June 6, 1997

MEMORANDUM

TO: Orville D. Green, Assistant Administrator
Air & Hazardous Waste

FROM: Martin Bauer, Chief
Air Quality Permitting Bureau

SUBJECT: Issuance of Tier II Operating Permit #005-00029
Idaho State University; Pocatello

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

FACILITY DESCRIPTION

Idaho State University (ISU) operates seventeen (17) boilers and two (2) incinerators.

PROJECT DESCRIPTION

This project involves the issuance of a Tier II Operating Permit (OP) that limits ISU's potential to emit (PTE)of each of the oxides of sulfur and oxides of nitrogen to below 100 tons per year (tpy). Specifically, this operating permit only limits the potential to emit of the Steam Plant #2 Boiler (#2 Boiler) and the Gail Life Sciences Building #1 and #2 Incinerators (#1 and #2 Incinerators). These three (3) pieces of combustion equipment drive ISU's PTE over 100 tpy.

SUMMARY OF EVENTS

On December 26, 1996, the Division of Environmental Quality (DEQ) received ISU's official Tier II operating permit application. DEQ deemed the application complete on February 18, 1997.

On April 4, 1997, a proposed Tier II OP was issued for public comment. The public comment period was from April 23, 1997, through May 23, 1997. No comments were received.

RECOMMENDATIONS

Based on the review of the Tier II OP application materials and of applicable state and federal rules and regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Idaho State University's Pocatello facility be issued a Tier II OP. Staff members also recommend that the facility be notified in writing of the obligation to pay permit application fees for the Tier II OP.

ODG\MB\ABC:jrj...\permit\id-state\isu-f.IMM

Attachment

cc: M. Lowe, Pocatello Regional Office
OP File Manual
Source File
COF

April 4, 1997

MEMORANDUM

TO: Martin Bauer, Chief
Air Quality Permitting Bureau
Air & Hazardous Waste

FROM: Almer B. Casile, Air Quality Engineer ABC
Air Quality Permitting Bureau
Operating Permits

THROUGH: Susan J. Richards, Air Quality Permits Manager
Air Quality Permitting Bureau
Operating Permits

SUBJECT: Technical Analysis for Proposed Tier II Operating Permit #005-00029
Idaho State University, Pocatello

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

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SUMMARY OF EVENTS

On February 29, 1996, DEQ notified ISU of the need to pay registration fees. ISU submitted the requested registration fees and submitted a letter on August 15, 1996, clarifying its major facility status. ISU later clarified the intent of this letter by stating that it served as its draft permit application. DEQ responded to this letter on September 18, 1996 by requesting further information. DEQ received this information on October 28, 1996, and requested additional information on November 7, 1996. DEQ received the requested information on November 18, 1996. DEQ received ISU's official Tier II operating permit application on December 26, 1996. ISU amended its application on January 28, 1997, and January 29, 1997. On February 18, 1997, DEQ deemed the application complete. DEQ requested that ISU certify its application per IDAPA 16.01.01.123 and 124 on February 21, 1997. ISU then amended its application on March 11, 1997.

DISCUSSION

1. Area Classification

   The facility is located in Pocatello, Idaho, which is classified as nonattainment for PM_{10} and attainment for all other criteria pollutants.

2. Emission Estimates

   Worst case emission estimates can be found in Appendix A. The facility has requested that the #2 Boiler be limited to a heat input $32x10^6$ Btu per hour, or a steam output of 25,088 pounds per hour. Emission estimates for the #2 Boiler have been calculated for 7 operating scenarios. Staff also received the emission estimates for the Gail Life Sciences Building Incinerators #1 and #2.

   All seven (7) operating scenarios assume operation at maximum hourly fuel throughput/input at 8760 hours of operation per year for all combustion equipment except the #2 Boiler and Gail Life Sciences Building Incinerators #1 and #2. See Table 1 for the operating conditions of all combustion equipment, except the #2 Boiler and Gail Life Sciences Building Incinerators #1 and #2. See Table 2 and 3 for the operating conditions of the #2 Boiler and Gail Life Sciences Building Incinerators #1 and #2.

