Statement of Basis

Permit to Construct No. P-2018.0003
Project ID 61987

St. Luke's MOB - 27th Development
Boise, Idaho

Facility ID 001-00350

Final

May 21, 2018
Will Tiedemann
Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GACT	Generally Available Control Technology
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
HHV	higher heating value
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PCB	polychlorinated biphenyl

PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTE	potential to emit
PW	process weight rate
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TEQ	toxicity equivalent
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

St. Luke's Health System (SLHS) is proposing to construct a new orthopedic Medical Office Building (MOB) located on the corner of Fairview and 27th Street in Boise, Idaho. Emission sources will consist of two Cleaver Brooks dual fire boilers, one Caterpillar diesel-fired emergency engine generator, one water cooling tower with 2 fans. The two dual-fuel boilers will be located in a mechanical room in the Orthopedic MOB on the northeast corner of the facility. The diesel-fired emergency engine generator and water cooling tower will be located in the mechanical yard on the south-eastern corner of the facility.

Permitting History

This is the initial PTC for a new facility thus there is no permitting history.

Application Scope

This permit is the initial PTC for this facility. The applicant has proposed to install and operate two Cleaver Brooks dual fire boilers, one Caterpillar diesel-fired emergency engine generator, one water cooling tower with 2 fans.

Application Chronology

January 5, 2018	DEQ received an application and an application fee.
January 22 – February 6, 2018	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
February 5, 2018	DEQ determined that the application was complete.
March 08, 2018	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 26, 2018	DEQ made available the draft permit and statement of basis for applicant review.
April 9 – May 9, 2018	DEQ provided a public comment period on the proposed action.
April 4, 2018	DEQ received the permit processing fee.
May 21, 2018	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
2	Emissions Unit Name: Boiler 1 Manufacturer: Cleaver Brooks Model: CBEX Elite Manufacture Date: 2018 Heat input rating: 20.22 MMBtu/hr Fuel: Natural Gas (primary) Distillate fuel oil: ULSD (backup)	None	Exit height: 54.83 ft (16.71 m) Exit diameter: 2ft (0.61 m) Exit flow rate: 5,024 acfm Exit temperature: 371.93 °F (188.85 °C)
	Emissions Unit Name: Boiler 2 Manufacturer: Cleaver Brooks Model: CBEX Elite Manufacture Date: 2018 Heat input rating: 20.22 MMBtu/hr Fuel: Natural Gas (primary) Distillate fuel oil: ULSD (backup)	None	Exit height: 54.83 ft (16.71 m) Exit diameter: 2ft (0.61 m) Exit flow rate: 5,024 acfm Exit temperature: 371.93 °F (188.85 °C)
3	Emissions Unit Name: Emergency IC Engine Manufacturer: Caterpillar Model: C32 Manufacture Date: 2017 Rating: 1,474 bhp Fuel: Distillate fuel oil: ULSD	Tier 2 technologies	Exit height: 11.33 ft (3.45 m) Exit diameter: 5.37ft (1.64 m) Exit flow rate: 6,813 acfm Exit temperature: 890.33 °F (476.85 °C)
4	Emissions Unit Name: Cooling Tower 1 Manufacturer: Evapco Model: USS 224-4M18 Max Flow Rate: 2400 gpm TDS Content: 2,400 mg/L	Drift Eliminators	Exit height: 36 ft (10.97 m) Exit diameter: 12ft (3.66 m) Exit flow rate: 146,337 acfm Exit temperature: 76.73 °F (24.85 °C)

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit an emission inventory was developed for the operation of two Cleaver Brooks dual fire boilers, one Caterpillar diesel-fired emergency engine generator, and one water cooling tower (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant, HAP PTE were based on emission factors from AP-42, manufacturer performance data, and 8760 hours per year for the cooling towers and 100 hours per year for the emergency engines. However, only one boiler may operate at one time, except when one boiler is combusting ULSD as fuel for testing purposes; the other boiler may combust natural gas. Additionally, each boiler is only permitted to combust ULSD for a maximum of 48 hours per year thus, collectively between the two boilers; natural gas may be combusted for 8712 hours per year. This operating scenario is applicant purposed in order to comply with 24-hours $PM_{2.5}$ NAAQS and assured by permit condition 2.6. Accordingly, facility PTE for the Boilers 1 and 2 reflects this scenario. The Applicant's originally submitted PTE Emission Inventory did not reflect this scenario, but has been updated by DEQ to do so. The updated PTE Emissions Inventory was reviewed without issue and accepted by the applicant.

Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For the two boilers, one emergency IC engine and the one cooling tower at the facility all emissions calculations were performed at the worst-case maximum for this medical center uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8760 hr/yr, except for the emergency generators evaluated at 100 hours per year.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10} T/yr	$PM_{2.5}$ T/yr	SO_2 T/yr	NO_X T/yr	CO T/yr	VOC T/yr
Point Sources						
Boiler 1[(a)]	0.67	0.67	0.05	3.14	1.66	0.32
Boiler 2[(a)]	0.67	0.67	0.05	3.14	1.66	0.32
Emergency IC Engine	0.006	0.006	0.001	0.97	0.04	0.005
Cooling Tower 1	1.44	0.005	-	-	-	-
Total, Point Sources	**2.79**	**1.35**	**0.11**	**7.25**	**3.36**	**0.65**

a) Worst Case scenario assumes combustion of USLD for 48 hr/yr and Natural Gas for 8712 hr/yr for both boilers

The following table presents the uncontrolled Potential to Emit for HAP pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this medical center uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8760 hr/yr, except for the emergency generators evaluated at 100 hours per year. Then, the worst-case maximum HAP Potential to Emit was determined for this medical center expansion.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

Hazardous Air Pollutants	PTE (T/yr)
Acetaldehyde	1.24E-05
Acrolein	3.89E-06
Benzene	7.47E-04
Ethylbenzene	4.45E-07
Formaldehyde	1.32E-02
Hexane	3.13E-01
Naphthalene	1.77E-04
Toluene	7.69E-04
o-Xylene	9.59E-05
POM	4.18E-06
Arsenic	1.92E-05
Beryllium	1.46E-06
Cadmium	9.55E-05
Chromium	1.22E-04
Cobalt	7.29E-06
Manganese	3.30E-05
Mercury	2.26E-05
Nickel	1.82E-04
Selenium	7.28E-06
Total	**0.33**

Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

This is a new facility. Therefore, pre-project emissions are set to zero for all criteria pollutants.

Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria pollutants from all emissions units at the facility as determined by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}		$PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Boiler 1 and 2 (Natural Gas)	0.15	0.68	0.15	0.68	0.01	0.054	0.71	3.2	0.38	1.7	0.07	0.32
Boiler 1 and 2 (ULSD)	0.46		0.46		0.03		2.24		0.16		0.027	
Emergency IC Engine	0.13	0.006	0.13	0.006	0.015	0.001	19.40	0.97	0.78	0.04	0.10	0.005
Cooling Tower 1	0.33	1.44	0.0012	0.005								
Post Project Totals	**1.07**	**2.13**	**0.74**	**0.69**	**0.06**	**0.06**	**22.35**	**4.17**	**1.32**	**1.74**	**0.20**	**0.33**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}		$PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Potential to Emit	1.07	2.13	0.74	0.69	0.06	0.06	22.35	4.17	1.32	1.74	0.20	0.33
Changes in Potential to Emit	**1.07**	**2.13**	**0.74**	**0.69**	**0.06**	**0.06**	**22.35**	**4.17**	**1.32**	**1.74**	**0.20**	**0.33**

Non-Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table.

Note: emissions for any TAPs that are also federal HAPS have not been evaluated. Per DEQ policy no review is required under IDAPA 58.01.01.210 for Toxic Air Pollutants (TAPs) which are already being regulated by 40 CFR 63 as federal Hazardous Air Pollutants (HAPs). Therefore, the Idaho TAPs that are federal HAPs may be excluded from the modeling analysis for the emergency generator and two dual-fired boilers. The emergency generator is subject to the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart iiii in accordance with 40 CFR 63.6590 (c). The two dual-fired boilers are specifically exempted sources under 40 CFR 63, Subpart JJJJJJ. The cooling towers will not yield Idaho TAPs or federal HAPs.

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)[a]	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)[a]	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Dichlorobenzene	0.0	2.38E-05	2.38E-05	20	No
Pentane	0.0	5.15E-02	5.15E-02	118	No
Barium	0.0	8.72E-05	8.72E-05	3.30E-02	No
Copper	0.0	1.38E-04	1.38E-04	1.30E-02	No
Molybdenum	0.0	2.18E-05	2.18E-05	0.333	No
Vanadium	0.0	6.54E-05	6.54E-05	3.00E-03	No
Zinc	0.0	6.56E-04	6.56E-04	6.67E-01	No

a) Post Project 24-hour Average Emission Rates for Units at this Facility assumes a conservative scenario in which one boiler combusts ULSD for whole period while the other combusts Natural Gas.

None of the PTEs for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average non-carcinogenic screening ELs identified in IDAPA 58.01.01.585 were exceeded.

Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of carcinogenic toxic air pollutants (TAP) is provided in the following table.

Note: emissions for any TAPs that are also federal HAPS have not been evaluated. Per DEQ policy no review is required under IDAPA 58.01.01.210 for Toxic Air Pollutants (TAPs) which are already being regulated by 40 CFR 63 as federal Hazardous Air Pollutants (HAPs). Therefore, the Idaho TAPs that are federal HAPs may be excluded from the modeling analysis for the emergency generator and two dual-fired boilers. The emergency generator is subject to the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart iiii in accordance with 40 CFR 63.6590 (c). The two dual-fired boilers are specifically exempted sources under 40 CFR 63, Subpart JJJJJJ. The cooling towers will not yield Idaho TAPs or federal HAPs.

Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)[b]	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)[b]	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
3-Methyl chloranthrene	0.0	3.57E-08	3.57E-08	2.50E-06	No

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.
b) Post Project 24-hour Average Emission Rates for Units at this Facility assumes a conservative scenario in which one boiler combusts ULSD for whole period while the other combusts Natural Gas.

None of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any carcinogenic TAP because none of the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 8 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

Hazardous Air Pollutants	PTE (T/yr)
Acetaldehyde	1.24E-05
Acrolein	3.89E-06
Benzene	5.65E-04
Ethylbenzene	4.45E-07
Formaldehyde	6.75E-03
Hexane	1.55E-01
Naphthalene	1.25E-04
Toluene	4.76E-04
o-Xylene	9.59E-05
POM	3.29E-06
Arsenic	2.12E-05
Beryllium	3.95E-06
Cadmium	9.79E-05
Chromium	1.24E-04
Cobalt	7.25E-06
Manganese	8.73E-06
Mercury	3.86E-05
Nickel	9.50E-05
Selenium	1.84E-04
Total	**0.16**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, and NO_X, from this project were exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix A.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

[1] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Ada County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has actual or potential emissions ≥ 10 T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions ≥ 25 T/yr.

SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits ≥ 8 T/yr of a single HAP or ≥ 20 T/yr of THAP.

SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to < 8 T/yr of a single HAP and/or < 20 T/yr of THAP.

B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold

UNK = Class is unknown

For All Other Pollutants:

A = Actual or potential emissions of a pollutant are ≥ 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are < 80 T/yr.

B = Actual and potential emissions are < 100 T/yr without permit restrictions.

UNK = Class is unknown.

Table 9 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM_{10}	2.79	2.13	**100**	B
$PM_{2.5}$	1.35	0.69	**100**	B
SO_2	0.11	0.06	**100**	B
NO_X	7.24	4.17	**100**	B
CO	3.35	1.74	**100**	B
VOC	0.64	0.33	**100**	B
HAP (single)	3.13E-01	1.55E-01	**10**	B
HAP (total)	0.33	0.16	**25**	B
Pb	8.68E-05	8.68E-05	**100**	B

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 ..... Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for two Cleaver Brooks dual fire boilers, one Caterpillar diesel-fired emergency engine generator, one water cooling tower. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 ..... Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 ..... Visible Emissions

The sources of PM emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.4 and 3.4.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676 ..... Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Condition 2.5

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 ..... Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, SO_2, NO_X, CO, VOC, and HAP or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 ..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility operates two boilers and one emergency IC engines for which the following NSPS requirements apply:

- **40 CFR 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units**

Title 40: Protection of Environment
Part 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

§ 60.40c Am I subject to this subpart?

You are subject to this subpart if you own or operate a steam generating unit with a maximum design heat input rating of 10 to 100 million Btu/hr that was constructed, modified, or reconstructed since June 9, 1989.

(a) Except as provided in paragraphs (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).

The facility proposes to install two dual-fuel boilers during the second quarter of 2018 each with rated heat input capacity of 20.22 MMBtu/hr when combusting natural gas and 19.44 MMBtu/hr when combusting diesel fuel. Each boiler is dual-fired and capable of combusting natural gas as the primary fuel or diesel as the secondary fuel.

Emission Standards for Operators

§ 60.42c What sulfur dioxide (SO_2) emission standards must I meet for natural gas and diesel fired boilers with a design heat input capacity input greater than 10 MMBtu/hr, but less than 100 MMBtu/hr?

(a) Except as provided in paragraphs (b), (c), and (e) of this section, on and after the date on which the performance test is completed or required to be completed under §60.8, whichever date comes first, the owner or operator of an affected facility that combusts only coal shall neither: cause to be discharged into the atmosphere from the affected facility any gases that contain SO_2 in excess of 87 ng/J (0.20 lb/MMBtu) heat input or 10 percent (0.10) of the potential SO_2 emission rate (90 percent reduction), nor cause to be discharged into the atmosphere from the affected facility any gases that contain SO_2 in excess of 520 ng/J (1.2 lb/MMBtu) heat input. If coal is combusted with other fuels, the affected facility shall neither: cause to be discharged into the atmosphere from the affected facility any gases that contain SO_2 in excess of 87 ng/J (0.20 lb/MMBtu) heat input or 10 percent (0.10) of the potential SO_2 emission rate (90 percent reduction), nor cause to be discharged into the atmosphere from the affected facility any gases that contain SO_2 in excess of the emission limit is determined pursuant to paragraph (e)(2) of this section.

(d) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that combusts oil shall cause to be discharged into the atmosphere from that affected facility any gases that contain SO_2 in excess of 215 ng/J (0.50 lb/MMBtu) heat input from oil; or, as an alternative, no owner or operator of an affected facility that combusts oil shall combust oil in the affected facility that contains greater than 0.5 weight percent sulfur. The percent reduction requirements are not applicable to affected facilities under this paragraph.

(h) For affected facilities listed under paragraphs (h)(1), (2), (3), or (4) of this section, compliance with the emission limits or fuel oil sulfur limits under this section may be determined based on a certification from the fuel supplier, as described under §60.48c(f), as applicable.

(1) Distillate oil-fired affected facilities with heat input capacities between 2.9 and 29 MW (10 and 100 MMBtu/hr).

(2) Residual oil-fired affected facilities with heat input capacities between 2.9 and 8.7 MW (10 and 30 MMBtu/hr).

(3) Coal-fired affected facilities with heat input capacities between 2.9 and 8.7 MW (10 and 30 MMBtu/h).

(4) Other fuels-fired affected facilities with heat input capacities between 2.9 and 8.7 MW (10 and 30 MMBtu/h).

(i) The SO_2 emission limits, fuel oil sulfur limits, and percent reduction requirements under this section apply at all times, including periods of startup, shutdown, and malfunction.

Since the two dual-fuel boilers will utilize fuel oil as a secondary fuel source, this standard will apply. However, as outlined above "compliance with the emission limits or fuel oil sulfur limits under this section may be determined based on a certification from the fuel supplier, as described under §60.48c(f), as applicable". Compliance demonstration associated with supplier fuel certification is insured by Permit Condition 2.10.

§ 60.43c What particulate matter (PM) emission standards must I meet for natural gas and diesel fired boilers with a design heat input capacity input greater than 10 MMBtu/hr, but less than 100 MMBtu/hr?

(c) On and after the date on which the initial performance test is completed or required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that combusts coal, wood, or oil and has a heat input capacity of 8.7 MW (30 MMBtu/h) or greater shall cause to be discharged into the atmosphere from that affected facility any gases that exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. Owners and operators of an affected facility that elect to install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring PM emissions according to the requirements of this subpart and are subject to a federally enforceable PM limit of 0.030 lb/MMBtu or less are exempt from the opacity standard specified in this paragraph (c).

This standard does not apply as neither Boiler 1 or 2 have a heat input capacity greater than 30 MMBtu/h.

(e)(1) On and after the date on which the initial performance test is completed or is required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commences construction, reconstruction, or modification after February 28, 2005, and that combusts coal, oil, wood, a mixture of these fuels, or a mixture of these fuels with any other fuels and has a heat input capacity of 8.7 MW (30 MMBtu/h) or greater shall cause to be discharged into the atmosphere from that affected facility any gases that contain PM in excess of 13 ng/J (0.030 lb/MMBtu) heat input, except as provided in paragraphs (e)(2), (e)(3), and (e)(4) of this section.

This standard does not apply as neither Boiler 1 or 2 have a heat input capacity greater than 30 MMBtu/h.

§ 60.44c Compliance and Performance Test Methods and Procedures for Sulfur Dioxide

(a) Except as provided in paragraphs (g) and (h) of this section and §60.8(b), performance tests required under §60.8 shall be conducted following the procedures specified in paragraphs (b), (c), (d), (e), and (f) of this section, as applicable. Section 60.8(f) does not apply to this section. The 30-day notice required in §60.8(d) applies only to the initial performance test unless otherwise specified by the Administrator.

