Ozone Plant (*existing*). Permit limits for the Merwin Hatchery Ozone Plant represent BACT and emission levels that are not expected to cause or contribute to a violation of the ambient air quality standards for ozone. At maximum capacity, the ozone decomposer will need to operate at

approximately 95% control efficiency to meet the permit limit. Based on SWCAA's experience with ozone decomposers and manufacturer information, this is easily achievable.

To minimize the impact of emissions on ambient air quality, the exhausts from the Merwin Hatchery Ozone plant are required to be exhausted vertically. Any device that obstructs or prevents vertical discharge (such as a traditional rain cap) is prohibited. This is good engineering practice and is required by SWCAA 400-200(1). The new engines do not meet the vertical exhaust configuration required for new emission units however SWCAA has determined that it is not necessary to re-configure the exhausts to protect ambient air quality.

The primary way to control ozone emissions from the stripping towers is to place a reasonable limit on the residual ozone that needs to be stripped from the water. Tacoma Power has indicated that a minimum of 0.17 ppm residual is necessary to assure proper disinfection at their Cowlitz Trout Ozone Plant. Operators at the Merwin Hatchery indicated that 0.17 ppm is an older standard and that they target a residual ozone concentration of 0.04 to 0.08 ppm based on the recommendations from their ozone equipment service contractor. From this information SWCAA has conservatively assumed that targeting an annual average maximum of 0.17 ppm would provide adequate disinfection margin while providing adequate protection of ambient air quality.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

11.a Start-up and Shutdown Provisions. Pursuant to SWCAA 400-081 "Start-up and Shutdown", technology based emission standards and control technology determinations shall take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, SWCAA shall include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

Diesel Engines. Diesel engines may exhibit higher than normal opacity during startup. Accordingly, the visual emissions limit for diesel engine power units is not applicable during startup periods as defined in the permit. General opacity standards continue to apply.

11.b Alternate Operating Scenarios. SWCAA conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were included in the permit requirements.

11.c Pollution Prevention Measures. SWCAA conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or SWCAA separate or in addition to those measures required under BACT considerations. Therefore, none were included in the permit requirements.

12. EMISSION MONITORING AND TESTING

The emergency generator engines are permitted only for intermittent use. No add-on control devices are required to comply with the emission limits and total potential emissions are relatively minor so initial or periodic emission testing is not required. Potential emissions from the Camp Creek Radio Tower, Marble Creek Radio Tower, and

the Swift Camp Generator Engines are relatively minor even without add-on control devices so no initial or periodic emission testing was required for those units.

Ozone emissions from the Merwin Hatchery ozone decomposer are expected to be minimal if the catalyst is active. Because the catalyst can be deactivated by liquid water and is located on the roof of the building, it seems reasonable that a test to determine the catalyst activity should be conducted periodically. The permit requires one of these tests to be between October 15th and November 30th of each year to correspond with the time period during which cooling ambient temperatures would be more likely to cause water condensation upstream of the catalyst, thereby deactivating the catalyst, if the catalyst heater failed.

If the measured concentration exceeds 200 ppm, the Permittee must either determine the mass emission rate for comparison with the permitted emission limits or replace the catalyst. The mass emission rate can be determined by measuring or otherwise determining the exhaust flow rate from the decomposer vent and combining this information with the ozone concentration measurement.

At the design decomposer flow rate of 100 cfm, the ozone concentration that correlates with the permitted emission limit is approximately 139 ppm, and the concentration corresponding to no control at full operating capacity is approximately 2,800 ppm. To allow for a slightly lower gas flow, a trigger concentration of 200 ppm was established. At this concentration the catalyst would need to be operating at 70% to 80% control efficiency even at operating rates more representative of normal operation (17 cfm are at ~14 psig). A catalyst failure is likely to cause the ozone concentration to greatly exceed 200 ppm.

13. FACILITY HISTORY

13.a. General History. The two gasoline storage tanks at this facility were permitted in 1990. The Merwin Dam emergency generator engine was permitted in 2002. As part of the facility inspection in 2006, it was determined that additional emergency generator engines were installed. After the issuance of ADP 10-2939, the Camp Creek Radio Tower Emergency Generator Engine, the Marble Creek Radio Tower Emergency Generator Engine, and the original two Swift Camp Generator Engine were installed without New Source Review. In 2012, the existence of the Merwin Hatchery Ozone Plant came to SWCAA's attention. ADP Application CO-944 was submitted to address these "new" units. The Camp Creek Radio Tower Generator Engine and the Marble Creek Radio Tower Generator Engines were added in 2017 after it was found that there were significant periods of time when the solar electric systems were unable to provide sufficient electricity to run the sites. ADP Application CO-999 was submitted in 2018 requesting approval for three replacement units and a new unit at the Woodland release ponds.

13.b Previous Permitting Actions. SWCAA has previously issued the following Permits for this facility:

Date	Application Number	Permit Number	Purpose
6/9/2022	CO-1049	22-3516	Replacement of two existing engine driven generators at Swift Forest Camp with one unit of similar capacity and configuration.

Date	Application Number	Permit Number	Purpose
2/18/2021	CO-1033	21-3453	Replacement of existing propane fired generator located at Swift Forest Campground with two diesel fired Generac generators. Replacement of emergency generator at the Swift Dam spillway gate with a generator of similar size and fuel type. Superseded by ADP 22-3516.
10/18/2018	CO-999	18-3309	Approval to operate three propane fired generators (Camp Creek, Marble Creek, and Swift Forest Camp) and one diesel fired generator (Woodland Release Ponds). Superseded by ADP 21-3453.
3/9/2015	CO-944	15-3125	Approval to operate four propane-fired generators (one at the Camp Creek Radio Tower, one at the Marble Creek Radio Tower, and two at Swift Forest Camp). Approval to operate an ozone plant at the Merwin Hatchery. Superseded by ADP 18-3309.
7/6/2010	CL-1849	10-2939	Approval for nine emergency generators (Lewis River Hatchery Downstream, Lewis River Hatchery Upstream, Merwin Headquarters, Yale Dam, Swift #1 Dam FSC, Swift #1 Dam Spillway, Swift Forest Camp #1, Swift Forest Camp #2, and Yale Microwave). Superseded by ADP 15-3125.
4/9/2002	CO-719	02-2401	Approval for diesel-fired emergency generator engine at Merwin Dam. Superseded by ADP 10-2939.
4/30/1990	CO-404	90-1204	Approval for gasoline storage tank at Yale Dam. Superseded by ADP 10-2939.
4/30/1990	CO-403	90-1203	Approval gasoline and diesel storage tanks at Merwin Dam. Superseded by ADP 10-2939.

13.c Compliance History. A search of source records on file at SWCAA did not identify any outstanding compliance issues at this facility.

14. PUBLIC INVOLVEMENT OPPORTUNITY

14.a Public Notice for ADP Application CO-1069. Public notice for ADP Application CO-1069 was published on the SWCAA internet website for a minimum of (15) days beginning on April 18, 2023.

14.b Public/Applicant Comment for ADP Application CO-1069. SWCAA did not receive specific comments, a comment period request or any other inquiry from the public regarding this ADP application. Therefore no public comment period was provided for this permitting action.

14.c State Environmental Policy Act. This project is exempt from SEPA requirements pursuant to WAC 197-11-800(3) since it only involves repair and/or maintenance of existing structures, equipment or facilities, and will not involve material expansions or changes in use. SWCAA issued a Determination of SEPA Exempt (SWCAA 23-019) concurrent with issuance of ADP 23-3578.