Scenario	Heat Input		SO_2	NO_x	CO
	Natural Gas	Coal			
	10^6 Btu/hr	10^6 Btu/hr	TPY	TPY	TPY
1	31.5	0.5	1.13	69.65	17.33
2	23.02	8.98	67.19	103.94	17.00
3	15.6	16.4	37.17	99.39	14.90
4	19.9	0.5	4.77	62.54	15.61
5	11.42	8.98	67.16	96.83	15.22
6	4.0	16.4	67.14	92.28	14.08
7	0	32	67.13	89.83	13.47

Scenarios 1-3, and 7 assume that total heat input of the #2 Boiler is limited to $32x10^6$ Btu per hour. All scenarios above, except scenarios 1 and 4, burn 3,854 tons of coal annually. The Permittee's request to be limited to $32x10^6$ Btu per hour heat input could not be granted because annual NO_x emissions would cause the Permittee to be major under the conditions of Scenario 2. Scenarios 4-6 assume that total heat input of the #2 Boiler is limited to $20.4x10^6$ Btu per hour. (This heat input value corresponds to upper limit of the operating range in which the #2 Boiler burns natural gas and coal. The total heat input of $20.4x10^6$ Btu per hour from natural gas and coal corresponds to a steam production rate of 16,000 pounds per hour). Please note that the requested daily limits and daily compliance determination procedures could not be granted because the above annual estimate are within five (5) tons of the major facility threshold. The requested daily limits and daily compliance determination procedures would not conservatively assure a synthetic minor status.

In order to limit NO_x emission to below 100 tons per year, the Permittee has been limited to a steam production rate of 16,000 pounds per hour (which corresponds to a heat input rate of $20.4x10^6$ Btu per hour) <u>when burning any combination of coal and natural gas</u>. In order to give the Permittee the ability to respond to maximum steam demand, the Permittee has also been limited to a steam production rate of 25,090 pounds per hour (equivalent to a heat input rate $32x10^6$ Btu per hour) <u>when burning only coal</u>. It should be noted, however, that worst case annual NO_x and SO_2 emission estimates that fall below the major facility threshold occur under the conditions of Scenario 5. Worst case CO emission occur under the conditions of Scenario 4. Worst case short-term NO_x and SO_2 emission estimates occur under the conditions of Scenario 7 on Table 3.

PM_{10} emission estimates were performed for all 7 operating scenarios. The Permittee provided documentation as to the percent ash content, 2.64%, of the coal burned. Emission estimates were performed at 5% ash content in order to provided the most conservative estimates, and to allow for variances in ash content of coal purchased. From the estimates provided in Table 4, the Permittee would not exceed the major facility threshold even if it burned coal with a 10% ash content.

In order to determine compliance with these operating requirements, the Permittee shall be required to record the date and time when the #2 Boiler begins and stops burning natural gas. The Permittee is also required to determine continuously the hourly steam production of the #2 Boiler. (The Permittee stated that circular charts of steam production were already produced on-site. It is assumed that Permittee would use this information to demonstrate compliance with the operating requirement).

Review of the submitted calculations regarding Gail Life Sciences Building Incinerators #1 and #2 revealed that the Permittee did not included maximum throughput values. Without these values, staff could not perform a worst case emission analysis on either incinerator. Also, the Permittee did not submit emissions data for Gail Life Sciences Building Incinerator #1. By using the submitted data, staff have placed total maximum hourly, and annual throughput limitations on the incinerators, and avoided the need to request further data.

The Permittee is now required to record the total amount of material burned per hour and per month in the incinerators.

The remaining combustion equipment given in Appendix A are assumed to operate at their maximum rated heat input. If these pieces of equipment were to be included in the permit, they would have been permitted at their potential to emit. Staff felt this was unnecessary because the operating requirements would only reflect maximum hourly and annual operating rates, and an unnecessary monitoring burden would have been placed on the Permittee.

3. Facility Classification

Without federally enforceable permit conditions, this facility would be considered major for SO_x and NO_x, as defined in IDAPA 16.01.01.008.014. The facility is no longer considered major, however, because the proposed permit limits the facility's potential to emit below 100 T/yr for NO_x and PM. The facility is not a designated facility, as defined in IDAPA 16.01.01.006.25. The facility is an educational institution (SIC 8221).