(h) For affected facilities subject to §60.42c(h)(1), (2), or (3) where the owner or operator seeks to demonstrate compliance with the SO_2 standards based on fuel supplier certification, the performance test shall consist of the certification from the fuel supplier, as described in §60.48c(f), as applicable.

Performance test shall consist of the certification from the fuel supplier, as described in §60.48c(f), as applicable. Compliance with this standard is insured by Permit Condition 2.10.

Emission Monitoring Requirements

§ 60.46c Emission Monitoring for Sulfur Dioxide

(a) Except as provided in paragraphs (d) and (e) of this section, the owner or operator of an affected facility subject to the SO_2 emission limits under §60.42c shall install, calibrate, maintain, and operate a CEMS for measuring SO_2concentrations and

either O_2 or CO_2 concentrations at the outlet of the SO_2 control device (or the outlet of the steam generating unit if no SO_2 control device is used), and shall record the output of the system. The owner or operator of an affected facility subject to the percent reduction requirements under §60.42c shall measure SO_2 concentrations and either O_2 or CO_2 concentrations at both the inlet and outlet of the SO_2 control device.

(b) The 1-hour average SO_2 emission rates measured by a CEMS shall be expressed in ng/J or lb/MMBtu heat input and shall be used to calculate the average emission rates under §60.42c. Each 1-hour average SO_2 emission rate must be based on at least 30 minutes of operation, and shall be calculated using the data points required under §60.13(h)(2). Hourly SO_2 emission rates are not calculated if the affected facility is operated less than 30 minutes in a 1-hour period and are not counted toward determination of a steam generating unit operating day.

(c) The procedures under §60.13 shall be followed for installation, evaluation, and operation of the CEMS.

(1) All CEMS shall be operated in accordance with the applicable procedures under Performance Specifications 1, 2, and 3 of appendix B of this part.

(2) Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 of appendix F of this part.

(3) For affected facilities subject to the percent reduction requirements under §60.42c, the span value of the SO_2CEMS at the inlet to the SO_2 control device shall be 125 percent of the maximum estimated hourly potential SO_2emission rate of the fuel combusted, and the span value of the SO_2 CEMS at the outlet from the SO_2 control device shall be 50 percent of the maximum estimated hourly potential SO_2 emission rate of the fuel combusted.

(4) For affected facilities that are not subject to the percent reduction requirements of §60.42c, the span value of the SO_2 CEMS at the outlet from the SO_2 control device (or outlet of the steam generating unit if no SO_2 control device is used) shall be 125 percent of the maximum estimated hourly potential SO_2 emission rate of the fuel combusted.

(d) As an alternative to operating a CEMS at the inlet to the SO_2 control device (or outlet of the steam generating unit if no SO_2 control device is used) as required under paragraph (a) of this section, an owner or operator may elect to determine the average SO_2 emission rate by sampling the fuel prior to combustion. As an alternative to operating a CEMS at the outlet from the SO_2 control device (or outlet of the steam generating unit if no SO_2 control device is used) as required under paragraph (a) of this section, an owner or operator may elect to determine the average SO_2 emission rate by using Method 6B of appendix A of this part. Fuel sampling shall be conducted pursuant to either paragraph (d)(1) or (d)(2) of this section. Method 6B of appendix A of this part shall be conducted pursuant to paragraph (d)(3) of this section.

(1) For affected facilities combusting coal or oil, coal or oil samples shall be collected daily in an as-fired condition at the inlet to the steam generating unit and analyzed for sulfur content and heat content according the Method 19 of appendix A of this part. Method 19 of appendix A of this part provides procedures for converting these measurements into the format to be used in calculating the average SO_2 input rate.

(2) As an alternative fuel sampling procedure for affected facilities combusting oil, oil samples may be collected from the fuel tank for each steam generating unit immediately after the fuel tank is filled and before any oil is combusted. The owner or operator of the affected facility shall analyze the oil sample to determine the sulfur content of the oil. If a partially empty fuel tank is refilled, a new sample and analysis of the fuel in the tank would be required upon filling. Results of the fuel analysis taken after each new shipment of oil is received shall be used as the daily value when calculating the 30-day rolling average until the next shipment is received. If the fuel analysis shows that the sulfur content in the fuel tank is greater than 0.5 weight percent sulfur, the owner or operator shall ensure that the sulfur content of subsequent oil shipments is low enough to cause the 30-day rolling average sulfur content to be 0.5 weight percent sulfur or less.

(3) Method 6B of appendix A of this part may be used in lieu of CEMS to measure SO_2 at the inlet or outlet of the SO_2 control system. An initial stratification test is required to verify the adequacy of the Method 6B of appendix A of this part sampling location. The stratification test shall consist of three paired runs of a suitable SO_2 and CO_2 measurement train operated at the candidate location and a second similar train operated according to the procedures in §3.2 and the applicable procedures in section 7 of Performance Specification 2 of appendix B of this part. Method 6B of appendix A of this part, Method 6A of appendix A of this part, or a combination of Methods 6 and 3 of appendix A of this part or Methods 6C and 3A of appendix A of this part are suitable measurement techniques. If Method 6B of appendix A of this part is used for the second train, sampling time and timer operation may be adjusted for the stratification test as long as an adequate sample volume is collected; however, both sampling trains are to be operated similarly. For the location to be adequate for Method 6B of appendix A of this part 24-hour tests, the mean of the absolute difference between the three paired runs must be less than 10 percent (0.10).

(e) The monitoring requirements of paragraphs (a) and (d) of this section shall not apply to affected facilities subject to §60.42c(h) (1), (2), or (3) where the owner or operator of the affected facility seeks to demonstrate compliance with the SO_2 standards based on fuel supplier certification, as described under §60.48c(f), as applicable.

(f) The owner or operator of an affected facility operating a CEMS pursuant to paragraph (a) of this section, or conducting as-fired fuel sampling pursuant to paragraph (d)(1) of this section, shall obtain emission data for at least 75 percent of the operating hours in at least 22 out of 30 successive steam generating unit operating days. If this minimum data requirement is not met with a single monitoring system, the owner or operator of the affected facility shall supplement the emission data with data collected with other monitoring systems as approved by the Administrator

The Orthopedic MOB will demonstrate that the fuel sulfur content is less than or equal to 0.5 percent by weight by obtaining fuel supplier certifications for all fuel supplied to the boiler, and maintain certified statements that the fuel certifications represent all of the fuel combusted during the reporting period. Fuel supplier certifications will be maintained for at least two years and made available upon request. Compliance with this standard is insured by Permit Conditions

Reporting and Recordkeeping Requirements

§ 60.48c What records are to be kept and what are the reporting requirements?

(a) The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include:

(1) The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

(2) If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under §60.42c, or §60.43c.

(3) The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.

(4) Notification if an emerging technology will be used for controlling SO_2 emissions. The Administrator will examine the description of the control device and will determine whether the technology qualifies as an emerging technology. In making this determination, the Administrator may require the owner or operator of the affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of §60.42c(a) or (b)(1), unless and until this determination is made by the Administrator.

(b) The owner or operator of each affected facility subject to the SO_2 emission limits of §60.42c, or the PM or opacity limits of §60.43c, shall submit to the Administrator the performance test data from the initial and any subsequent performance tests and, if applicable, the performance evaluation of the CEMS and/or COMS using the applicable performance specifications in appendix B of this part.

(c) In addition to the applicable requirements in §60.7, the owner or operator of an affected facility subject to the opacity limits in §60.43c(c) shall submit excess emission reports for any excess emissions from the affected facility that occur during the reporting period and maintain records according to the requirements specified in paragraphs (c)(1) through (3) of this section, as applicable to the visible emissions monitoring method used.

(1) For each performance test conducted using Method 9 of appendix A-4 of this part, the owner or operator shall keep the records including the information specified in paragraphs (c)(1)(i) through (iii) of this section.

(i) Dates and time intervals of all opacity observation periods;

(ii) Name, affiliation, and copy of current visible emission reading certification for each visible emission observer participating in the performance test; and

(iii) Copies of all visible emission observer opacity field data sheets;

(2) For each performance test conducted using Method 22 of appendix A-4 of this part, the owner or operator shall keep the records including the information specified in paragraphs (c)(2)(i) through (iv) of this section.

(i) Dates and time intervals of all visible emissions observation periods;

(ii) Name and affiliation for each visible emission observer participating in the performance test;

(iii) Copies of all visible emission observer opacity field data sheets; and

(iv) Documentation of any adjustments made and the time the adjustments were completed to the affected facility operation by the owner or operator to demonstrate compliance with the applicable monitoring requirements.

(3) For each digital opacity compliance system, the owner or operator shall maintain records and submit reports according to the requirements specified in the site-specific monitoring plan approved by the Administrator

(d) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits, or percent reduction requirements under §60.42c shall submit reports to the Administrator.

(e) The owner or operator of each affected facility subject to the SO_2 emission limits, fuel oil sulfur limits, or percent reduction requirements under §60.42c shall keep records and submit reports as required under paragraph (d) of this section, including the following information, as applicable.

(1) Calendar dates covered in the reporting period.

(2) Each 30-day average SO_2 emission rate (ng/J or lb/MMBtu), or 30-day average sulfur content (weight percent), calculated during the reporting period, ending with the last 30-day period; reasons for any noncompliance with the emission standards; and a description of corrective actions taken.

(3) Each 30-day average percent of potential SO_2 emission rate calculated during the reporting period, ending with the last 30-day period; reasons for any noncompliance with the emission standards; and a description of the corrective actions taken.

(4) Identification of any steam generating unit operating days for which SO_2 or diluent (O_2 or CO_2) data have not been obtained by an approved method for at least 75 percent of the operating hours; justification for not obtaining sufficient data; and a description of corrective actions taken.

(5) Identification of any times when emissions data have been excluded from the calculation of average emission rates; justification for excluding data; and a description of corrective actions taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

(6) Identification of the F factor used in calculations, method of determination, and type of fuel combusted.

(7) Identification of whether averages have been obtained based on CEMS rather than manual sampling methods.

(8) If a CEMS is used, identification of any times when the pollutant concentration exceeded the full span of the CEMS.

(9) If a CEMS is used, description of any modifications to the CEMS that could affect the ability of the CEMS to comply with Performance Specifications 2 or 3 of appendix B of this part.

(10) If a CEMS is used, results of daily CEMS drift tests and quarterly accuracy assessments as required under appendix F, Procedure 1 of this part.

(11) If fuel supplier certification is used to demonstrate compliance, records of fuel supplier certification as described under paragraph (f)(1), (2), (3), or (4) of this section, as applicable. In addition to records of fuel supplier certifications, the report shall include a certified statement signed by the owner or operator of the affected facility that the records of fuel supplier certifications submitted represent all of the fuel combusted during the reporting period.

(f) Fuel supplier certification shall include the following information:

(1) For distillate oil:

(i) The name of the oil supplier;

(ii) A statement from the oil supplier that the oil complies with the specifications under the definition of distillate oil in §60.41c; and

(iii) The sulfur content or maximum sulfur content of the oil.

(2) For residual oil:

(i) The name of the oil supplier;

(ii) The location of the oil when the sample was drawn for analysis to determine the sulfur content of the oil, specifically including whether the oil was sampled as delivered to the affected facility, or whether the sample was drawn from oil in storage at the oil supplier's or oil refiner's facility, or other location;

(iii) The sulfur content of the oil from which the shipment came (or of the shipment itself); and

(iv) The method used to determine the sulfur content of the oil.

(3) For coal:

(i) The name of the coal supplier;

(ii) The location of the coal when the sample was collected for analysis to determine the properties of the coal, specifically including whether the coal was sampled as delivered to the affected facility or whether the sample was collected from coal in storage at the mine, at a coal preparation plant, at a coal supplier's facility, or at another location. The certification shall include the name of the coal mine (and coal seam), coal storage facility, or coal preparation plant (where the sample was collected);

(iii) The results of the analysis of the coal from which the shipment came (or of the shipment itself) including the sulfur content, moisture content, ash content, and heat content; and

(iv) The methods used to determine the properties of the coal.

(4) For other fuels:

(i) The name of the supplier of the fuel;

(ii) The potential sulfur emissions rate or maximum potential sulfur emissions rate of the fuel in ng/J heat input; and

(iii) The method used to determine the potential sulfur emissions rate of the fuel.

(g)(1) Except as provided under paragraphs (g)(2) and (g)(3) of this section, the owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.

(2) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility that combusts only natural gas, wood, fuels using fuel certification in §60.48c(f) to demonstrate compliance with the SO_2 standard, fuels not subject to an emissions standard (excluding opacity), or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

(3) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility or multiple affected facilities located on a contiguous property unit where the only fuels combusted in any steam generating unit (including steam generating units not subject to this subpart) at that property are natural gas, wood, distillate oil meeting the most current requirements in §60.42C to use fuel certification to demonstrate compliance with the SO_2 standard, and/or fuels, excluding coal and residual oil, not subject to an emissions standard (excluding opacity) may elect to record and maintain records of the total amount of each steam generating unit fuel delivered to that property during each calendar month.

(h) The owner or operator of each affected facility subject to a federally enforceable requirement limiting the annual capacity factor for any fuel or mixture of fuels under §60.42c or §60.43c shall calculate the annual capacity factor individually for each fuel combusted. The annual capacity factor is determined on a 12-month rolling average basis with a new annual capacity factor calculated at the end of the calendar month.

(i) All records required under this section shall be maintained by the owner or operator of the affected facility for a period of two years following the date of such record.

(j) The reporting period for the reports required under this subpart is each six-month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

The Orthopedic MOB will report and maintain records of their operations. Records must be maintained for at least two years. Records will include notification of the date of boiler construction or reconstruction, and anticipated and actual startup dates (within the timeframe specified in subpart A of the NSPS), including: 1) The design heat-input capacity of the boiler and identification of the fuels to be combusted in the boiler; 2) the annual capacity at which you anticipate operating the boiler based on all fuels fired and based on each individual fuel fired.

Records of the amounts of each fuel combusted during each day will be kept.

Since the Orthopedic MOB is subject to SO_2 emission limits, they will submit a semi-annual (every 6 months) report as described in 60.48c(d). Reports will be postmarked by the 30th day following the end of the reporting period.

Facilities using the fuel supplier certification to demonstrate compliance with the SO_2 Standard must also submit the semi-annual report as described in Section 60.48c(e)(11). The report must include the following: 1) Calendar dates covered in the report period. 2) A certified statement signed by the owner or operator of the affected facility that the records of fuel supplier certifications submitted represents all of the fuel combusted during the reporting period and; 3) Records of fuel supplier certifications for the reporting period.

The fuel supplier certification will state that the fuel oil complies with the specifications under the definition of distillate oil in Subpart Dc 60.41c.

Compliance with these reporting and recordkeeping requirements are insured by Permit Conditions 2.9 through 2.13

- **40 CFR 60, Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines**

Title 40: Protection of Environment
Part 60, Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

60.4200 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

The St. Luke Orthopedic MOB will operate one emergency internal combustion engine generator. The 2017 engine will be manufactured by Caterpillar, Model C32 ATAAC, and rated at 1,000 kW (1474 HP rating).

Emission Standards for Operators

§ 60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

1,000 kW rated emergency standby generators with total displacement = 32 liters/ 12 cylinders = 2.67 liter/cylinder.

The Energency IC Engine must comply with emission standards for new nonroad CI engines in §60.4202 (see below).

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in paragraphs (d)(1) and (2) of this section.

(1) Reduce NO_X emissions by 90 percent or more, or limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to 1.6 grams per KW-hour (1.2 grams per HP-hour).

(2) Reduce PM emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

§ 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.

(1) For engines with a maximum engine power less than 37 KW (50 HP):

(i) The certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants for model year 2007 engines, and

(ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.

(2) For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007.

The Emergency IC Engine must comply with emission standards (Table 1 per 40 CFR 89.112): NHMC + NOx = 6.4 g/kw-hr; CO = 3.5 g/kw-hr; PM= 0.20 g/kw-hr. Compliance with this standard is assured by Engine's Tier 2 technologies rating as well as Permit Condition 3.3 and 3.10.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.

(1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

(c) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines to the certification emission standards for new marine CI engines in 40 CFR 94.8, as applicable, for all pollutants, for the same displacement and maximum engine power.

(d) Beginning with the model years in table 3 to this subpart, stationary CI internal combustion engine manufacturers must certify their fire pump stationary CI ICE to the emission standards in table 4 to this subpart, for all pollutants, for the same model year and NFPA nameplate power.

§ 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?

Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§60.4204 and 60.4205 according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

This standard applies to the Emergency IC Engine. Compliance with this standard is insured by Permit Condition 3.10.

Fuel Requirements for Owners and Operators

§ 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?

(a) Beginning October 1, 2007, owners and operators of stationary CI ICE subject to this subpart that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a).

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel.

The Emergency IC Engine is required to use ultralow sulfur diesel fuel with a maximum sulfur content of 15 ppmv. Compliance with this standard is insured by Permit Condition 3.6 and 3.9.

(c) Owners and operators of pre-2011 model year stationary CI ICE subject to this subpart may petition the Administrator for approval to use remaining non-compliant fuel that does not meet the fuel requirements of paragraphs (a) and (b) of this section beyond the dates required for the purpose of using up existing fuel inventories. If approved, the petition will be valid for a period of up to 6 months. If additional time is needed, the owner or operator is required to submit a new petition to the Administrator.