4. Regulatory Review

This Tier II OP is subject to the following permitting regulations:

IDAPA 16.01.01.006	Definitions;
IDAPA 16.01.01.401	Tier II Operating Permit;
IDAPA 16.01.01.402	Application Procedures;
IDAPA 16.01.01.403	Permit Requirements;
IDAPA 16.01.01.404	Procedure for Issuing Permits;
IDAPA 16.01.01.405	Conditions for Tier II Operating Permit;
IDAPA 16.01.01.406	Obligation to Comply;
IDAPA 16.01.01.470	Permit Application Fees for Tier II Permits;
IDAPA 16.01.01.625	Visible Emissions Limitations;
IDAPA 16.01.01.677	Standards for Minor and Existing Sources, and;
IDAPA 16.01.01.729	Coal.

5. AIRS

The abbreviated AIRS data entry sheet is located in Appendix B.

FEES

Upon issuance of this permit, this facility is not a major facility as defined in IDAPA 16.01.01.008.14. Therefore, registration and registration fees, in accordance with IDAPA 16.01.01.526, are not applicable. Permit application fees, in accordance with IDAPA 16.01.01.470 are, however, applicable.

RECOMMENDATIONS

Based on the review of the Tier II OP application materials and of applicable state and federal rules and regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Idaho State University be issued a proposed Tier II OP. An opportunity for public comment on the air quality aspects of the proposed OP shall be provided as required by IDAPA 16.01.01.404.01. Staff members also recommend that the facility be notified in writing of the obligation to pay permit application fees for the Tier II OP.

MS\SJR\ABC:jrj...\permit\isu\isu.TM

Attachment

cc: M. Lowe, Pocatello Regional Office
Source File
COF

Table 1

Facility: Idaho State University - Physical Plant
Address: Campus Box [illegible]
Pocatello, Idaho [illegible]
Project: Year 1: Operation Permit

Point Sources																										
ID	Source Name	Design Heat Input (10^6 Btu/hr)	Actual Heat Input (10^6 Btu/hr)	Fuel Type	Firing Rate (gal/hr)	Annual Fuel Used (gal/yr)	Operating Hours per day	Operating Hours per year	Winter Heat Input per day	Summer Heat Input per year	Summer Heat Input per year	Fuel Notes	NOx EMF Emission Factor	NOx Emissions (lb/hr)	SO2 Emission Factor	SO2 Emissions (lb/hr)	CO Emission Factor	CO Emissions (lb/hr)	VOC Emission Factor	VOC EMF Emissions (lb/hr)	NOx Emissions (tons/yr)	SO2 Emissions (tons/yr)	CO Emissions (tons/yr)	VOC Emissions (tons/yr)	NOx Emissions (tons/yr)
														(lb/hr)	(lb/month)	(lb/month)	(lb/month)	(lb/month)	(lb/month)	(lb/month)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
[illegible]	Steam Plant Boiler #1	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Steam Plant Boiler #2 (N G Combustion)	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
					(gal/hr)	(tons)								(lb/ton)	(lb/ton)	(lb/ton)	(lb/ton)	(lb/ton)	(lb/ton)							
[illegible]	Steam Plant Boiler #2 (Coal Combustion)	[illegible]	[illegible] Coal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Steam Plant Boiler #2 (Total Combustion)																			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Steam Plant Boiler #3	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Turner Gymnasium Hall Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Graduate Dormitory Hall Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	President's Home Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Reed Gym	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Diesel Emp Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Diesel Emp Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Alumni House Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Graduate Center Building Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ASC Building Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Minidome Sports Arena Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Minidome Sports Arena Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Minidome Sports Arena Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Minidome Sports Arena Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Gail Life Sciences Building Boiler	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Gail Life Sciences Building Emergency [illegible] Gen.	[illegible]	[illegible] Nat. Gas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
					(lb/hr)	(mmcf/yr)							(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)								
[illegible]	Gail Life Sciences Building Emergency [illegible] (Gas)			Gasoline	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 4
Annual Emissions

FACILITY: Idaho State University - Physical Plant
ADDRESS: Campus Box 8137
Pocatello, Idaho 83209-8137
PROJECT: Tier II Operation Permit

POINT SOURCES

Source ID	Source Name	Rated Heat Input 10^6 BTU/hr	Actual Heat Input 10^6 BTU/hr	Fuel/ Material	Firing Rate mmcf/hr	Annual Fuel Used mmcf/yr	Operating Hours per day	Winter Hours per day	Annual Days per year	Annual Hours per year	Foot-note	PM (TSP) Emission Factor	PM10 Emission Factor (lb/mmcf)	SO2 Emission Factor (lb/mmcf)	NOx Emission Factor (lb/mmcf)	CO Emission Factor (lb/mmcf)	VOC Emission Factor (lb/mmcf)	PM10 Annual Emissions (Tons/yr)	SO2 Annual Emissions (Tons/yr)	NOx Annual Emissions (Tons/yr)	CO Annual Emissions (Tons/yr)	VOC Annual Emissions (Tons/yr)
Scenario 1																						
ISUP001	Steam Plant Boiler #2 (N.G. Combustion)	19	21.1	Nat. Gas	0.0216	215.94	24	24	365	8760	(1) (3)	11.7	11.7	0.6	140	35	2.94	1.356	0.069	15.120	4.029	0.316
					Coal/hr	Coal							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton					
ISUP002	Steam Plant Boiler #2 (Coal Combustion)	19	0.5	Coal	0.0341	111.6216	24	24	365	8760	(2)	80	11.8	36.300	21.7	0.5	0.80	1.276	2.002	2.320	0.056	0.090
ISUP003	Steam Plant Boiler #2 (Total Combustion)																	1.33	2.07	21.44	4.08	0.39
Scenario 2																						
ISUP001	Steam Plant Boiler #2 (N.G. Combustion)	19	21.0211	Nat. Gas	0.0216	201.265	24	24	365	8760	(1) (3)	11.7	11.7	0.6	140	35	2.94	1.262	0.063	14.112	3.528	0.276
					Coal/hr	Coal							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton					
ISUP003	Steam Plant Boiler #2 (Coal Combustion)	19	0.37(226	Coal	0.0480	1884.9	24	24	365	8760	(2)	80	11.8	36.300	21.7	0.5	0.80	22.188	66.084	41.014	0.943	0.754
ISUP003	Steam Plant Boiler #4 (Total Combustion)																	23.44	66.15	55.03	4.09	0.46
Scenario 3																						
ISUP001	Steam Plant Boiler #2 (N.G. Combustion)	19	16.6	Nat. Gas	0.0156	116.484	24	24	365	8760	(1) (3)	11.7	11.7	0.6	140	35	2.94	0.854	0.043	9.544	2.385	0.190
					Coal/hr	Coal							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton					
ISUP003	Steam Plant Boiler #3 (Coal Combustion)	19	11.4	Coal	0.0434	1884.9	24	24	365	8760	(2)	80	11.8	36.300	21.7	0.5	0.80	22.188	66.084	41.014	0.943	0.754
ISUP003	Steam Plant Boiler #4 (Total Combustion)																	23.04	66.13	51.34	3.33	0.94
Scenario 4																						
ISUP001	Steam Plant Boiler #2 (N.G. Combustion)	19	13.5	Nat. Gas	0.0126	114.134	24	24	365	8760	(1) (3)	11.7	11.7	0.6	140	35	2.94	0.836	0.042	9.352	2.338	0.186
					Coal/hr	Coal							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton					
ISUP003	Steam Plant Boiler #3 (Coal Combustion)	19	6.1	Coal	0.0244	111.6216	24	24	365	8760	(2)	80	11.8	36.300	21.7	0.5	0.80	1.316	3.903	2.420	0.056	0.044
ISUP003	Steam Plant Boiler #3 (Total Combustion)																	2.15	3.94	11.77	2.39	0.23
Scenario 5																						
ISUP001	Steam Plant Boiler #2 (N.G. Combustion)	19	11.0211	Nat. Gas	0.0114	100.021	24	24	365	8760	(1) (3)	11.7	11.7	0.6	140	35	2.94	0.665	0.030	7.056	1.763	1.763
					Coal/hr	Coal							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton					

TABLE 4
Annual Emissions

FACILITY: Idaho State University - Physical Plant
ADDRESS: Campus Box 4137
Pocatello, Idaho 83209-8137
PREPARED: Site II Operation Permit