(d) Owners and operators of pre-2011 model year stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the Federal Aid Highway System may petition the Administrator for approval to use any fuels mixed with used lubricating oil that do not meet the fuel requirements of paragraphs (a) and (b) of this section. Owners and operators must demonstrate in their petition to the Administrator that there is no other place to use the lubricating oil. If approved, the petition will be valid for a period of up to 6 months. If additional time is needed, the owner or operator is required to submit a new petition to the Administrator.

(e) Stationary CI ICE that have a national security exemption under §60.4200(d) are also exempt from the fuel requirements in this section.

Other Requirements for Owners and Operators

§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in the previous model year?

(a) After December 31, 2008, owners and operators may not install stationary CI ICE (excluding fire pump engines) that do not meet the applicable requirements for 2007 model year engines.

(b) After December 31, 2009, owners and operators may not install stationary CI ICE with a maximum engine power of less than 19 KW (25 HP) (excluding fire pump engines) that do not meet the applicable requirements for 2008 model year engines.

(c) After December 31, 2014, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 19 KW (25 HP) and less than 56 KW (75 HP) that do not meet the applicable requirements for 2013 model year non-emergency engines.

(d) After December 31, 2013, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 56 KW (75 HP) and less than 130 KW (175 HP) that do not meet the applicable requirements for 2012 model year non-emergency engines.

(e) After December 31, 2012, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 130 KW (175 HP), including those above 560 KW (750 HP), that do not meet the applicable requirements for 2011 model year non-emergency engines.

(f) After December 31, 2016, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 560 KW (750 HP) that do not meet the applicable requirements for 2015 model year non-emergency engines.

(g) In addition to the requirements specified in §§60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (f) of this section after the dates specified in paragraphs (a) through (f) of this section.

(h) The requirements of this section do not apply to owners or operators of stationary CI ICE that have been modified, reconstructed, and do not apply to engines that were removed from one existing location and reinstalled at a new location.

The Emergency IC Engine is to be a model year 2017 or later engine.

§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine, you must install a non-resettable hour meter prior to startup of the engine.

This standard applies: A non-resettable hour meter must be installed on each emergency generator. Compliance with this standard is insured by Permit Condition 3.10.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

Compliance Requirements

§ 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) If you are an owner or operator and must comply with the emission standards specified in this subpart, you must operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer. In addition, owners and operators may only change those settings that are permitted by the manufacturer. You must also meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply to you.

This standard applies to the Emergency IC Engine. Compliance with this standard is insured by Permit Condition 3.10.

(b) If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in §§60.4204(a) or 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to this subpart and must comply with the emission standards specified

in §60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

(1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

(5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

(c) If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(b) or §60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must comply by purchasing an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's specifications.

This standard applies to the Emergency IC Engine. Compliance with this standard is insured by Permit Condition 3.10.

(d) If you are an owner or operator and must comply with the emission standards specified in §60.4204(c) or §60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.

(1) Conducting an initial performance test to demonstrate initial compliance with the emission standards as specified in §60.4213.

(2) Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in paragraphs (d)(2)(i) through (v) of this section.

(i) Identification of the specific parameters you propose to monitor continuously;

(ii) A discussion of the relationship between these parameters and NO_X and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit NO_X and PM emissions;

(iii) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(iv) A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(v) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(3) For non-emergency engines with a displacement of greater than or equal to 30 liters per cylinder, conducting annual performance tests to demonstrate continuous compliance with the emission standards as specified in §60.4213.

(e) Emergency stationary ICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. Anyone may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. For owners and operators of emergency engines meeting standards under §60.4205 but not §60.4204, any operation other than emergency operation, and maintenance and testing as permitted in this section, is prohibited.

This standard applies to the Emergency IC Engine. Compliance with this standard is insured by Permit Condition 3.5. Maintenance and testing hours of operation for the emergency generators will not exceed 100 hr/yr.

Testing Requirements for Owners and Operators

§ 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (d) of this section.

(a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F.

(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.

(c) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8, as applicable, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in 40 CFR 89.112 or 40 CFR 94.8, as applicable, determined from the following equation:

$$\text{NTE requirement for each pollutant} = (1.25) \times (\text{STD}) \qquad \text{(Eq. 1)}$$

Where:

STD = The standard specified for that pollutant in 40 CFR 89.112 or 40 CFR 94.8, as applicable.

Alternatively, stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8 may follow the testing procedures specified in §60.4213 of this subpart, as appropriate.

(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in §60.4204(a), §60.4205(a), or §60.4205(c), determined from the equation in paragraph (c) of this section.

Where:

STD = The standard specified for that pollutant in §60.4204(a), §60.4205(a), or §60.4205(c).

Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) may follow the testing procedures specified in §60.4213, as appropriate.

This standard does not apply as no performance testing pursuant to this subpart is required for the Emergency IC Engine.

Notification, Reports, and Records for Owners and Operators

§ 60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

(1) Submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section.

(i) Name and address of the owner or operator;

(ii) The address of the affected source;

(iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(iv) Emission control equipment; and

(v) Fuel used.

(2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section.

(i) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(ii) Maintenance conducted on the engine.

(iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards.

(iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

This standard applies to the Emergency IC Engine. Compliance with this standard is insure by permit condition 3.11.

(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT/GACT Applicability (40 CFR 63)

- **40 CFR 63, Subpart ZZZZ……..National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines**

  Per 40 CFR 63.6590(c) "Stationary RICE subject to Regulations under 40 CFR Part 60. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part."

  The one emergency IC engine at this facility meets the requirements of 40 CFR 60 Subpart IIII, therefore there are no applicable requirements under 40 CFR 63 Subpart ZZZZ.

Title 40: Protection of Environment
Part 63, Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

§ 63.6580 What is the purpose of subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

§ 63.6585 Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

The St. Luke Orthopedic MOB maintains and operates one emergency internal combustion engine that will be installed after June 12, 2006. This facility is classified as an area source of HAP emissions defined as potential-to-emit (PTE) 10 tons per year (tpy) or less for any single HAP or PTE less than 25 tpy for total HAPs.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in § 63.6675, which includes operating according to the provisions specified in § 63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

§ 63.6590 What parts of my plant does this subpart cover?

This subpart applies to each affected source.

(a) Affected source. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(1) *Existing stationary RICE.*

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

(2) *New stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(3) *Reconstructed stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

(b) *Stationary RICE subject to limited requirements.* (1) An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of §63.6645(f).

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(2) A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of §63.6645(f) and the requirements of §§63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.

(3) The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in §63.6640(f)(2)(ii) and (iii).

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(v) Existing stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(c) *Stationary RICE subject to Regulations under 40 CFR Part 60.* An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

(1) A new or reconstructed stationary RICE located at an area source;

The Emergency IC Engine is subject to 40 CFR 60, Subpart IIII with compliance assured by Permit Conditions 3.8 through 3.11. Refer to the St. Luke Orthopedic MOB applicability review per 40 CFR Part 60, Subpart IIII for the emergency compression ignition engine.

(2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;

(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

- **40 CFR 63 Subpart JJJJJJ-National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources**

Title 40: Protection of Environment
40 CFR 63 Subpart JJJJJJ—National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

§63.11193 Am I subject to this subpart?

You are subject to this subpart if you own or operate an industrial, commercial, or institutional boiler as defined in §63.11237 that is located at, or is part of, an area source of hazardous air pollutants (HAP), as defined in §63.2, except as specified in §63.11195.

The requirements of this subpart do not apply to St. Luke Orthopedic MOB because the facility is an area source that owns and operates boilers that meet the excluded definitions in 40 CFR 63.11195.

§63.11195 Are any boilers not subject to this subpart?

The types of boilers listed in paragraphs (a) through (k) of this section are not subject to this subpart and to any requirements in this subpart.

(a) Any boiler specifically listed as, or included in the definition of, an affected source in another standard(s) under this part.

(b) Any boiler specifically listed as an affected source in another standard(s) established under section 129 of the Clean Air Act.

(c) A boiler required to have a permit under section 3005 of the Solid Waste Disposal Act or covered by subpart EEE of this part (e.g., hazardous waste boilers), unless such units do not combust hazardous waste and combust comparable fuels.

(d) A boiler that is used specifically for research and development. This exemption does not include boilers that solely or primarily provide steam (or heat) to a process or for heating at a research and development facility. This exemption does not prohibit the use of the steam (or heat) generated from the boiler during research and development, however, the boiler must be concurrently and primarily engaged in research and development for the exemption to apply.

(e) A gas-fired boiler as defined in this subpart.

The Orthopedic MOB will maintain boilers that satisfy the definition of gas-fired boilers in this section. Therefore, these boilers are not subject to this subpart nor to any requirements in this subpart.

§63.11237 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2 (the General Provisions), and in this section as follows:

Gas-fired boiler includes any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year.

The Orthopedic MOB boilers will have the ability to fire both natural gas as the primary fuel and diesel fuel as backup. During an electric power failure event, diesel fuel will only be used in an emergency situation if the natural gas supply to the facility is disrupted. The Orthopedic MOB will limit periodic maintenance testing of diesel fuel to less than 48 hours per calendar year per boiler and 4 hours or less per calendar day per boiler. Permit Conditions 2.6 and 2.7 assure Boiler 1 and Boiler 2 operational compliance within the definition of Gas-fired boiler.

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Boilers 1 and 2

Initial Permit Condition 2.1

Initial Permit Condition 2.1 describes the two boilers at the facility.

Initial Permit Condition 2.2

The two boilers operate with no control devices on the exhaust stacks. Table 2.1 presents the Boilers 1 and 2 emission points as presented in the application.

Initial Permit Condition 2.3

This permit condition lists the criteria pollutant emissions for the emissions units permitted in this section of the permit. SO_x, CO and VOC levels in this application were well below regulatory concern. Therefore, there were no limits for SO_x, CO and VOC included. PM_{10} was assumed equal to $PM_{2.5}$ as presented in applicant emission inventory (Appendix A).

Permit Condition 2.4

Permit Condition 2.4 establishes that emissions shall not exceed 20% opacity as required by IDAPA 625

Initial Permit Condition 2.5

In accordance with IDAPA 58.01.01.676 fuel burning equipment PM limits for operation of the boilers.

Initial Permit Condition 2.6

This permit condition specifies natural gas for primary operation and ULSD fuel for back-up operation. The number of boilers allowed to operate at one time is also specified. These requirements are needed as modeling compliance was demonstrated under these conditions.

Initial Permit Condition 2.7

Permit Condition 2.7 limits testing of the boilers with backup fuel to 48 hours per boiler per consecutive 12 month period and 4 hours for both boilers per 24 hour period. Only one unit can be tested at a time. These requirements are needed as modeling compliance was demonstrated under these conditions.

Initial Permit Condition 2.8

The boilers shall only combust ULSD fuel shall with a maximum sulfur content of 0.0015% by weigh as specified by applicant.

Initial Permit Condition 2.9

This permit condition specifies requirements for recordkeeping for back-up fuel operation of the boilers.

Initial Permit Condition 2.10

This permit condition specifies requirements for recordkeeping of the sulfur content of the fuel used for back-up operation of the boilers.

40 CFR 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Initial Permit Condition 2.11

In accordance with 40 CFR 60.44c the permittee shall conduct an initial performance test according to paragraph (b) as proposed by the applicant, or opt to use fuel samples or supplier certifications as stated in paragraph (a) through exceptions in paragraphs (g) and (h).

Initial Permit Condition 2.12

In accordance with 40 CFR 60.46c the permittee must demonstrate sulfur dioxide compliance by monitoring the percent sulfur content by weight using fuel samples or supplier certifications.

Initial Permit Condition 2.13

In accordance with 40 CFR 60.48c the permittee is required to record boiler construction and startup dates, amounts of fuel combusted each day and keep records maintained and available upon request for at least two years. A semiannual report to DEQ of sulfur dioxide is also required.

Initial Permit Condition 2.14

In accordance with 40 CFR 60.1 the permittee required to comply with the listed Subpart A General Provisions.

Initial Permit Condition 2.15

In any case where any permit condition conflicts with NSPS or NESHAP requirements. The federal requirement will take precedent.

Emergency Generators

Initial Permit Condition 3.1

Initial Permit Condition 3.1 describes the one emergency IC engine at the facility.

Initial Permit Condition 3.2

The emergency IC engine operates with no control devices on the exhaust stack. Table 3.1 presents the emission points as presented in the application.

Initial Permit Condition 3.3

This permit condition lists the criteria pollutant emissions for the emissions units permitted in this section of the permit. SO_x, CO and VOC levels in this application were well below regulatory concern and considered insignificant. Therefore, there were no limits for SO_x, CO and VOC included. PM_{10} was assumed equal to $PM_{2.5}$ as presented in applicant emission inventory (Appendix A).

Initial Permit Condition 3.4

Permit Condition 3.4 establishes that emissions shall not exceed 20% opacity as required by IDAPA 625.

Initial Permit Condition 3.5

This permit condition establishes daily and yearly maximum hours of the non-emergency situation testing as proposed by the applicant. This requirement is needed as modeling compliance was demonstrated under these conditions.

Initial Permit Condition 3.6

The emergency IC engine shall only combust ULSD fuel shall with a maximum sulfur content of 0.0015% by weigh as specified by applicant

Initial Permit Condition 3.7

This permit condition requires recordkeeping of the sulfur content in the fuel used in the emergency generators.

40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Initial Permit Condition 3.8

In accordance with 40 CFR 60.4202(a)(2) the emergency IC engines shall be operated to limit opacity exhaust and in accordance with manufacturer certification.

Initial Permit Condition 3.9

In accordance with 40 CFR 60.4207(a) the emergency IC engines shall operate on fuel with a maximum sulfur content of 15 ppm.

Initial Permit Condition 3.10

In accordance with 40 CFR 60.4209(a) the emergency IC engines shall have a non-resettable hour meter installed, shall not change setting from manufacturers specifications, and limit testing to 100 hours per year.

Initial Permit Condition 3.11

In accordance with 40 CFR 60.4214(b) the permittee must record the time of operation of the engine and the reason the engine was in operation during that time.

Initial Permit Condition 3.12

In accordance with 40 CFR 60.1 the permittee required to comply with the listed Subpart A General Provisions.

Initial Permit Condition 3.13

In any case where any permit condition conflicts with NSPS or NESHAP requirements. The federal requirement will take precedent.

Cooling Tower 1

Initial Permit Condition 4.1

Initial Permit Condition 4.1 describes the cooling tower at the facility.

Initial Permit Condition 4.2

The cooling tower operates with no control devices on the exhaust stacks. Table 4.1 presents the cooling tower emission points as presented in the application.

Initial Permit Condition 4.3

This permit condition lists the criteria pollutant emissions for the emissions units permitted in this section of the permit. The cooling tower emits no other criteria pollutants other than associated particulate matter. $PM_{2.5}$ emission limit has not been specified as the level of $PM_{2.5}$ emitted from the cooling tower is insignificant (0.005 T/Yr).

Permit Condition 4.4 and 4.5

Permit Condition 4.5 establishes total dissolved solids (TDS) content and circulating flow rate limits for the cooling tower water. Estimated PM emissions assumed the use of cooling tower water meeting these specifications. Compliance with this requirement is assured by complying with monitoring and recordkeeping requirements in Permit Condition 4.5. Note: compliance with TDS content requirements may be demonstrated with conductivity monitoring as per industry standard. Per Cooling Tower Equipment Rep. "TDS (total dissolved solids) is rarely referred to in our industry. We speak in terms of conductivity, which is ALMOST the same thing"... "The conductivity controller that is provided on our water treatment systems operates based on a conductivity set point and cycles of concentration" (See DEQ HP Content Manager record number 2018 AAG654).

General Provisions

Initial Permit Condition 5.1
The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Initial Permit Condition 5.2
The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 5.3
The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Initial Permit Condition 5.4
The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Initial Permit Condition 5.5
The permit expiration construction and operation provision specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Initial Permit Condition 5.6
The notification of construction and operation provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.03.

Initial Permit Condition 5.7
The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Initial Permit Condition 5.8
The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Initial Permit Condition 5.9
The performance test report provision requires that the permittee report any performance test results to DEQ within 30 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Initial Permit Condition 5.10
The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Initial Permit Condition 5.11
The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Initial Permit Condition 5.12
The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Initial Permit Condition 5.13
The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Initial Permit Condition 5.14
The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Initial Permit Condition 5.15
The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Initial Permit Condition 5.16
The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there was a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

Public Comment Period

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c. During this time, comments were not submitted in response to DEQ's proposed action. Refer to the chronology for public comment period dates.

APPENDIX A – EMISSIONS INVENTORIES

St Lukes Orthopedic MOB
Criteria Pollutant Summary

Source	PM_{10}		$PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Boiler 1 and 2 (Natural Gas)	0.15	0.68	0.15	0.68	0.01	0.054	0.71	3.2	0.38	1.7	0.07	0.32
Boiler 1 and 2 (ULSD)	0.46		0.46		0.03		2.24		0.16		0.027	
Emergency IC Engine	0.13	0.006	0.13	0.006	0.015	0.001	19.4	0.97	0.78	0.04	0.1	0.005
Cooling Tower 1	0.33	1.44	0.0012	0.005								
Post Project Totals	**1.07**	**2.13**	**0.74**	**0.69**	**0.06**	**0.06**	**22.35**	**4.17**	**1.32**	**1.74**	**0.2**	**0.33**

Notes:

CO S02 and NOx facility emissions are BRC

Short term NO_2 modeling not required for intermittent sources

Monthly Pb Emissions
0.00E+00 lb/mo

For Boilers #1 through #2 applicant purposed scenario to comply with 24 hour PM2.5 NAAQS is used: only one boiler may operate at one time, exempt when one boiler is combusting ULSD as fuel for testing purposes; the other boiler may combust natural g

St Lukes Orthopedic MOB
Toxic and Hazardous Air Pollutants Summary

Current Baseline

TAPs/HAPs	HAPs	Boilers 1-2		Gen 1		Facility Wide Total		EL	Exceeds EL
		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	
2-Methylnaphthalene	No	4.76E-07	2.07E-06			4.76E-07	2.07E-06		
3-Methylchloranthrene	No	3.57E-08	1.55E-07			3.57E-08	1.55E-07	2.50E-06	Below
7,12-Dimethylbenz(a)anthracene	No	3.17E-07	1.38E-06			3.17E-07	1.38E-06		
Acenaphthene	No	3.11E-06	3.03E-07	5.27E-07	2.31E-06	3.64E-06	2.61E-06		
Acenaphthylene	No	7.26E-08	1.57E-07	1.04E-06	4.55E-06	1.11E-06	4.71E-06		
Acetaldehyde[a]	**Yes**			**2.84E-06**	**1.24E-05**	**2.84E-06**	**1.24E-05**		
Acrolein[a]	**Yes**			**8.87E-07**	**3.89E-06**	**8.87E-07**	**3.89E-06**		
Anthracene	No	2.25E-07	2.16E-07	1.38E-07	6.06E-07	3.64E-07	8.22E-07		
Benzo(a)anthracene	No	6.20E-07	1.83E-07	7.00E-08	3.07E-07	6.90E-07	4.90E-07		
Benzene[a]	**Yes**	7.28E-05	1.83E-04	**8.74E-05**	**3.83E-04**	**1.60E-04**	**5.65E-04**		
Benzo(a)pyrene	No	2.38E-08	1.04E-07	2.89E-08	1.27E-07	5.27E-08	2.30E-07		
Benzo(b)fluoranthene	No	2.51E-07	1.66E-07	1.25E-07	5.47E-07	3.76E-07	7.13E-07		
Benzo(g,h,i)perylene	No	3.53E-07	1.19E-07	6.26E-08	2.74E-07	4.16E-07	3.94E-07		
Benzo(k)fluoranthene	No	2.51E-07	1.66E-07	2.45E-08	1.07E-07	2.76E-07	2.73E-07		
Chrysene	No	3.83E-07	1.72E-07	1.72E-07	7.54E-07	5.55E-07	9.26E-07		
Dibenz(a,h)anthracene	No	2.67E-07	1.15E-07	3.90E-08	1.71E-07	3.06E-07	2.86E-07		
Dichlorobenzene	No	2.38E-05	1.04E-04			2.38E-05	**1.04E-04**	20	Below
Ethylbenzene[a]	**Yes**	9.27E-06	4.45E-07			**9.27E-06**	**4.45E-07**		
Fluoranthene	No	7.65E-07	2.93E-07	4.54E-07	1.99E-06	1.22E-06	2.28E-06		
Fluorene	No	7.07E-07	2.73E-07	1.44E-06	6.31E-06	2.15E-06	6.58E-06		
Formaldehyde[a]	**Yes**	6.30E-03	6.71E-03	**8.88E-06**	**3.89E-05**	**6.31E-03**	**6.75E-03**		
Hexane[a]	**Yes**	3.57E-02	1.55E-01			**3.57E-02**	**1.55E-01**		
Indeno(1,2,3-cd)pyrene	No	3.48E-07	1.70E-07	4.66E-08	2.04E-07	3.94E-07	3.75E-07		
Naphthalene[a]	**Yes**	1.77E-04	6.06E-05	**1.46E-05**	**6.41E-05**	**1.91E-04**	**1.25E-04**		
Pentane	No	5.15E-02	2.24E-01			5.15E-02	2.24E-01	118	Below
Phenanthrene	No	1.87E-06	1.54E-06	4.59E-06	2.01E-05	6.46E-06	2.17E-05		
Propylene	No			3.14E-04	1.38E-03	3.14E-04	1.38E-03		
Pyrene	No	7.19E-07	4.61E-07	4.18E-07	1.83E-06	1.14E-06	2.29E-06		
Toluene[a]	**Yes**	9.71E-04	3.37E-04	**3.16E-05**	**1.39E-04**	1.00E-03	**4.76E-04**		
o-Xylene[a]	**Yes**	1.59E-05	7.63E-07	**2.17E-05**	**9.52E-05**	**3.76E-05**	**9.59E-05**		
PAH	No			2.39E-05	1.05E-04	2.39E-05	1.05E-04	9.10E-05	Below
POM[a]	**Yes**	2.14E-06	1.08E-06	5.06E-07	2.22E-06	**2.65E-06**	**3.29E-06**		
TAPs/HAPs Metals									
Arsenic[a]	**Yes**	8.48E-05	**2.12E-05**			8.48E-05	**2.12E-05**		
Barium	No	8.72E-05	**3.80E-04**			8.72E-05	3.80E-04	0.033	Below
Beryllium[a]	**Yes**	6.09E-05	**3.95E-06**			6.09E-05	**3.95E-06**		
Cadmium[a]	**Yes**	8.25E-05	**9.79E-05**			8.25E-05	**9.79E-05**		
Chromium[a]	**Yes**	8.84E-05	**1.24E-04**			8.84E-05	**1.24E-04**		
Cobalt[a]	**Yes**	1.67E-06	**7.25E-06**			1.67E-06	**7.25E-06**		
Copper	No	1.38E-04	**7.92E-05**			1.38E-04	7.92E-05	0.013	Below
Manganese[a]	**Yes**	1.82E-04	**8.73E-06**			1.82E-04	**8.73E-06**		
Mercury (HAP not a TAP)	**Yes**	1.29E-04	**3.86E-05**			1.29E-04	**3.86E-05**		
Molybdenum	No	6.58E-05	**2.54E-05**			6.58E-05	2.54E-05	0.333	Below
Nickel[a]	**Yes**	2.18E-05	**9.50E-05**			2.18E-05	**9.50E-05**		
Selenium[a]	**Yes**	1.02E-04	**1.84E-04**			1.02E-04	**1.84E-04**		
Vanadium	No	3.04E-04	**1.66E-05**			3.04E-04	1.66E-05	0.003	Below
Zinc	No	6.54E-05	**2.85E-04**			6.54E-05	2.85E-04	0.667	Below
HAPs Total							**0.16**	tpy	

Notes:

[a] TAP that are HAP emissions are excluded for modeling purposes, per email from Darrin Pampaian, dated July 18, 2017: "It is presumed that EPA evaluated the 187 HAPs when developing the emission standards for new, modified or existing stationary sources regulated by 40 CFR Part 63; therefore, no further review is required under IDAPA 58.01.01.210 for these pollutants for sources subject to 40 CFR Part 63, including sources specifically exempted within the subpart."

TAP that are HAP emissions from the emergency generator can be excluded from the modeling analysis because they will be addressed through 40 CFR Part 63, Subpart ZZZZ-NESHAP for Reciprocating Internal Combustion Engines. The emergency generator engine is required to meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR part 60 subpart IIII in accordance with 40 CFR 63.6590(c).

TAP that are HAP emissions from the boilers can be excluded from the modeling analysis because they are specifically exempted under 40 CFR 63, Subpart JJJJJJ-NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources.

St Lukes Orthopedic MOB

1 m= 3.28084

AERMOD Modeling Stack Parameters

Stack Name	Stack ID	Easting (meters)[a]	Northing (meters)[a]	Stack Height		Diameter		Flow Rate	Temperature	Exit Velocity	Notes
				(ft)	(m)	(ft)	(m)	acfm	(K)	(m/s)	
Gen 1*	GEN1	562826.86	4829910.96	11.33	3.45	7.56 ft x 3 ft[b]	1.64	6,813	750	1.53	With area of 22.7 ft^2 exit vel =1.53 m/s[c]
Boiler 1	BLR1	562816.36	4830021.33	54.83	16.71	2.0	0.61	5,024	462	8.12	Based on NG typical operations of 75%
Boiler 2	BLR2	562816.38	4830019.79	54.83	16.71	2.0	0.61	5,024	462	8.12	Based on NG typical operations of 75%
Cooling Tower 1A[d]	CT1A	562829.08	4829895.28	36.00	10.97	12.0	3.66	146,337	298	6.57	
Cooling Tower 1B[d]	CT1B	562829.08	4829898.95	36.00	10.97	12.0	3.66	146,337	298	6.57	

[a] Datum: WGS84; Projection: UTM Zone 11

[b] Effective diameter calculated for use in AERMOD is 5.37 ft.

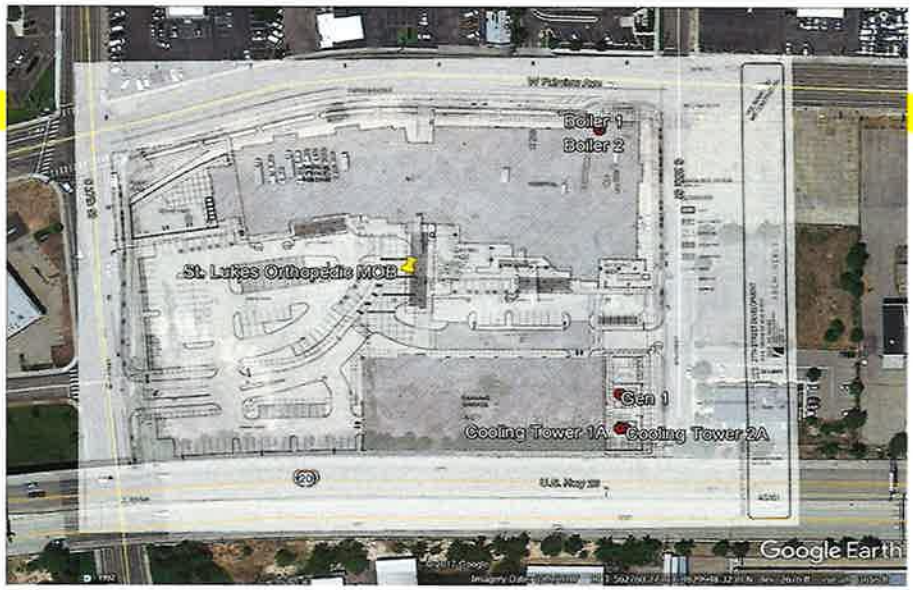
[c] Assume typical operating flow rate of 75%

[d] Converted cooling tower flow rates from manufacturer data sheet SCFM to ACFM (Appendix B).

Notes:

Roof height for boiler roof tier is 45.33 ft

Boiler No. 1 and No. 2 stack heights are 9.5 ft with raincap from roof tier



Effective Diameter of Gen 1 stack:

length	7.56	ft
width	3.00	ft
area	22.68	sq. ft
eff. Diameter	5.373739189	ft
eff. Diameter	1.637915652	m

Boiler Height Notes from drawing A404:

rooftop height:	45.33	feet above ground level
drawing scale:	0.09	inches to feet
drawing stack ht:	0.89	inches above rooftop
stack height:	9.49	feet above rooftop
stack height:	54.83	feet above ground level

St Lukes Orthopedic MOB
Greenhouse Gas Emissions Summary

Criteria Pollutants	**CO_2**	**CO_2**	**N_2O**	**N_2O**	**CH_4**	**CH_4**	**CO2e**	**CO2e**
Emissions Unit Name	Metric Tons/Yr	Short Tons/Yr	Metric Tons/Yr	Short Tons/Yr	Metric Tons/Yr	Short Tons/Yr	Metric Tons/Yr	Short Tons/Yr
Gen 1	73	81	0.0006	0.0007	0.003	0.003	74	81
Boiler #1 (NG)	9,473	10,442	0.018	0.020	0.18	0.20	9,483	10,453
Boiler #1 (ULSD) - Worst Case	9,492	10,464	0.0183	0.0202	0.180	0.199	9,502	10,475
Boiler #2 (NG)	9,473	10,442	0.018	0.020	0.18	0.20	9,483	10,453
Boiler #2 (ULSD) - Worst Case	9,492	10,464	0.0183	0.0202	0.180	0.199	9,502	10,475
Total Facility Wide	**19,058**	**21,008**	**0.037**	**0.041**	**0.364**	**0.401**	**19,078**	**21,030**

Notes:
If a source exceeds major source thresholds for conventional criteria pollutants, then BACT for GHG shall be applied.
Since the St. Luke's Orthopedic MOB facility is not a major source, it is not subject to GHG BACT requirements.

St Lukes Orthopedic MOB -Egen

Generator Name Model No.	Caterpillar C32 ATAAC	EPA Certified Tier 2	Displacement	32.10 L
Engine Power Rating (kW)	1,000		V-12, 4- Stroke	
Engine Power Rating (hp)	1,474	CAT Performance data	Cylinder Displacement	2.68
Fuel Consumption (gal/hr)	71.9	100% load		
Maximum Firing Rate (gal/yr)	7,190			
Fuel Type	Distillate #2			
- maximum sulfur content (%)	0.0015	ULSD		
Maximum Heat Input Rating (MMBtu/hr)	9.86			
Annual Maint Limit (hrs/yr)	100	Assume:	Uncontrolled PTE is equal to Controlled PTE	
Heat Value of Fuel (Btu/min)	164,360	HHV Energy - CAT Performance data		

		Uncontrolled Potential to Emit				
Pollutant	**CAS No.**	**Emission Factor (lb/MMBtu)**	**Emission Factor (g/hp-hr)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total Particulate Matter (PM)[1,2]			0.04	0.13	13.00	0.006
Nitrogen Oxides (NOx)[1] as NO_2			5.97	19.40	1939.99	0.97
Sulfur Oxides[3]		0.0015		0.015	1.49	0.001
Carbon Monoxide (CO)[1]			0.24	0.78	77.99	0.04
HC[1,4]			0.03	0.10	9.75	0.005

			Uncontrolled Potential to Emit		
Toxics[5]	**CAS Number**	**Emission Factor (lb/MMBtu)**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Benzene	71-43-2	7.76E-04	8.74E-05	7.65E-01	3.83E-04
Formaldehyde	50-00-0	7.89E-05	8.88E-06	7.78E-02	3.89E-05
Naphthalene	91-20-3	1.30E-04	1.46E-05	1.28E-01	6.41E-05
Toluene	108-88-3	2.81E-04	3.16E-05	2.77E-01	1.39E-04
o-Xylenes	1330-20-7	1.93E-04	2.17E-05	1.90E-01	9.52E-05
Acetaldehyde	75-07-0	2.52E-05	2.84E-06	2.49E-02	1.24E-05
Acrolein	107-02-8	7.88E-06	8.87E-07	7.77E-03	3.89E-06
Propylene	115-07-1	2.79E-03	3.14E-04	2.75E+00	1.38E-03
Acenaphthalylene	203-96-8	9.23E-06	1.04E-06	9.10E-03	4.55E-06
Acenaphthene	83-32-9	4.68E-06	5.27E-07	4.62E-03	2.31E-06
Fluorene	86-73-7	1.28E-05	1.44E-06	1.26E-02	6.31E-06
Phenanthrene	85-01-8	4.08E-05	4.59E-06	4.02E-02	2.01E-05
Anthracene	120-12-7	1.23E-06	1.38E-07	1.21E-03	6.06E-07
Fluoranthene	206-44-0	4.03E-06	4.54E-07	3.97E-03	1.99E-06
Pyrene	129-00-0	3.71E-06	4.18E-07	3.66E-03	1.83E-06
Benzo(g,h,i)perylene	191-24-2	5.56E-07	6.26E-08	5.48E-04	2.74E-07
Benz(a)anthracene	56-55-3	6.22E-07	7.00E-08	6.13E-04	3.07E-07
Benzo(b)fluoranthene	205-99-2	1.11E-06	1.25E-07	1.09E-03	5.47E-07
Benzo(k)fluoranthene	205-82-3	2.18E-07	2.45E-08	2.15E-04	1.07E-07
Chrysene	218-01-9	1.53E-06	1.72E-07	1.51E-03	7.54E-07
Dibenzo(a,h)anthracene	53-70-3	3.46E-07	3.90E-08	3.41E-04	1.71E-07
Indeno(1,2,3-cd)pyrene	193-39-5	4.14E-07	4.66E-08	4.08E-04	2.04E-07
Benzo(a)pyrene	50-32-8	2.57E-07	2.89E-08	2.53E-04	1.27E-07
Total PAH		2.12E-04	2.39E-05	2.09E-01	1.05E-04
POM[6]			5.06E-07	4.43E-03	2.22E-06

[1] PM, NOx, CO, and HC emission factors are derived from Caterpillar performance data

[2] PM emission factor is assumed to equal PM_{10} and $PM_{2.5}$

[3] SO_2 emission factor multiplied by percent sulfur content of fuel (EPA AP-42 Table 3.4-1) EF = 1.01 x (sulfur content) = 0.0015

[4] HC emission factor is used to equal VOCs.

[5] Toxic emission factors are derived from EPA AP-41, Table 3.4-3 and Table 3.4-4.

[6] POM (polycyclic organic matter) 7-PAH group, sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene

Note: Toxic emission factors derived from EPA AP-42 Tables 3.4-3 and 3.4-4.