ID No.	Source Name	Rated Heat Input 10^6 Btu/hr	Actual Heat Input 10^6 Btu/hr	Fuel/ Material	Firing Rate mscf/hr	Annual Fuel Used mscf/yr	Operations Hours per day	Winter Hours per day	Annual Days per year	Annual Hours per year	Footnote	PM (TSP) Emission Factor	PM10 Emission Factor (lb/mscf)	SO2 Emission Factor (lb/mscf)	NOx Emission Factor (lb/mscf)	CO Emission Factor (lb/mscf)	VOC Emission Factor (lb/mscf)	PM10 Annual Emissions (Tons/yr)	SO2 Annual Emissions (Tons/yr)	NOx Annual Emissions (Tons/yr)	CO Annual Emissions (Tons/yr)	VOC Annual Emissions (Tons/yr)
18/7116	Hall Life Sciences Building Incinerator at Stores			Human Pathol/ Animals	345.8	788.86	12	13	365	4380	11 11a	4.87	3.84	2.19	4.99	3.84	0.0299	1.149	0.830	1.670	1.450	0.011
18/7116	Hall Life Sciences Building Incinerator at Stores																	1.15	0.83	1.69	1.44	0.02

SEE LAST PAGES FOR NOTES

Footnotes:

1 Assumes 1000 btu/cf of natural gas (NG).

1a VOC E.F. taken from Table 1.4-1, AP42, Fifth Edition. VOC E.F. actually VOC since decimal percent nonmethane VOC.

2. Boiler fired at 15 MMBtU/hr but only operated at 13.4 MMBtU/hr.
Boiler operated November through March to provide heat and hot water.
Normally on standby status 10.8% MMBtU/hr, with 15 days per year at 15.4 MMBtU/hr operating rate.
Operating days shown represent equivalent days at 15.4 MMBtU/hr operating rate
Discharges through same stack as Boiler 1

2 Boiler fired at 15 MMBtU/hr but only operated at 13.4 MMBtU/hr.
Boiler operated November through March to provide heat and hot water.
Boiler normally fired with NG up to operating rate of 5.31 MMBtU/hr.
Boiler normally fired with pulverized coal from operating rate of 5.31 MMBtU/hr up to the 13.4 MMBtU/hr operating rate.
Operating days shown represent equivalent days at 13.4 MMBtU/hr operating rate
Discharges through same stack as Boiler 1

Coal

3 Based on analysis of coal purchased by ISU
HHV Value = 10,785 Btu/lb (10.785 MMBtU/ton)
Sulfur content = 0.51%

3a VOC E.F. taken from Table 1.1-11, AP42, Fifth Edition. VOC E.F. actually represents is the nonmethane VOC, which make the value conservative.

4 Boiler operated September through April.

5 Boiler used to supply supplemental heat and hot water when three Plant boilers not operating or can not meet demand.

7 Not operated in 1985

8 Fuel paid for by private fund, usage data not available.
Estimated based on use from September through April

9 Boiler discharge through common stack, only one operates at given time.

10 Boiler used to supply hot water and heat for facility.

11 Assumed value for heat input. University did not supply boiler rating, but did supply fuel usage.

12 Incinerator used for disposal of laboratory animals.

13 Incinerator used for disposal of laboratory animals and human parts.

14 Calculated for NOx emissions:
Control Techniques for Nitrogen Oxide Emissions from Stationary Sources - Revised Second Edition (NOx:NO2) E.F.
NO E.F. = (0.98)(NOx E.F.)(10.4559)
NO2 E.F. = (0.02)(NOx E.F.)(10.4559)

14 F. E.F. = (0.149 lb/mscf)(1000) = 0.149 lb/mcm

15 VOC E.F. taken from AP42, Fifth Edition, 1985, Table 1.3-1. E.F. represents uncontrolled VOC, which conservatively represents VOC.