GHG Emissions				
Pollutant[8]	Emissions (metric tons)	GWP[9]		CO_2e
CO_2	73.38	1		73.385
CH_4	0.0030	25		0.074
N_2O	0.00060	298		0.177
Total	73.39			73.64

For CO2, Use Equation C-1 from 40 CFR 98 Subpart C:
CO2 = 1x10-3 x Fuel x HHV x EF

CO2 = Annual CO2 mass emissions in Metric Tons	=	73.38
Fuel = Volume of fuel used (gallons)	=	7,190
HHV = High Heat Value from Table C-1 (mmBTU/short ton)	=	0.138
EFCO2 = Emission factor (kg/mmBTU)	=	73.96

For CH4 and N2O, Use Equation C-8 from 40 CFR 98 Subpart C:
CH4, N2O = 1x10-3 x Fuel x HHV x EF

CH4 = Annual CH4 mass emissions in Metric Tons	=	0.003
N2O = Annual N2O mass emissions in Metric Tons	=	0.0006
Fuel = Volume of fuel used (gallons)	=	7,190
HHV = High Heat Value from Table C-1 (mmBTU/short ton)	=	0.138
EFCH4 = Emission factor (kg/mmBTU)	=	3.00E-03
EFCH4 = Emission factor (kg/mmBTU)	=	6.00E-04

Notes
[8] 40 CFR 98.32 - For stationary fuel combustion sources only, report CO2, CH4, and N2O
[9] GWP = Global Warming Potential - 40 CFR 98 Subpart A, Table A-1, revised 2013 GWP.

St Lukes Orthopedic MOB -Boilers Dual-Fired

Boiler NG (MMBtu/hr)	20.22
Boiler Oil (MMBtu/hr)	19.44
Manufacturer	CBEX Elite
Fuel Type (Primary)	Natural Gas
Fuel Type (Backup)	ULSD
Boiler Horsepower (BHP)	600
Natural Gas*	
Maximum Operation Limit (hrs/yr)	8,760
Maximum Firing Rate (MMcf/yr)	174
Heat Value of NG (Btu/scf)	1,020
Maximum Firing Rate (MMcf/hr)	1.98E-02
Ultra Low Sulfur Diesel**	
Maximum Operating Limit (hrs/yr)	48
NG Operating Hours (hrs/yr)	8,712
Sulfur Content in Fuel (%)	0.0015
Maximum Fuel Usage (gal/hr)	145.8
Maximum Fuel Usage (gal/yr)	6,998
Heat Value of ULSD (Btu/gal)	140,000

Note: 2 dual-fired boilers are proposed with exactly the same maximum heat input rating. PTE emissions for 1 boiler is provided below.

30 PPM System

* Note: Annual worst-case assumed 8712 annual hours of operation using natural gas + 48 hours using diesel fuel.

** Ultra low sulfur diesel (ULSD) is 0.0015% sulfur content

NOTE #1: "Corrected Facility PTE" values come from applicant purposed scenario to comply with 24 hour PM2.5 NAAQS: only one boiler may boiler is combusting ULSD as fuel for testing purposes; the other boiler may combust natural gas

				NG Uncontrolled Potential to Emit			ULSD Uncontrolled Potential to Emit			Worst Case*		
Criteria Pollutant	**Natural Gas Emission Factor (lb/10^6 BTU)[2]**	**ULSD Emission Factor (lb/10^6 BTU)[3]**	**ULSD Emission Factor (lb/Mgal)[4]**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**Emission Rate (lb/hr)[5]**	**Emission Rate (lb/yr)[6]**	**Emission Rate (ton/yr)[6]**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Total PM_{10}	0.0075	0.024		0.15	1,328	0.66	0.46	1,343	0.67	0.46	1,343	0.67
$PM_{2.5}$	0.0075	0.024		0.15	1,328	0.66	0.46	1,343	0.67	0.46	1,343	0.67
Nitrogen Oxides (NOx)	0.035	0.115		0.71	6,199	3.10	2.24	6,272	3.14	2.24	6,272	3.14
Sulfur Oxides	0.0006		0.213	0.01	106	0.05	0.03	107	0.05	0.03	107	0.05
Carbon Monoxide (CO)	0.0167	0.006		0.38	3,312	1.66	0.10	3,301	1.65	0.38	3,312	1.66
VOC	0.0036	0.0014		0.07	638	0.32	0.027	635	0.32	0.07	638	0.32
Lead[7]				9.91E-06	0.087	4.34E-05				9.91E-06	0.087	4.34E-05

				NG Uncontrolled Potential to Emit			ULSD Uncontrolled Potential to Emit			Worst Case		
Toxics	**CAS No.**	**NG Emission Factor[8] (lb/10^9 scf)**	**ULSD Emission Factor[9] (lb/Mgal)**	**NG Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**ULSD Emission Rate (lb/hr)[5]**	**Combined Emission Rate (lb/yr)[6]**	**Combined Emission Rate (ton/yr)[6]**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
2-Methylnaphthalene	91-57-6	2.40E-05		4.76E-07	4.17E-03	2.08E-06	0	0	0	4.76E-07	4.17E-03	2.08E-06
3-Methylchloranthrene	56-49-5	1.80E-06		3.57E-08	3.13E-04	1.56E-07	0	0	0	3.57E-08	3.13E-04	1.56E-07
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05		3.17E-07	2.78E-03	1.39E-06	0	0	0	3.17E-07	2.78E-03	1.39E-06
Acenaphthene	83-32-9	1.80E-06	2.11E-05	3.57E-08	3.13E-04	1.56E-07	3.08E-06	4.59E-04	2.29E-07	3.08E-06	4.59E-04	2.29E-07
Acenaphthylene	203-96-8	1.80E-06	2.53E-07	3.57E-08	3.13E-04	1.56E-07	3.69E-08	3.13E-04	1.56E-07	3.69E-08	3.13E-04	1.56E-07
Anthracene	120-12-7	2.40E-06	1.22E-06	4.76E-08	4.17E-04	2.08E-07	1.78E-07	4.23E-04	2.11E-07	1.78E-07	4.23E-04	2.11E-07
Benzo(a)anthracene	56-55-3	1.80E-06	4.01E-06	3.57E-08	3.13E-04	1.56E-07	5.85E-07	3.39E-04	1.69E-07	5.85E-07	3.39E-04	1.69E-07
Benzene	71-43-2	2.10E-03	2.14E-04	4.16E-05	3.65E-01	1.82E-04	3.12E-05	3.64E-01	1.82E-04	4.16E-05	3.65E-01	1.82E-04
Benzo(a)pyrene	50-32-8	1.20E-06		2.38E-08	2.08E-04	1.04E-07	0	2.07E-04	1.04E-07	2.38E-08	2.08E-04	1.04E-07
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.48E-06	3.57E-08	3.13E-04	1.56E-07	2.16E-07	3.21E-04	1.61E-07	2.16E-07	3.21E-04	1.61E-07
Benzo(g,h,i)perylene	191-24-2	1.20E-06	2.26E-06	2.38E-08	2.08E-04	1.04E-07	3.30E-07	2.23E-04	1.12E-07	3.30E-07	2.23E-04	1.12E-07
Benzo(k)fluoranthene	205-82-3	1.80E-06	1.48E-06	3.57E-08	3.13E-04	1.56E-07	2.16E-07	3.21E-04	1.61E-07	2.16E-07	3.21E-04	1.61E-07
Chrysene	218-01-9	1.80E-06	2.38E-06	3.57E-08	3.13E-04	1.56E-07	3.47E-07	3.27E-04	1.64E-07	3.47E-07	3.27E-04	1.64E-07
Dibenz(a,h)anthracene	53-70-3	1.20E-06	1.67E-06	2.38E-08	2.08E-04	1.04E-07	2.43E-07	2.19E-04	1.09E-07	2.43E-07	2.19E-04	1.09E-07
Dichlorobenzene	25321-22-6	1.20E-03		2.38E-05	2.08E-01	1.04E-04	0	2.07E-01	1.04E-04	2.38E-05	2.08E-01	1.04E-04
Ethylbenzene	100-41-4		6.36E-05	0	0	0	9.27E-06	4.45E-04	2.23E-07	9.27E-06	4.45E-04	2.23E-07
Fluoranthene	206-44-0	3.00E-06	4.84E-06	5.95E-08	5.21E-04	2.60E-07	7.06E-07	5.52E-04	2.76E-07	7.06E-07	5.52E-04	2.76E-07
Fluorene	86-73-7	2.80E-06	4.47E-06	5.55E-08	4.86E-04	2.43E-07	6.52E-07	5.15E-04	2.57E-07	6.52E-07	5.15E-04	2.57E-07
Formaldehyde	50-00-0	7.50E-02	3.30E-02	1.49E-03	1.30E+01	6.51E-03	4.81E-03	1.32E+01	6.59E-03	4.81E-03	1.32E+01	6.59E-03
Hexane	110-54-3	1.80E+00		3.57E-02	3.13E+02	1.56E-01	0	3.11E+02	1.55E-01	3.57E-02	3.13E+02	1.56E-01
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	2.14E-06	3.57E-08	3.13E-04	1.56E-07	3.12E-07	3.28E-04	1.63E-07	3.12E-07	3.28E-04	1.63E-07
Naphthalene	91-20-3	6.10E-04	1.13E-03	1.21E-05	1.06E-01	5.30E-05	1.65E-04	1.13E-01	5.66E-05	1.65E-04	1.13E-01	5.66E-05
Pentane	109-66-0	2.60E+00		5.15E-02	4.51E+02	2.26E-01				5.15E-02	4.51E+02	2.26E-01
Phenanthrene	85-01-8	1.70E-05	1.05E-05	3.37E-07	2.95E-03	1.48E-06	1.53E-06	3.01E-03	1.50E-06	1.53E-06	3.01E-03	1.50E-06
Pyrene	129-00-0	5.00E-06	4.25E-06	9.91E-08	8.68E-04	4.34E-07	6.20E-07	8.93E-04	4.47E-07	6.20E-07	8.93E-04	4.47E-07
Toluene	108-88-3	3.40E-03	6.20E-03	6.74E-05	5.90E-01	2.95E-04	9.04E-04	6.31E-01	3.15E-04	9.04E-04	6.31E-01	3.15E-04
o-Xylene	1330-20-7		1.09E-04	0	0	0	1.59E-05	7.63E-04	3.81E-07	1.59E-05	7.63E-04	3.81E-07
POM[10]				2.26E-07	1.88E-03	9.38E-07	1.92E-06	2.06E-03	9.81E-07	1.92E-06	2.06E-03	9.81E-07

				NG Uncontrolled Potential to Emit			ULSD Uncontrolled Potential to Emit			Worst Case		
Toxic-Metals	**CAS Number**	**NG Emission Factor[11] (lb/10^9 scf)**	**ULSD Emission Factor[12] (lb/10^{12} BTU)**	**NG Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**	**ULSD Emission Rate (lb/hr)[5]**	**Combined Emission Rate (lb/yr)[6]**	**Combined Emission Rate (ton/yr)[6]**	**Emission Rate (lb/hr)**	**Emission Rate (lb/yr)**	**Emission Rate (ton/yr)**
Arsenic	7440-38-2	2.00E-04	4.00E+00	3.96E-06	3.47E-02	1.74E-05	8.09E-05	3.84E-02	1.92E-05	8.09E-05	3.84E-02	1.92E-05
Barium	7440-39-3	4.40E-03		8.72E-05	7.64E-01	3.82E-04		7.60E-01	3.80E-04	8.72E-05	7.64E-01	3.82E-04
Beryllium	7440-41-7	1.20E-05	3.00E+00	2.38E-07	2.08E-03	1.04E-06	6.07E-05	2.91E-03	1.46E-06	6.07E-05	2.91E-03	1.46E-06
Cadmium	7440-43-9	1.10E-03	3.00E+00	2.18E-05	1.91E-01	9.55E-05	6.07E-05	2.91E-03	1.46E-06	6.07E-05	1.91E-01	9.55E-05
Chromium	7440-47-3	1.40E-03	3.00E+00	2.78E-05	2.43E-01	1.22E-04	6.07E-05	2.91E-03	1.46E-06	6.07E-05	2.43E-01	1.22E-04
Cobalt	7440-48-4	8.40E-05		1.67E-06	1.46E-02	7.29E-06		1.45E-02	7.25E-06	1.67E-06	1.46E-02	7.29E-06
Copper	7440-50-8	8.50E-04	6.00E+00	1.68E-05	1.48E-01	7.38E-05	1.21E-04	5.82E-03	2.91E-06	1.21E-04	1.48E-01	7.38E-05
Lead			9.00E+00				1.82E-04	8.73E-03	4.37E-06	1.82E-04	8.73E-03	4.37E-06
Manganese	7439-96-5	3.80E-04	6.00E+00	7.53E-06	6.60E-02	3.30E-05	1.21E-04	5.82E-03	2.91E-06	1.21E-04	6.60E-02	3.30E-05
Mercury	7439-97-6	2.60E-04	3.00E+00	5.15E-06	4.51E-02	2.26E-05	6.07E-05	2.91E-03	1.46E-06	6.07E-05	4.51E-02	2.26E-05
Molybdenum	7439-98-7	1.10E-03		2.18E-05	1.91E-01	9.55E-05		1.90E-01	9.50E-05	2.18E-05	1.91E-01	9.55E-05
Nickel	7440-02-0	2.10E-03	3.00E+00	4.16E-05	3.65E-01	1.82E-04	6.07E-05	2.91E-03	1.46E-06	6.07E-05	3.65E-01	1.82E-04
Selenium	7782-49-2	2.40E-05	1.50E+01	4.76E-07	4.17E-03	2.08E-06	3.03E-04	1.46E-02	7.28E-06	3.03E-04	1.46E-02	7.28E-06
Vanadium	1314-62-1	3.30E-03		6.54E-05	5.73E-01	2.87E-04		5.70E-01	2.85E-04	6.54E-05	5.73E-01	2.87E-04
Zinc	7440-66-6	2.90E-02	4.00E+00	5.75E-04	5.04E+00	2.52E-03	8.09E-05	3.88E-03	1.94E-06	5.75E-04	5.04E+00	2.52E-03

Notes

[2] PM, NOx, SOx, CO, and VOC natural gas emission factors obtained from Cleaver Brooks manufacturer.
[3] PM, NOx,CO, and VOC No. 2 fuel oil emission factors obtained from Cleaver Brooks manufacturer.
[4] SO_2 emission factor based on distillate oil fired boiler < 100 MMBTu/hr (EPA AP-42, Section 1.3 Fuel Oil Combustion, Table 1.3-1).
[5] For ULSD, pound per hour emissions based on emission factor multiplied by the maximum fuel consumption.
[6] For ULSD, annual emissions based on 48 hours of operation under ULSD and 8712 hours of operation under NG
[7] Natural gas lead emissions based on 0.0005 lb/10^6 scf from small uncontrolled boilers (EPA AP-42, Section 1.4 Natural Gas Combustion, Tables 1.4-1 and 1.4-2).
[8] Toxic Air Pollutants (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).
[9] Toxic Air Pollutants (EPA AP-42, Section 1.3 Fuel Oil Combustion, Table 1.3-9).
[10] POM (Polycyclic organic matter) 7 PAH group is the sum of benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene
[11] Metals from Natural Gas Combustion (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).
[12] Metals from Fuel Oil Combustion (EPA AP-42, Section 1.3 Fuel Oil Combustion, Table 1.3-10).

GHG Emissions Compound [13]	NG Emissions (metric tons)	ULSD Emissions (metric tons)	GWP[14]	NG CO_2e	ULSD CO_2e
CO_2	9472.93	9492.45	1	9472.93	9492.45
CH_4	0.18	0.18	25	4.48	4.51
N_2O	0.018	0.018	298	5.32	5.46
Total	9473.13	9492.65		9482.71	9502.43

For CO2: Use Equation C-1 from 40 CFR 98 Subpart C:		ULSD & NG (ULSD)	(NG)
CO2 = 1x10-3 x Fuel x HHV x EF			
CO2 = Annual CO2 mass emissions in Metric Tons	=	9492.45	9472.93
Fuel = Volume of fuel used (standard cubic feet)	=	172,685,506	173,636,941
Fuel = Volume of fuel used (gallons)	=	6,998	
HHV = High Heat Value from Table C-1 (mmBTU/short ton)	=	0.138	0.001026
EFCO2 = Emission factor (kg/mmBTU)	=	73.96	53.07
For CH4 and N2O, Use Equation C-8 from 40 CFR 98 Subpart C:			
CH4, N2O = 1x10-3 x Fuel x HHV x EF			
CH4 = Annual CH4 mass emissions in Metric Tons	=	0.1804	0.1765
N2O = Annual N2O mass emissions in Metric Tons	=	0.01833	0.01785
Fuel = Volume of fuel used (standard cubic feet)	=	172,685,506	173,636,941
Fuel = Volume of fuel used (gallons)	=	6,998	
HHV = High Heat Value from Table C-1 (mmBTU/short ton)	=	0.138	1.03E-03
EFCH4 = Emission factor (kg/mmBTU)	=	3.00E-03	1.00E-03
EFN2O = Emission factor (kg/mmBTU)	=	6.00E-04	1.00E-04

Notes
[13] 40 CFR 98.32 - For stationary fuel combustion sources only, report CO2, CH4, and N2O
[14] GWP = Global Warming Potential - 40 CFR 98 Subpart A, Table A-1, revisions effective Jan 1, 2014.