Emission Factor References

Natural Gas

		PM10	AP42 Table 1.4-1 Filterable + Condensible PM
		SO2	SO2 Assumed 0.6 mlb per MMcf gas. 1.4.4
		CO	AP42 Table 1.4-1
		NOx	AP42 Table 1.4-1 Expressed as NO2 Uncontrolled
		NO	NOx assumed 98% of NOx per EPA-450/3-91-002 (See Note 14)
		NO2	NOx assumed 2% of NOx per EPA-450/3-91-002 (See Note 14)
		VOC	AP42 Table 1.4-2

Coal

		PM10	AP42 Table 1.1-5
		SO2	AP42 Table 1.1-5
		CO2	2.86 provided by Permittee. Calculations based on 65 ash content of coal.
		CO	AP42 Table 1.1-3 Dependent on sulfur content of coal, see Note 3
		NOx	Assumed 7.5 lb/mlb or lb/ton per AP42 Table 1.1-3 note b; converts to MMBtu from SO2
		NOx	AP42 Table 1.1-3 Expressed as NO2 uncontrolled
		NO	NOx assumed 98% of NOx per EPA-450/3-91-002 (See Note 14)
		NO2	NOx assumed 2% of NOx per EPA-450/3-91-002 (See Note 14)
		VOC	AP42 Table 1.1-3

Medical

Waste Incineration		PM (TSP)	AP-42 Table 2.3-1
		PM10	Assumed 91% of PM10 per AP-42 Table 2.3-15
		SO2	Assumed 15.5% SO2 per AP-42 Table 2.3-15
		CO	AP42 Table 2.3-1
		NOx	AP42 Table 2.3-1 Expressed as NO2 Uncontrolled
		NO	NOx assumed 98% of NOx per EPA-450/3-91-002 (See Note 14)
		NO2	NOx assumed 2% of NOx per EPA-450/3-91-002 (See Note 14)
		VOC	AP42 Table 2.3-1
		F-	Derived from Fisher for NF, AP42 Table 2.3-16 (See Note 14F)

Table 3
WORST CASE ANALYSIS OF SHORT TERM EMISSIONS

FACILITY: Idaho State University - Physical Plant
ADDRESS: Campus Box 8117
Pocatello, Idaho 83209-8117
PROJECT: Tier II Operation Permit

Source	Source Name	Point Source Rated Heat Input	Point Source Actual Heat Input	Fuel Material	Firing Rate	Annual Fuel Used	Operations Hours per day	Winter Hours per day	Winter Days per year	Annual Hours per year	Note	PM (TSP) Emission Factor	PM10 Emission Factor	SO2 Emission Factor	NOx Emission Factor	CO Emission Factor	VOC Emission Factor	PM (TSP) Maximum Hourly	PM10 Maximum Hourly	SO2 Maximum Hourly	NOx Maximum Hourly	CO Maximum Hourly	VOC Maximum Hourly
ID		10^6 BTU/hr	10^6 BTU/hr		mmcf/hr	mmcf/yr	day	day	year	year	note		(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)
Scenario 4																							
IGUP002	Steam Plant Boiler #3 (N G Combustion)	39	15.9	Nat. Gas	0.0199	174.124	24	24	365	8760 (1) (3)		13.7	13.7	0.6	140	35	2.704	0.273	0.273	0.012	2.704	0.037	0.03
					ton/hr	tons							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton						
IGUP002	Steam Plant Boiler #3 (Coal Combustion)	39	9.3	Coal	0.0166	144.6424	24	24	365	8760 (4)		30	13.5	34.3S	21.7	0.5	0.08	1.3253(5)(6)	0.353	0.446	0.035	0.012	0.00
IGUP002	Steam Plant Boiler #3 (Total Combustion)																	1.498	0.626	0.002	3.338	0.788	0.03
Scenario 5																							
ID		10^6 BTU/hr	10^6 BTU/hr		mmcf/hr	mmcf/yr	day	day	year	year	note		(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)		(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)
IGUP002	Steam Plant Boiler #3 (N G Combustion)	39	11.6313	Nat. Gas	0.0116	100.069	24	24	365	8760 (1) (3)		13.7	13.7	0.6	140	35	2.704	0.156	0.156	0.007	1.890	0.490	0.03
					ton/hr	tons							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton						
IGUP002	Steam Plant Boiler #3 (Coal Combustion)	39	8.3763	Coal	0.0100	3364.0	24	24	365	8760 (4)		30	13.5	34.3S	21.7	0.5	0.08	21.5777(6)	5.085	10.080	5.847	0.230	0.03
IGUP002	Steam Plant Boiler #3 (Total Combustion)																	21.741	5.241	10.086	21.344	0.720	0.06
Scenario 6																							
ID		10^6 BTU/hr	10^6 BTU/hr		mmcf/hr	mmcf/yr	day	day	year	year	note		(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)		(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)
IGUP002	Steam Plant Boiler #3 (N.G Combustion)	39	6	Nat. Gas	0.0060	26.04	24	24	365	8760 (1) (3)		13.7	13.7	0.6	140	35	2.704	0.082	0.082	0.003	0.840	0.140	0.03
					ton/hr	tons							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton						
IGUP002	Steam Plant Boiler #3 (Coal Combustion)	39	16.6	Coal	0.0016	3364.0	24	24	365.000	8760.00 (4)		30	13.5	34.3S	21.7	0.5	0.08	48.1801(6)	5.345	21.044	12.442	0.482	0.06
IGUP002	Steam Plant Boiler #3 (Total Combustion)																	48.341	5.426	21.045	12.882	0.622	0.09
Scenario 7																							
ID		10^6 BTU/hr	10^6 BTU/hr		mmcf/hr	mmcf/yr	day	day	year	year	note		(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)	(lb/mmcf)		(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)
IGUP002	Steam Plant Boiler #3 (N.G Combustion)	39	0	Nat. Gas	0.0000	0	24	24	365	8760 (1) (3)		13.7	13.7	0.6	140	35	2.704	0.000	0.000	0.000	0.000	0.000	0.00
					ton/hr	tons							lb/ton	lb/ton	lb/ton	lb/ton	lb/ton						
IGUP002	Steam Plant Boiler #3 (Coal Combustion)	39	16	Coal	0.0016	3364.000	24	24	365.000	8760.00 (4)		30	13.5	34.3S	21.7	0.5	0.08	48.1801(6)	5.345	21.044	12.442	0.482	0.06
IGUP002	Steam Plant Boiler #3 (Total Combustion)																	48.341	5.426	21.045	12.882	0.622	0.09
IGUP016	Gail Life Sciences Building Incinerator #1 (No Comb.)	0.02	0.02	Nat. Gas	0.0000	0	0	0	0	0 (1) (3) (12)		13	13	0.6	140	35	2.70	0	0.000	0.000	0.000	0.000	0.00
					lb/hr	tons/yr						lb/ton	lb/ton	lb/ton	lb/ton	lb/ton							

Review of Short Term Emission Limit Calculations for the #2 Boiler

Given (as provided by McClure Engineering:

Heat Input	=	32×10^6 Btu per hr
Btu Content of Boiler Feed Water	=	148 Btu per lb
Temperature of Boiler Feed Water	=	180° F
Pressure of Steam from Boiler	=	100 PSIG (Saturated)
Combustion Efficiency of Boiler	=	81.7% @ 6% O_2
Elevation of #2 Boiler	=	4520 Feet

Determine: Pound per hr Steam Production Rate at a Heat Input of 32×10^6 Btu per hr

Calculation:

Convert 100 PSIG Saturated to absolute pressure (standard) at 4520 feet of elevation.

Pursuant to IDAPA 16.01.01.680, standard pressure at 4520 ft. equals

29.92 in. HG - [(4520 + 100) * 0.1] = 25.4 in Hg = 112.48 PSI;

From *Fundamentals of Engineering Thermodynamics*, Moran & Shipiro, 1988, p. A41.

Interpolated value of enthalpy of saturated vapor at 112.48 PSI = 1189.97 Btu per pound
= 1190 Btu per pound;

Net Btu content per lb steam = (1190 - 148) Btu per pound = 1042 Btu per pound;

Pound per hour steam production rate at a heat input of 32×10^6 Btu per hr =

32×10^6 Btu per hr * (81.7% + 100%) + 1042 Btu per lb = **25,090 lb steam per hour**

ABBREVIATED AIRS DATA ENTRY SHEET

Name of Facility:	Idaho State University
AIRS/Permit #:	005-00029
Permit Issue Date:	

Source/Emissions Unit Name (25 spcs) (Please Use Name As Indicated In Permit)	SCC # (8 digit #)	Air Program (SIP/NESHAP/NSPS/PSD)
Steam Plant #2 Boiler	10100202	SIP
Gail Life Sciences Building #1 and #2 Incinerators	50200505	SIP