St Lukes Orthopedic MOB
Wet Cooling Tower

Water Flow Rate (gal/min)	2,400	Design
Flow of cooling water (lbs/hr)	1,200,960	Calculated
TDS of blowdown (mg/l or ppmw) - Maximum ppm at blowdown	2,400	Design
Flow of dissolved solids (lbs/hr)	2,882	Calculated
Fraction of flow producing PM_{10} drift (See Note 2)	0.572	See Note 2
Fraction of flow producing $PM_{2.5}$ drift (See Note 2)	0.002	See Note 2
Control efficiency of drift eliminators (gal drift/gal flow)	0.0002	See Note 3
PM emissions from tower (lb/hr)	0.576	Calculated
PM_{10} emissions from tower (lb/hr)	0.330	Calculated
$PM_{2.5}$ emissions from tower (lb/hr)	0.001	Calculated
PM emissions from tower (tpy)	2.525	Calculated
PM_{10} emissions from tower (tpy)	1.444	Calculated
$PM_{2.5}$ emissions from tower (tpy)	0.005	Calculated

Other Parameters

Number of cells per tower (outlet fans)	2	1 CT
Height at cell release (ft):	36.0	
Height at cell release (m):	10.97	
Discharge flow per cell (ACFM):	146,337	per cell
Diameter of each cell (ft):	12.0	
Diameter of each cell (m):	3.66	
Area of cell discharge (ft^2):	113	
Average Temperature of cell discharge (degF):	77	
Average Temperature of cell discharge (K):	298.16	
Exit Velocity (ft/s):	21.6	
Exit Velocity (m/s):	6.57	

Notes:
(1) Cooling Tower design data from Evapco.
(2) From "Calculating Realistic PM_{10} Emissions From Cooling Towers" (J. Reisman, G. Frisbie). Presented at 2001 AWMA Annual Meeting.
(3) Based on AP-42, Table 13.4-1 by converting drift emission factor into percentage.

St Lukes Orthopedic MOB

TDS= **2,400** ppmw

EPRI Droplet Diameter (µm) [1]	Droplet Volume (µm3)	Droplet Mass (µg)	Particle Mass (Solids) (µg)	Solid Particle Volume (µm3)	Solid Particle Diameter (µm)	EPRI % Mass Smaller [1]	TSP % Mass Smaller	PM10 % Mass Smaller	PM2.5 % Mass Smaller
10	524	5.24E-04	1.26E-06	0.57	1.03	0			
20	4189	4.19E-03	1.01E-05	4.57	2.06	0.196			0.209
30	14137	1.41E-02	3.39E-05	15.42	3.09	0.226			
40	33510	3.35E-02	8.04E-05	36.56	4.12	0.514			
50	65450	6.54E-02	1.57E-04	71.40	5.15	1.816			
60	113097	1.13E-01	2.71E-04	123.38	6.18	5.702			
70	179594	1.80E-01	4.31E-04	195.92	7.21	21.348			
90	381704	3.82E-01	9.16E-04	416.40	9.26	49.812		57.202	
110	696910	6.97E-01	1.67E-03	760.27	11.32	70.509			
130	1150347	1.15E+00	2.76E-03	1254.92	13.38	82.023			
150	1767146	1.77E+00	4.24E-03	1927.80	15.44	88.012			
180	3053628	3.05E+00	7.33E-03	3331.23	18.53	91.032			
210	4849048	4.85E+00	1.16E-02	5289.87	21.62	92.468			
240	7238229	7.24E+00	1.74E-02	7896.25	24.71	94.091			
270	10305995	1.03E+01	2.47E-02	11242.90	27.79	94.689	85.476		
300	14137167	1.41E+01	3.39E-02	15422.36	30.88	96.288			
350	22449298	2.24E+01	5.39E-02	24490.14	36.03	97.011			
400	33510322	3.35E+01	8.04E-02	36556.71	41.18	98.34			
450	47712938	4.77E+01	1.15E-01	52050.48	46.32	99.071			
500	65449847	6.54E+01	1.57E-01	71399.83	51.47	99.071			
600	113097336	1.13E+02	2.71E-01	123378.91	61.77	100			

Data from "Calculating Realistic PM10 Emissions from Cooling Towers"

St Lukes Orthopedic MOB
PM Standard Calculations

Compliance with IDAPA Rule 677 PM Standard for Fuel Burning Equipment

Unit	Cleaver Brooks Dual	
Fuel	No. 2 Diesel	
Rated Heat Input (MM Btu/hr)	19.44	per boiler
PM Emission Rate (lb/hr)	0.46	
Exit/Flue Gas Flowrate Calculation		
F_d (Table 19-2, EPA Method 19) (dscf/MM Btu) [1,2]	9,190	
Exit flowrate @ 0% O_2: (acfm)	5,024	
Exit flowrate @ 0% O_2: (dscfm)[5]	2,325	
Exit flowrate @ 3% O_2 for Natural Gas: (dscfm) [3]	2,714	
Calculated Grain Loading (gr/dscf @ 3% O_2) [4]	0.020	per boiler
PM Loading Standard (IDAPA 58.01.01.677) (gr/dscf @ 3% 02)	0.050	
Compliance w/ PM Loading Standard	Yes	

[1] Appendix A-7 to 40 CFR part 60, Method 19—Determination of sulfur dioxide removal efficiency and particulate, sulfur dioxide and nitrogen oxides emission rates, Table 19-2 (F Factors for Various Fuels)

[2] Fd, Volumes of combustion components per unit of heat content (scf/million Btu). Fd for No. 2 diesel fuel is 9,190 dscf/106 Btu.

[3] (Flow $_{3\%}$) = (Flow $_{0\%}$)x (20.9/(20.9 - 3)), where 20.9 = Oxygen concentration in ambient air

[4] (PM lb/hr x (7,000 gr/lb) /flow (dscfm) x(60 min/ hr) = gr/dscf

St Lukes Orthopedic MOB
PM Standard Calculations

Compliance with IDAPA Rule 677 PM Standard for Fuel Burning Equipment

Unit	Cleaver Brooks Dual Fuel	
Fuel	Natural Gas	
Rated Heat Input (MM Btu/hr)	20.22	per boiler
PM Emission Rate (lb/hr)	0.15	
Exit/Flue Gas Flowrate Calculation		
F_d (Table 19-2, EPA Method 19) (dscf/MM Btu) [1,2]	8,710	
Exit flowrate @ 0% O_2: (acfm)	5,024	
Exit flowrate @ 0% O_2: (dscfm)[5]	2,325	
Exit flowrate @ 3% O_2 for Natural Gas: (dscfm) [3]	2,714	
Calculated Grain Loading (gr/dscf @ 3% O_2) [4]	0.007	per boiler
PM Loading Standard (IDAPA 58.01.01.677) (gr/dscf @ 3% 02)	0.050	
Compliance w/ PM Loading Standard	Yes	

[1] Appendix A-7 to 40 CFR part 60, Method 19—Determination of sulfur dioxide removal efficiency and particulate, sulfur dioxide and nitrogen oxides emission rates, Table 19-2 (F Factors for Various Fuels)

[2] Fd, Volumes of combustion components per unit of heat content (scf/million Btu). Fd for Natural gas fuel is 8710 dscf/106 Btu.

[3] (Flow $_{3\%}$) = (Flow $_{0\%}$)x (20.9/(20.9 - 3)), where 20.9 = Oxygen concentration in ambient air

[4] (PM lb/hr x (7,000 gr/lb) /flow (dscfm) x(60 min/ hr) = gr/dscf

[5] dscfm = acfm *(Standard Temp {R}) / (Stack Temp {R}) * (Stack Pressure {in Hg}) / (Standard Pressure {in Hg})

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: March 1, 2018

TO: William Tiedemann, Permit Writer, Air Program

FROM: Pao Baylon, Air Quality Modeler, Air Program

PROJECT: P-2018.0003 PROJ 61987, PTC from St. Luke's Health Services for a new orthopedic Medical Office Building in Boise, ID

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses

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Contents

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
BPIP	Building Profile Input Program
BLR1, BLR2	Dual-fired Boilers 1 and 2
BRC	Below Regulatory Concern
CFR	Code of Federal Regulations
CH2M	CH2M Hill, Inc
CMAQ	Community Multi-Scale Air Quality modeling system
CO	Carbon Monoxide
CT1A, CT1B	Cooling Tower with two fans
DEM	Digital Elevation Map
DEQ	Idaho Department of Environmental Quality
DV	Design Values
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GEN1	Diesel-fired Emergency Generator
GEP	Good Engineering Practice
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/sec	Meters per second
MC	Monte Carlo
MOB	Medical Office Building
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NED	National Elevation Dataset
NG	Natural Gas
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
OLM	Ozone Limiting Method
Pb	Lead
PM	Particulate Matter

$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
ppb	parts per billion
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
SIL	Significant Impact Level
SLHS	St. Luke's Health Services
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	Tons Per Year
ULSD	Ultra-Low-Sulfur Diesel
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
°F	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

St. Luke's Health Services (SLHS) submitted a Permit to Construct (PTC) application for their new orthopedic Medical Office Building (MOB) in Boise, Idaho. The original PTC application was received by DEQ on January 5, 2018. SLHS submitted a modeling protocol on September 20, 2017. DEQ provided a conditional approval letter on November 6, 2017, pending alternative methodology for adequately demonstrating compliance with NAAQS. Therefore, a modeling addendum was submitted by SLHS on December 5, 2017. A complete air quality impact modeling analysis was submitted to DEQ on January 5, 2018. The application was determined complete on February 5, 2018.

This memorandum provides a summary of the ambient air impact analyses submitted with the permit application. It also describes DEQ's review of those analyses, DEQ's verification and sensitivity analyses, additional clarifications, and conclusions.

CH2M Hill, Inc. (CH2M), on behalf of SLHS, prepared the PTC application and performed the ambient air impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Toxic Air Pollutant (TAP) increments, as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03, respectively (Idaho Air Rules Section 203.02 and 203.03). The DEQ review of submitted data and analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis. Moreover, emission calculation methods were not evaluated in this modeling review memorandum.

The submitted information and analyses, in combination with DEQ's verification analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emissions increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments.

Table 1 presents key assumptions and results to be considered in the development of the permit.

Idaho Air Rules require that air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information and analyses, in combination with DEQ's analyses, demonstrated to the satisfaction of the Department that operation of the proposed facility will not cause or significantly contribute to a violation of any ambient air quality standard, provided that the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ

permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure that the requirements of Appendix W are met regarding emissions representing design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Intermittent Emissions from Dual-fired Boilers and Diesel-fired Emergency Generator. The facility includes two dual-fired boilers and a diesel-fired generator. Only one of the boilers operates at any time on either ultra-low-sulfur diesel (ULSD; up to 48 hours per year) or natural gas (NG; for the remainder of the year), except when one of the boilers is fired on ULSD (when one boiler is tested, the other boiler will operate on NG). ULSD operations occur in 4-hour blocks, and DEQ sensitivity analyses indicate that the time of day when emissions occur is not critical for NAAQS compliance. The diesel-fired generator will operate for up to 100 hours per year for testing and maintenance. Emission rates used in the dispersion modeling analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Maintenance/testing ULSD operations were set to 48 hours per year for each boiler, and uncontrolled NG operations were set to 8712 hours per year for each boiler. Results from the worst-case scenario are compared to the NAAQS. The emergency generator will operate intermittently, up to a maximum of 5 hours per day. Compliance with NAAQS is not assured for operations outside of these restrictions.
Below Regulatory Concern for Criteria Pollutant Emissions. Facility-wide potential to emit (PTE) values for CO, SO_2, and Pb are less than 10 percent of the significant emission rate and therefore qualify for a Below Regulatory Concern (BRC) exemption as per Idaho Air Rules Section 221.	Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels.
Air Impact Analyses for Criteria Pollutant Emissions. Facility-wide PTE for annual and 24-hour $PM_{2.5}$[a], 24-hour PM_{10}[b], 1-hour NO_2, and annual NO_2 does not qualify them for a BRC exemption. Moreover, their short- and long-term emissions are greater than DEQ Level I modeling thresholds. Therefore, these pollutants and averaging times are subject to NAAQS Compliance Demonstration requirements.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above BRC thresholds, or for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used).
TAPS Modeling. There were no emission rates of any applicable TAPs that exceeded Emissions Screening Level (EL) rates of Idaho Air Rules Section 585 and 586.	Air impact analyses demonstrating compliance with TAPs, as required by Idaho Air Rules Section 203.03, is required for applicable pollutants having an emission rate greater than ELs. Because no applicable TAP emissions exceeded the ELs, a demonstration of compliance with TAP increments was not required.
Monte Carlo Method for Determination of 24-hour $PM_{2.5}$ Design Values. To provide a more accurate estimate of the probability of exceeding the 24-hour $PM_{2.5}$ NAAQS threshold, daily background pollutant concentrations for the project site are combined with daily air dispersion model output using the Monte Carlo Analysis developed by R. Dhammapala et al.[7]	DEQ performed a verification analysis using the same emissions release parameters and an additional sensitivity analysis assuming nighttime operation of the boilers. Results of the verification and sensitivity analyses still demonstrated compliance with NAAQS.

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

2.0 Background Information

This section provides background information applicable to the project and the site where the facility is located. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The proposed facility includes the following emission units: two dual-fired boilers (BLR1 and BLR2), one diesel-fired emergency generator (GEN1), and one cooling tower with two fans (CT1A and CT1B).

The main purpose of the boilers is to generate steam for space heating at the hospital. Both boilers are dual-fired and capable of combusting natural gas (NG; primary fuel) or ultra-low-sulfur diesel (ULSD; secondary fuel). Only one of these boilers operates at any time, with the other boiler used as a back-up. The exception to this is when one boiler is tested for firing on ULSD. When a boiler is tested on ULSD, the other boiler will operate on NG. St. Luke's Health Services (SLHS) proposes that the boilers operate on either ULSD for up to 48 hours per year, or NG for the remainder of the year. This operation restriction is incorporated into the dispersion modeling, and the worst-case scenario is compared with the NAAQS.

The emergency generator is diesel-fired and is used to provide electrical power to the hospital in the event of a power interruption. It will operate for up to 100 hours per year for testing and maintenance purposes. SLHS proposes to limit generator maintenance and testing to 5 hours each day.

The cooling tower is used to dissipate the large heat loads generated by the facility and is a source of $PM_{2.5}$ and PM_{10}. The two fans have been modeled as individual emission units.

2.2 Proposed Location and Area Classification

The new orthopedic Medical Office Building (MOB) will be located on the corner of Fairview and 27th Street in Boise City, Ada County, Idaho (Northing: 4829956 m; Easting: 562740 m; UTM Zone 11). The MOB campus covers approximately 7 acres of land and will contain a connected medical office building/hospital building, a utility yard, and a parking garage. The two dual-fired boilers will be located in the hospital building, while both the diesel-fired emergency generator and the cooling tower will be situated in the utility yard. The surrounding land is mostly residential, commercial, and light industrial. Terrain is flat in the immediate vicinity.

Ada County is a federally-designated Class II area. It is classified as a maintenance area for particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) and carbon monoxide (CO), and an area of concern for particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$) and ozone (O_3). While maintenance areas are geographic areas that are previously classified as nonattainment but are now consistently meeting the NAAQS, areas of concern are locations where monitoring data have indicated that compliance with NAAQS is threatened. Ada County is designated as attainment or unclassifiable for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb).

The MOB will be classified as a minor source based on its potential to emit (PTE), and this permit application will not trigger Prevention of Significant Deterioration (PSD) permitting requirements.

2.3 Air Impact Analyses Required for All Permits to Construct

Demonstration of compliance with NAAQS and TAPs are addressed in Idaho Air Rules Sections 203.02 and 203.03, respectively:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*

*02. **NAAQS**. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*

*03. **Toxic Air Pollutants.** Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

*02. **Estimates of Ambient Concentrations**. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the new facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification are not significant (that is, if they are less than the SILs), then the modeling is complete for that pollutant and averaging period. Compliance with NAAQS is demonstrated. However, if predicted impacts exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from facility-wide potential/allowable emissions, and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. For all pollutants, ambient background concentrations are obtained from the NW-AIRQUEST design value lookup tool.[2] (See Section 3.2 of this memorandum for more details on background concentrations). However, this approach assumes that the 98th (or 99th) percentile concentration from the source and background occur simultaneously. In reality, their distributions are largely independent. To account for this effect, CH2M used a Monte Carlo (MC) simulation where background concentrations are combined with American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) outputs. This method is detailed in Section 3.2.2 of this memorandum. The resulting pollutant concentrations in

ambient air are then compared to the NAAQS regulatory limit listed in Table 2, which also specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	NAAQS Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emission rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. As an example, consider a hypothetical case where the SIL analysis indicates the project (new source or modification) has impacts exceeding the SIL

and the cumulative impact analysis indicates a violation of the NAAQS. If project-specific impacts are below the SIL at the specific receptors showing the violations during the time periods when modeled violations occurred, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emissions increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[3]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis resulted in modeled NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emissions increase of any TAP associated with a new source or modification exceeds screening emission levels (Els) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with

applicable air quality impact requirements.

3.1 Emissions Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the MOB facility were provided by CH2M for various applicable averaging periods.

Review and approval of estimated emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analyses review included verification that the potential emission rates provided in the emission inventory were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the dispersion modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emissions Rates

Table 3 lists criteria pollutants for which site-specific air impact analyses were performed to demonstrate compliance with NAAQS. Facility-wide potential to emit (PTE) values for CO, SO_2, and Pb are less than the 10 percent of significant emission rate and therefore qualify for a Below Regulatory Concern (BRC) exemption as per Idaho Air Rules Section 221. These pollutants are not subject to NAAQS Compliance Demonstration requirements for the project under DEQ's regulatory interpretation policy and have not been modeled. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[3]" The interpretation policy also states that the exemption criteria of uncontrolled PTE not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year.

An air impact analysis must be performed for pollutant increases that would not qualify for the BRC exemption. Therefore, modeling was performed for annual and 24-hour $PM_{2.5}$, 24-hour PM_{10}, 1-hour NO_2, and annual NO_2. These pollutants and averaging times are subject to NAAQS Compliance Demonstration requirements.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, Nox, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Table 3. CRITERIA POLLUTANT NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY						
Source	**PM_{10}[a]**	**$PM_{2.5}$[b]**	**CO**	**SO_2**	**NOx**	**Pb**
GEN1	0.006	0.006	0.04	0.001	0.97	
BLR1 (NG[c])	0.66	0.66	1.66	0.05	3.10	4.34E-05
BLR1 (ULSD[d])	0.67	0.67	1.65	0.05	3.14	
Worst Case for BLR1	0.67	0.67	1.66	0.05	3.14	4.34E-05
BLR2 (NG)	0.66	0.66	1.66	0.05	3.10	4.34E-05
BLR2 (ULSD)	0.67	0.67	1.65	0.05	3.14	
Worst Case for BLR2	0.67	0.67	1.66	0.05	3.14	4.34E-05
Cooling Tower	1.44	0.005				
Applicable Facility-Wide PTE Emissions (tpy)	**2.79**	**1.35**	**3.36**	**0.11**	**7.25**	**8.68E-05**
BRC level (tpy)	**1.50**	**1.0**	**10.00**	**4.00**	**4.00**	**0.06**
Level I Threshold (tpy)	**0.22[e]**	**0.35**	**15.0[e]**	**1.20**	**1.20**	**14.0[f]**
Air Impact Analysis Required?	**Yes**	**Yes**	**No**	**No**	**Yes**	**No**

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
[c] Natural gas.
[d] Ultra-low-sulfur diesel.
[e] Short-term emission threshold in pounds per hour.
[f] Short-term emission threshold in pounds per month.

Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

The facility-wide VOC emission estimate of 0.64 tons/year falls below the emission rate considered by DEQ to warrant evaluation of VOCs as a precursor to ozone. Therefore, DEQ determined it was not necessary to require a quantitative source-specific O_3 impact analysis.

Secondary Particulate Formation

The impact from secondary particulate formation resulting from emissions of NOx, SO_2, and/or VOCs was assumed by DEQ to be negligible based on the magnitude of emissions. Therefore, secondary particulate matter (PM) is not modeled.

Emissions Rates Used in Significant Impact Level Analyses

SLHS has completed a cumulative, facility-wide modeling analysis rather than a project-based SIL

analysis to demonstrate compliance. Potential facility-wide estimates have been calculated for each emission unit, determined from manufacturer's data, EPA-established emission factors, and/or engineering calculations.

The emergency generator (GEN1) is an intermittent source. For testing and maintenance purposes, GEN1 will operate up to 5 hours/day. Therefore, the 24-hour emission rates for $PM_{2.5}$ and PM_{10} have been modeled as the calculated total emission rate for 5 hours of operation per day divided by 24.

$$0.13\frac{lb}{hr}(hourly\ emission\ rate) \times \frac{5\ hours\ of\ operation}{24\ hour\ day} = 0.027\frac{lb}{hr}(24-hour\ emission\ rate)$$

GEN1 will operate for not more than 100 hours/year. Therefore, the annual emission rate has been modeled as the calculated total emission rate for 100 hours of operation per year. Per the State of Idaho Guideline for Performing Air Quality Impact Analysis, Appendix A (September 2013), modeling for 1-hour NO_2 is no longer required for emergency generators that run intermittently. Thus, GEN1 has been excluded from 1-hour NO_2 modeling demonstration.

The dual-fired boilers (BLR1 and BLR2) may run on natural gas (NG) or ultra-low-sulfur diesel (ULSD). Both boilers will not operate concurrently except when one of the boilers is undergoing testing while using ULSD. NG is the primary fuel, but each boiler may fire on ULSD up to 48 hours per year for periodic operation testing purposes. The 1-hour NO_2 modeling setup accounts for the fuel variability by using a randomized hourly emission file in which the boilers are fired on ULSD for 48 hours per year (split between the two boilers and occurring in 4-hour blocks between 8AM and 6PM) and on NG for the remainder of the year. The 24-hour $PM_{2.5}$ modeling includes the 48 hours of ULSD operation and accounts for the lack of concurrent operations by including two scenarios: the first scenario uses an hourly emissions file in which only BLR1 operates on NG for the remainder of the year (BLR2 does not operate) and the second scenario uses an hourly emissions file in which BLR2 operates on NG for the remainder of the year (BLR1 does not operate). The worst-case of the two scenarios is used for comparison to the NAAQS.

Table 4 lists criteria pollutant emission rates used in the SIL analysis.

Table 4. MODELED EMISSION RATES FOR SIL ANALYSES					
Source ID	**Source Description**	**Pollutant**	**Averaging Period**	**Emissions (lb/hr)[a]**	
GEN1	Diesel-fired Generator	$PM_{2.5}$	24-hour	0.027	
			Annual	0.00148	
		PM_{10}	24-hour	0.027	
		NOx	1-hour	Not Modeled	
			Annual	0.221	
		SO_2	1-hour	Not Modeled	
		CO	1-hour	Not Modeled	
			8-hour	Not Modeled	
BLR1	Dual-fired Boiler 1	$PM_{2.5}$	24-hour	NG[b]	0.152
				ULSD[c]	0.459
			Annual	0.153	
		PM_{10}	24-hour	0.459	
		NOx	1-hour	NG	0.708
				ULSD	2.24
			Annual	0.716	
		SO_2	1-hour	Not Modeled	
		CO	1-hour	Not Modeled	
			8-hour	Not Modeled	
BLR2	Dual-fired Boiler 2	$PM_{2.5}$	24-hour	NG	0.152
				ULSD	0.459
			Annual	0.153	
		PM_{10}	24-hour	0.459	
		NOx	1-hour	NG	0.708
				ULSD	2.24
			Annual	0.716	
		SO_2	1-hour	Not Modeled	
		CO	1-hour	Not Modeled	
			8-hour	Not Modeled	
CT1A	Cooling Tower, Fan A	$PM_{2.5}$	24-hour	0.000602	
			Annual	0.000602	
		PM_{10}	24-hour	0.165	
		NOx	1-hour	0	
			Annual	0	
		SO_2	1-hour	Not Modeled	
		CO	1-hour	Not Modeled	
			8-hour	Not Modeled	
CT1B	Cooling Tower, Fan B	$PM_{2.5}$	24-hour	0.000602	
			Annual	0.000602	
		PM_{10}	24-hour	0.165	
		NOx	1-hour	0	
			Annual	0	
		SO_2	1-hour	Not Modeled	
		CO	1-hour	Not Modeled	
			8-hour	Not Modeled	

[a] 24-hour $PM_{2.5}$ and 1-hour NO_2 modeling used hourly emission rate files for the dual-fired boilers, BLR1 and BLR2.
[b] Natural gas.
[c] Ultra-low-sulfur diesel.

3.1.2 Toxic Air Pollutant Emissions Rates

TAP emissions regulations under Idaho Air Rules Section 210 are only applicable to new or modified sources constructed after July 1, 1995. Idaho Air Rules Section 210.20 state that no TAPs review is required under Idaho Air Rules Section 210 for TAPs that are already regulated by 40 CFR 63 as federal Hazardous Air Pollutants (HAPs). Therefore, the Idaho TAPs that are federal HAPs may be excluded

from the modeling analysis for the emergency generator and two dual-fired boilers. The cooling towers will not yield Idaho TAPs or federal HAPs.

After excluding emissions from sources exempt from the TAPs rules, no project-wide emissions of any TAP exceeded the applicable emissions screening levels (ELs) of Idaho Air Rules Section 585 or Section 586. Consequently, air impact modeling analyses were not required to demonstrate that impacts of TAP emissions are below the applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586.

3.1.3 Emissions Release Parameters

Table 5 provides emissions release parameters, including stack height, exhaust temperature, exhaust velocity, stack diameter, and orientation of release for emission sources modeled in the air impact analyses. Units in the English system are enclosed in parentheses.

Table 5. POINT SOURCE STACK PARAMETERS USED IN IMPACT MODELING ANALYSES

Release Point	Description	UTM[a] Coordinates		Stack Height in m (ft)	Stack Gas Flow Temp. in K[d] (°F)[e]	Stack Gas Flow Velocity in m/sec[f] (ft/s)[g]	Stack Diam. in m (ft)	Orient. Of Release[h]
		Easting in m[b] (ft)[c]	Northing in m (ft)					
GEN1	Diesel-fired Generator (Caterpillar) – Utility Yard	562826.86 (1846544.82)	4829910.96 (15846164.57)	3.45 (11.32)	750 (890)	1.53 (5.02)	1.64 (5.38)	VERTICAL
BLR1	Dual-fired Boiler #1 (Cleaver-Brooks) – Hospital Building	562816.36 (1846510.37)	4830021.33 (15846526.67)	16.71 (54.82)	462 (372)	8.12 (26.64)	0.61 (2.00)	RAINCAP
BLR2	Dual-fired Boiler #2 (Cleaver-Brooks) – Hospital Building	562816.38 (1846510.43)	4830019.79 (15846521.62)	16.71 (54.82)	462 (372)	8.12 (26.64)	0.61 (2.00)	RAINCAP
CT1A	Cooling Tower, Fan A (Evapco) – Utility Yard	562829.08 (1846552.1)	4829895.28 (15846113.12)	10.97 (35.99)	298 (76.7)	6.57 (21.56)	3.66 (12.0)	VERTICAL
CT1B	Cooling Tower, Fan B (Evapco) – Utility Yard	562829.08 (1846552.1)	4829898.95 (15846125.16)	10.97 (35.99)	298 (76.7)	6.57 (21.56)	3.66 (12.0)	VERTICAL

a. Universal Transverse Mercator (NAD83).
b. Meters.
c. Feet.
d. Kelvin.
e. Degrees Fahrenheit.
f. Meters per second.
g. Feet per second.
h. Vertical uninterrupted, rain-capped, or horizontal release.

CH2M provided detailed documentation and justification of emissions release parameters within the *Air Impact Modeling Analyses Report*, submitted as part of the application on September 2017. All stack parameters for the generator, boilers, and cooling tower were determined from the manufacturer's engineering specifications. DEQ has determined that these stack parameters represent best or

conservative design information at the time of permit application submittal. If release parameters change substantially with final design such that parameters no longer are a conservative representation of the emission sources, then these air impact analyses may be effectively invalidated and will not satisfy the requirements of Idaho Air Rules Section 203.02 and 203.03. Substantial changes from what was submitted in the application would include: 1) a decrease in stack height by more than about 10 percent; 2) a decrease in stack gas flow temperature by more than about 20 percent; 3) a change in source location by more than 10 meters, especially if closer to an ambient air boundary or closer to the design value receptor location; 4) construction of buildings near emission sources that could cause plume downwash.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS air impact modeling analysis is needed to demonstrate compliance with applicable NAAQS. Background design values (DV) for 24-hour PM_{10}, 1-hour NO_2, and annual NO_2 were obtained from NW-AIRQUEST[2] using the project site coordinates. These background air pollutant levels are based on regional scale air pollution modeling of Washington, Oregon, and Idaho, with values influenced by monitoring data as a function of distance from the monitor. The background concentration tool estimated the following background values for the MOB site in Boise: 24-hour PM_{10} = 75 $\mu g/m^3$; 1-hour NO_2 = 96 $\mu g/m^3$; annual NO_2 = 21 $\mu g/m^3$.

3.2.1 Annual $PM_{2.5}$

Because the NW-AIRQUEST data is based on the interpolation of modeled and monitored data for the years 2009-2011 and it does not accurately represent the most recent available ambient air measurements in the MOB facility, the background DV for annual $PM_{2.5}$ has been conservatively extrapolated from the nearest available monitoring background data in Meridian, ID (approximately 6.4 miles from the MOB site). To account for this disparity, a spatially- and temporally-representative background DV has been derived for annual $PM_{2.5}$ by (1) calculating the ratio between the annual DV at MOB and the annual DV at the Meridian site; and (2) multiplying this ratio by the most recent available DV for the Meridian site. This calculation yields an annual $PM_{2.5}$ DV of 9.5 $\mu g/m^3$ at the MOB site. DEQ has determined that this estimate for annual background $PM_{2.5}$ is reasonably representative and adequate for the analyses.

3.2.2 24-hour $PM_{2.5}$

The standard approach of adding representative background pollutant concentrations to modeled values for determining compliance with air quality standards assumes that the regulatory design value (the upper 98th percentile concentration) resulting from modeled emissions of the source and design value background concentrations occur simultaneously. This is a very conservative assumption because these two distributions are largely independent in most cases. Worst-case modeled emissions from the MOB facility are associated with intermittent use of diesel for the testing of boilers and emergency generators while worst-case background values are associated with regional meteorology and temporally varying pollutant emissions from other sources. Both scenarios are mostly independent. Hence, the original method of using a single 24-hour $PM_{2.5}$ background design value typically leads to overestimates of air quality impacts.

A Monte Carlo (MC) method described in the article "*A Monte Carlo Method for Summing Modeled and Background Pollutant Concentrations*" was used to combine AERMOD output and background concentrations.[1] A script written for R was submitted with the application. The MC method randomly selects and combines background concentrations and modeled values from the same month for each day of the year to create a representative year of AERMOD + background values, from which the 98th percentile design value at each receptor is obtained. The whole process is repeated 1000 times. The

median of the 1000 98th percentile values is selected as the most likely design value at each modeled receptor. The script also calculates probabilities of each receptor exceeding the NAAQS.

3.3 NAAQS Impact Modeling Methodology

This section describes the modeling methods used by CH2M and DEQ to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

CH2M performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. Results of the submitted information/analyses, in combination with DEQ's verification and sensitivity analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum. Table 6 provides a brief description of parameters used in the modeling analyses.

Table 6. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Ada County, ID	Ada County is a federally-designated Class II area. It is classified as a maintenance area for PM_{10} and CO, and an area of concern for $PM_{2.5}$ and O_3. Ada County is designated as attainment or unclassifiable for SO_2, NO_2, and Pb.
Model	AERMOD	AERMOD version 16216r, with the PRIME downwash algorithm.
Meteorological Data	The surface and upper air data (2012-2016) are from the Boise Air Terminal (surface met ID: 726810, upper-air ID: 24131). No on-site data were used.	The meteorological model input files for this project were developed by IDEQ. The data were processed using the latest version of AERMET (v16216) and the "ADJ_U*" option, in accordance with current EPA modeling guidance (EPA, 2017).
Terrain	Considered	AERMAP (Version 11103) was used to process terrain elevation data for all buildings and receptors using National Elevation Dataset (NED) files prepared by the USGS. AERMAP first determines the base elevation at each building and receptor. For complex terrain situations, AERMOD captures the physics of dispersion and creates elevation data for the surrounding terrain identified by a parameter called hill height scale. AERMAP creates hill height scale by searching for the terrain height and location that has the greatest influence on dispersion for each individual source and receptor. Both the base elevation and hill-height scale data are produced for each receptor by AERMAP as a file or files that can be directly accessed by AERMOD.
Building Downwash	Considered	Building influences on stacks are calculated by incorporating the updated EPA Building Profile Input Program for use with the PRIME algorithm (BPIP-PRIME). The stack heights used in the dispersion modeling are the actual stack heights.
NOx Chemistry	ARM2	The ARM2 method is a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option.
Receptor Grid	**Significant Impact Analysis** The ambient air boundary is defined as the perimeters of the buildings (hospital building, medical office building, parking garage, utility yard, and off-site buildings) since the public has direct access to the hospital buildings and to the perimeter of the utility yard. The selection of receptors for use in AERMOD is as follows:	
	Grid 1	A 10-meter grid extended approximately 100 meters from the building perimeter.
	Grid 2	A 100-meter grid extended approximately 1 kilometer from the ambient air boundary.

	Grid 3	A 500-meter grid extended approximately 5 kilometers from the ambient air boundary.
	NAAQS Analysis The same receptor grid was used for the NAAQS analysis as for the Significant Impact Analysis.	
	TAPs Analysis N/A	

3.3.2 Modeling Protocol and Methodology

A modeling protocol, describing data and methods proposed for the project, was submitted to DEQ on September 20, 2017. DEQ provided a conditional approval letter on November 6, 2017. Alternative methodology for demonstrating compliance with the NAAQS 24-hour and annual $PM_{2.5}$ average period was discussed. A modeling protocol addendum was submitted to DEQ on December 5, 2017. Final project-specific modeling and other required impact analyses were generally conducted using data and methods as discussed with DEQ and as described in the *Idaho Air Quality Modeling Guideline.*[4]

3.3.3 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady-state, multiple-source, Gaussian dispersion model American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was promulgated as the replacement model for Industrial Source Complex Short Term 3 (ISCST3) in December 2005. AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 16216r was used by DEQ for the modeling analyses to evaluate air pollutant impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.4 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum.*[5] The guidance outlines a three-tiered approach:

- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

CH2M used the Tier 2 Ambient Ratio Method 2 (ARM2) to conservatively account for NO/NO_2 chemistry. A minimum and maximum NO_2/NOx ratio of 0.5 and 0.9, respectively, were specified in the model. These are default values defined by EPA regulatory guidance for stationary source modeling.

3.3.5 Meteorological Data

DEQ provided CH2M with meteorological data which includes five years (2012-2016) of standard

National Weather Service (NWS) data from the Boise Air Terminal. The data were processed using the latest version of AERMET (v16216) and the "ADJ_U*" option, in accordance with current EPA modeling guidance (EPA, 2017). These model-ready input files were provided as .SFC and .PFL files and e-mailed to CH2M on November 6, 2017.

3.3.6 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) files.

The terrain preprocessor AERMAP Version 11103 was used by CH2M to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain.

3.3.7 Facility Layout

Because all modeled sources and buildings are planned but have not yet been constructed, source and building locations have been determined using the most up-to-date available architectural site drawings. DEQ verified proper identification of the site location, equipment locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to plot plans submitted in the application. Aerial photographs on Google Earth (available at https://www.google.com/earth) were also used to assure that horizontal coordinates were accurate as described in the application.

3.3.8 Effects of Building Downwash on Modeled Impacts

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD. One existing off-site building, located to the east of the site across 25th St., was also included for its potential downwash effects. All other off-site buildings are less than 20 feet high and located more than 100 feet from modeled sources, and they will not have downwash effects on the modeled stacks. Stack heights used in the dispersion modeling were also determined from architectural plans.

3.3.9 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." Ambient air consists of the perimeters of the MOB facility, including the hospital building, medical office building, and parking garage. The utility yard is open to the atmosphere, but public access to the yard is precluded by a wall and steel gates. Therefore, the ambient air boundary around the yard is taken to be the perimeter of the utility yard wall. DEQ has determined that measures described in the application to preclude public access to areas of the site excluded from ambient air are adequate.

3.3.10 Receptor Network

Because no fenceline exists, a receptor grid with 10-meter spacing was created around all ambient air boundaries and extending to a distance of approximately 100 meters from the ambient air boundary. Additional 100-meter and 500-meter grids extended approximately 1 kilometer and 5 kilometers, respectively, from the ambient air boundary. Table 6 describes the receptor grid used in the submitted analyses. The receptor grid used in the submitted analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*[4] and DEQ determined that it was adequate to resolve maximum modeled impacts. A receptor grid extending out beyond 7,000 meters from the facility boundary was not necessary for these analyses because pollutants are emitted from relatively short stacks that will cause maximum impacts very close to the source, typically at or very close to the ambient air boundary.

All receptors for which the design value (DV) used for comparison to the NAAQS is greater than 85 percent of the NAAQS value are located within the closest (10-meter) grid spacing. This is demonstrated for 24-hour $PM_{2.5}$ in Figure 1. Maximum DV for other modeled pollutants are less than 85 percent of the NAAQS value.

3.3.11 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

$H = S + 1.5L$, where:

- H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.
- S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.
- L = lesser dimension, height or projected width, of the nearby structure.

All sources in the new facility are below GEP stack height. Therefore, it is important to account for plume downwash caused by structures at the facility.

4.0 NAAQS Impact Modeling Results

This section describes the modeling results for both NAAQS and TAP impact analyses.

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analyses

The Modeling Protocol requires that the maximum predicted impacts from the facility be first compared to their respective significant impact levels (SILs). Table 7 provides the results of the SIL analyses. The maximum predicted impacts from the MOB facility are above the SIL for 24-hour and annual $PM_{2.5}$, 24-hour PM_{10}, and 1-hour and annual NO_2. Therefore, a cumulative NAAQS analysis was conducted for these pollutants.

Table 7. RESULTS FOR SIGNIFICANT IMPACT LEVEL ANALYSES					
Pollutant	**Averaging Period**	**Maximum Modeled Concentration ($\mu g/m^3$)[a]**	**Significant Contribution Level ($\mu g/m^3$)**	**Impact Percentage of Significant Contribution Level**	**Cumulative NAAQS Analysis Required?**
$PM_{2.5}$[b]	24-hour	8.57[g]	1.2	714%	Yes
	Annual	0.88[g]	0.3	294%	Yes
PM_{10}[c]	24-hour	18.5	5.0	370%	Yes
NO_2[d]	1-hour	118.44[g]	7.5	1579%	Yes
	Annual	9.04	1.0	904%	Yes
SO_2[e]	1-hour	BRC Exempt; Not Modeled	7.8	BRC Exempt; Not Modeled	No
	3-hour		25		No
	24-hour		5		No
	Annual		1.0		No
CO[f]	1-hour	BRC Exempt; Not Modeled	2,000	BRC Exempt; Not Modeled	No
	8-hour		500		No

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
e. Sulfur dioxide.
f. Carbon monoxide.
g. Maximum 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of the maximum modeled concentration for each year modeled.

4.1.2 Cumulative NAAQS Impact Analyses

For each modeled pollutant, the Total Impact was calculated by adding the design value (DV) of the impact to the ambient background value. The sum was compared to the NAAQS. The cumulative NAAQS impact analysis shows that modeled 1-hour and annual NO_2, 24-hour and annual $PM_{2.5}$, and 24-hour PM_{10} impacts do not violate their respective NAAQS. These results are summarized in Table 8.

The Total Impact for 24-hour $PM_{2.5}$ was calculated using the Monte Carlo (MC) Method described in Section 3.2.2 of this memorandum and incorporates daily background values for $PM_{2.5}$. This value (30.14 $\mu g/m^3$) is below the NAAQS (35 $\mu g/m^3$). The total probability of each receptor exceeding the 24-hour $PM_{2.5}$ NAAQS was also calculated and is shown in Figures 1a and 1b, using the hourly emission rate files for Boilers 1 and 2, respectively. The maximum probability of exceedance is 4.80 percent, and occurs at the ambient air boundary. Although the analysis demonstrates some probability of exceeding the NAAQS, this would only occur when worst-case background conditions combine with worst-case emissions and worst-case dispersion conditions. Finally, the potential area of impact (where concentrations exceed the 24-hour $PM_{2.5}$ SIL) is small, extending less than 400 feet from the ambient air boundary at its widest point.

Table 8. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSES					
Pollutant	**Averaging Period**	**Modeled Design ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Impact ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**
$PM_{2.5}$[b]	24-hour	5.08[g]	Daily values used	30.14[g]	35
	Annual	0.88[h]	9.52	10.40[h]	12
PM_{10}[c]	24-hour	16.10[i]	75.00	91.10[i]	150
NO_2[d]	1-hour	62.24[g]	95.89	158.13[g]	188
	Annual	9.05	20.68	29.73	100
SO_2[e]	1-hour	Not modeled			196
	3-hour				1,300
	24-hour				365
	Annual				80
CO[f]	1-hour				40,000
	8-hour				10,000

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
d. Nitrogen dioxide.
e. Sulfur dioxide.
f. Carbon monoxide.
g. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of 8th highest modeled concentrations for each year modeled.
h. Maximum of 5-year means (or a lesser averaging period if less than 5 years of meteorological data were used in the analyses) of maximum modeled concentrations for each year modeled.
i. Maximum of 6th highest modeled concentrations for a 5-year period (or the maximum of the 2nd highest modeled concentrations if only 1 year of meteorological data are modeled).

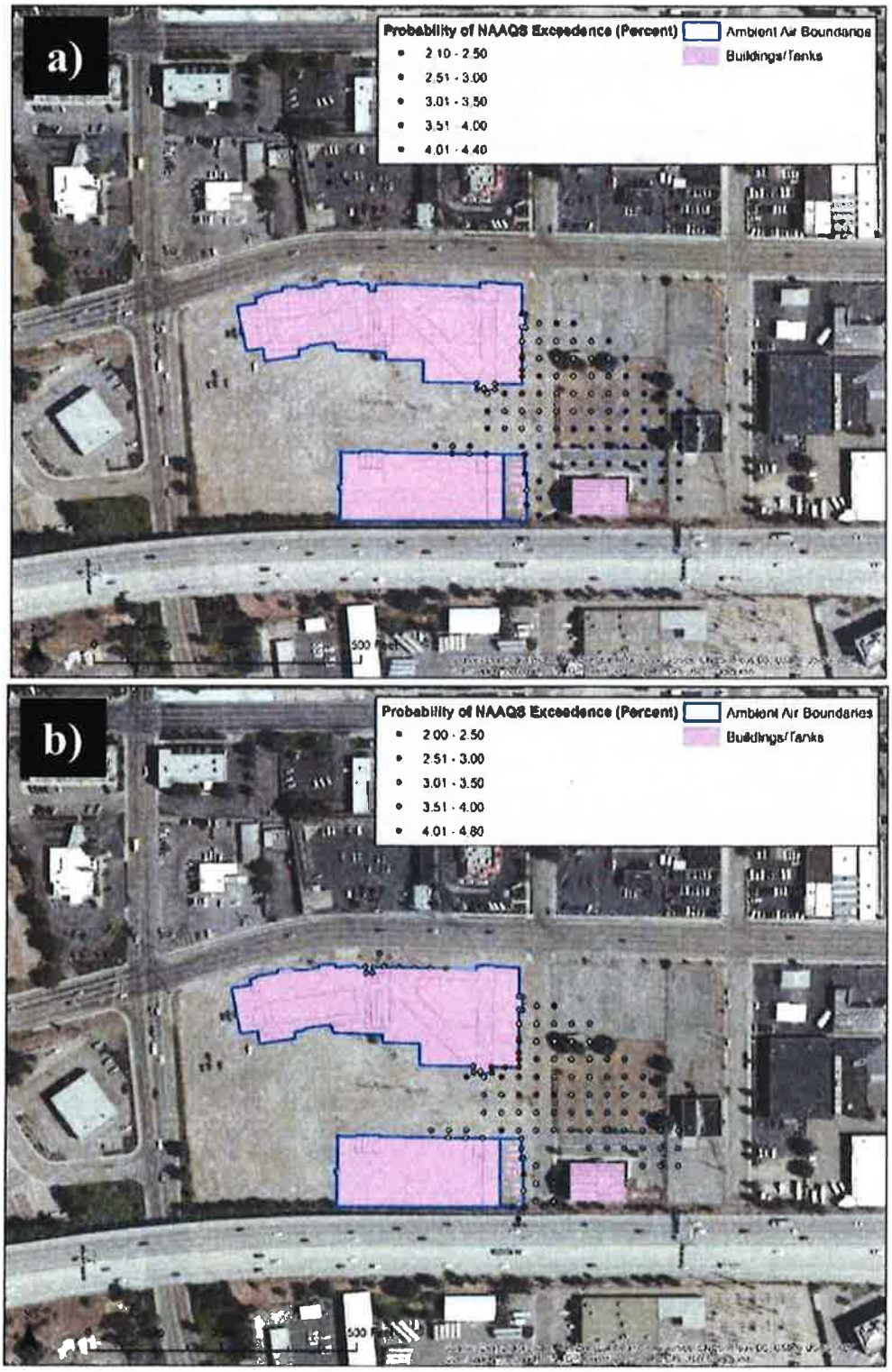

Figure 1. Probability of exceedance of the NAAQS for 24-hour $PM_{2.5}$, shown for all receptors which exceed the SIL, using the (a) BLR1 and (b) BLR2 hourly emission files.

4.1.3 DEQ Sensitivity and Verification Analyses

DEQ performed a sensitivity analysis to investigate the potential for nighttime operation of the boilers, for testing operations while using diesel fuel, to increase design value 24-hour $PM_{2.5}$ impacts, and a verification analysis for the Monte Carlo (MC) simulations. Sensitivity analyses are performed to evaluate how sensitive model results are to changes in the input parameters, such as source exhaust flow rates, exhaust temperatures, etc. Verification analyses assure that model output results, given the specified input parameters, are accurate and reproducible.

Nighttime-Operation Sensitivity Analysis

SLHS proposes to run the boilers on ULSD for no more than 48 hours per year. These operations occur in 4-hour blocks from 8AM to 6PM. Figure 2 shows a frequency plot of the time of day when the boilers run on ULSD. These hours are extracted from the external emission rate files that CH2M used as input to the dispersion model.

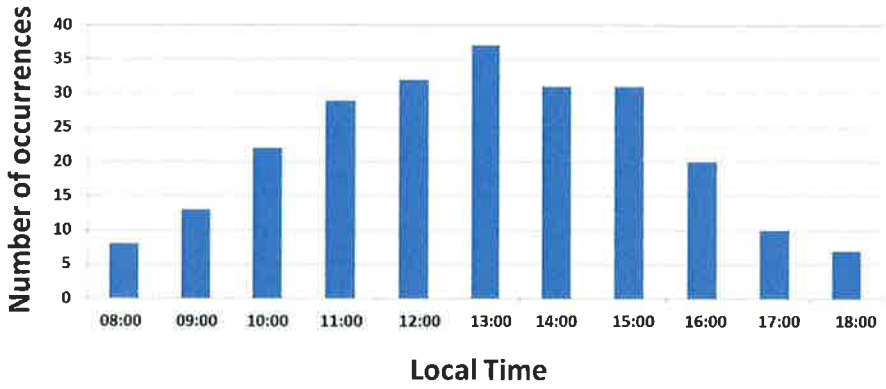

Figure 2. Frequency plot for daytime hours when the boilers are running on ultra-low-sulfur diesel (ULSD).

To investigate the potential for nighttime operations to impact 24-hour $PM_{2.5}$ values, DEQ performed a sensitivity test by altering the external emission rate files. Instead of running the boilers from 8AM to 6PM, a worst-case scenario where the boilers run only from 8PM to 6AM of the following day was considered. Everything else was held constant. Nighttime meteorology is typically characterized by more stable atmospheric conditions and the least amount of plume dispersion. Therefore, running the dispersion model under nighttime conditions will allow us to evaluate potential NAAQS compliance issues.

From 2012-2016, the mean ± 1σ (one standard deviation) daytime (8AM-6PM) wind speed at Boise Air Terminal is 3.86 ± 2.18 meters per second, while the nighttime (8PM-6AM) mean is 3.13 ± 1.74 meters per second. Nighttime wind speeds are lower on average than daytime wind speeds but the difference is not significant.

The modeled 8th-highest 24-hour $PM_{2.5}$ impact averaged over 5 years, from the DEQ sensitivity analysis, was 5.08 μg/m^3. This value is identical to that obtained from the analysis performed by CH2M (Table 8 of this memorandum) and submitted with the application.

DEQ does not find any significant consequences or any evidence for NAAQS compliance issues assuming the boilers operate during the night.

Monte Carlo Verification Analysis

To ensure accuracy and reproducibility, DEQ performed a total of four Monte Carlo (MC) simulations for both daytime and nighttime operation of the boilers. The maximum total impact (background + AERMOD) ranged from 29.91 to 30.04 $\mu g/m^3$. These are similar to that simulated by CH2M (30.14 $\mu g/m^3$; Table 8 of this memorandum). These values are below the 24-hour $PM_{2.5}$ NAAQS (35 $\mu g/m^3$).

The probability for the receptors exceeding the NAAQS threshold, assuming nighttime operation of the boilers, ranges from 4.00 to 6.10 percent which is in the same range as the 4.80 percent reported by CH2M. Nighttime probabilities are slightly higher than daytime and this could be because of the lower average wind speeds and lesser atmospheric turbulence during the night.

Overall, DEQ does not find any significant $PM_{2.5}$ NAAQS compliance issues. The Department agrees that the analyses presented by the applicant are adequate to support their conclusions. The submitted information, in combination with results from DEQ's calculations, demonstrates the new facility's compliance with applicable air quality standards.

4.2 Results for TAPs Impact Analyses

Site-specific TAP impact analyses were not required for the MOB facility because applicable facility-wide emissions of all TAPs are below ELs.

5.0 Conclusions

The information submitted with the PTC application, combined with DEQ air impact sensitivity and verification analyses, demonstrated to DEQ's satisfaction that emissions from the new orthopedic Medical Office Building will not cause or significantly contribute to a violation of any ambient air quality standard.

References

1. Dhammapala, R., Bowman, C., and Schulte, J. *A Monte Carlo method for summing modeled and background pollutant concentrations*, Journal of the Air & Waste Management Association, 67:8, 836-846, DOI: 10.1080/10962247.2017.1294546. 2017.

2. Air Quality Environmental Science and Technology Consortium (NW AIRQUEST). *Lookup 2009-2011 Design Values of Criteria Pollutants*. 2017. Available at: http://lar.wsu.edu/nw-airquest/lookup.html.

3. *Policy on NAAQS Compliance Demonstration Requirements.* Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

4. *State of Idaho Guideline for Performing Air Quality Impact Analyses.* Idaho Department of Environmental Quality. State of Idaho DEQ Air Doc. ID AQ-011. September 2013. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

5. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard.* Office of Air Quality Planning and Standards.

Air Quality Modeling Group. Research Triangle Park, NC. Guidance memorandum from R. Chris Owen and Roger Brode to Regional Dispersion Modeling Contacts. September 30, 2014.

APPENDIX C – FACILITY DRAFT COMMENTS

The facility purposed no comments to facility draft.

APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**St. Lukes MOB - 27th Development**
Address:	**27th St and Fairview St**
City:	**Boise**
State:	**ID**
Zip Code:	**83702**
Facility Contact:	**Jeff Hull**
Title:	**Owner's Representative**
AIRS No.:	**621111**

N	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Did this permit require engineering analysis? Y/N
N	Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	4.2	0	4.2
SO_2	0.1	0	0.1
CO	1.7	0	1.7
PM10	2.1	0	2.1
VOC	0.3	0	0.3
TAPS/HAPS	0.2	0	0.2
Total:	5.6	0	**8.6**
Fee Due	**$ 2,500.00**		

Comments: New source or modification to existing source with increase of emissions of one (1) to less than ten (10) tons per year (IDAPA 58.01.01.225)