7.0 Ambient Air Impact Analysis

Documentation of correspondence with IDEQ modeling personnel is representative of an approved modeling protocol. All electronic modeling files are also included on a disc with this submission. Included in Appendix A are the updated stack parameters as communicated to DEQ.

AIR DISPERSION MODELING REPORT
for
IDAHO SUPREME POTATOES, INC.
FIRTH FACILITY

February 17, 2008

Prepared for:

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7.1 Environmental Evaluation

This report describes the results of dispersion modeling conducted for Idaho Supreme Potatoes, Inc. (Idaho Supreme) Firth facility located in central Bingham County, Idaho. This modeling resolves incompleteness issues documented by IDEQ in May, 2007 by providing a modeling analysis which documents compliance with PM_{10} impact standards. The model source data includes stack parameters documented to and approved by IDEQ. Idaho Supreme will increase stack heights on the facility flaker and fluidized bed stacks to those heights documented in this analysis to ensure PM_{10} ambient air compliance. Attachment A includes an updated 2006 impact analysis for TAPs as a result of the only facility action resulting in TAP increases since the last IDEQ-approved permit impact analysis. No changes were made in any parameter involved in that September, 2006 modeling analysis. Compliance with all other applicable impact standards has been documented in previous permit application and/or modeling submissions.

Consistent with previous agreements with IDEQ during the permitting process, this report documents an ambient air compliance demonstration, performed consistent with an IDEQ-approved modeling protocol, that shows compliance with all applicable criteria pollutant ambient air quality standards.

7.2 Summary of Required Information

Idaho Supreme's Firth facility site is located at the corner of Highway 91 and 800 North, Goshen Highway, less than 1 mile northeast of Firth. Air Quality Control Region 61 surrounding Firth (Bingham Co.) and the facility's significant impact area are attainment for all criteria pollutants. The approximate UTM coordinates of this facility are UTMN: 4795^{900}, UTME 404^{800}, in Zone 12.

7.3 Emission Units

Actual emissions, consistent with historic and planned future production rates, were used for all inventoried facility sources of criteria pollutants. All stack parameters were re-verified to address and resolve IDEQ comments on inconsistency between modeling runs and other permit documentation. IDEQ concurrence on all stack parameters based upon supporting documentation was verified by February 2008. In addition, some stack alterations were required to ensure compliance with ambient impact limits. Those changes, which include raising all facility flaker release points to the GEP stack height of 56 feet and raising the fluidized bed dryer stack to 35 feet, are reflected in the model source parameters documented in Table 1. TAP impacts were previously analyzed for the proposed increase, and are not required for Tier II permit analyses.

Updated emission calculations are included in Section 6.0 of the permit application and are generally based on EPA's Compilation of Air Pollution Factors, 5th Edition, or AP-42. Table 7-1 summarizes the emission rate increases used in this evaluation. The emission inventory associated with this application documents the derivation of all emission rates used in the modeling analysis.

Two scenarios were modeled, consistent with an October, 2007 Modeling Protocol Supplement and IDEQ approval of that methodology. Numerous modeling runs prepared to support that modeling protocol supplement verified that the facility would show compliance with ambient impact standards as long as the flaker stacks were at GEP stack height of 56'. Final stack configuration is not yet fully defined. In the IDEQ-approved modeling protocol, two model scenarios were proposed that in combination would justify any stack configuration as long as the release point for all flaker exhaust was at least the GEP stack height of 56 feet. The two scenarios were: 1) with existing stacks each raised to GEP stack height, and 2) with the most conservative conceivable scenario for combined flaker stacks, where the flaker exhausts were routed into conservatively high diameter stacks with conservatively low exhaust flows (half the sum of the flow rates of the individual stacks). Table 7-1 shows the stack parameters for the point and volume sources. The yellow highlight indicates flaker exhausts for the individual stack height increase scenario, while the blue highlight indicates replacements in the other scenario for conservative combined stack exhaust flows. The modeling analysis conservatively assumed all model sources operate continuously year-round.

Table 7-1 Model Source Data

POINT SOURCES		Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temp	Exit Vel	Stack Diam	SO2	NO2	CO	PMTEN
Source ID	Stack Release Type	(m)	(m)	(m)	(ft)	(K)	(m/s)	(ft)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
SSA	DEFAULT	404711	4795913	1392.4	73.6	293.15	18.38	0.80	0	0	0	0.064
SSB	DEFAULT	404717	4795921	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSC	DEFAULT	404722	4795931	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSD	DEFAULT	404727	4795940	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSE	DEFAULT	404732	4795949	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSF	DEFAULT	404737	4795958	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSG	DEFAULT	404743	4795967	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSH	DEFAULT	404748	4795976	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSI	DEFAULT	404754	4795986	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
SSJ	DEFAULT	404759	4795995	1392.5	73.6	293.15	18.38	0.80	0	0	0	0.064
DS_A	DEFAULT	404805	4795931	1392.8	26.2	380	23.86	2.30	0	0.78	0.65	0.439
DS_B	DEFAULT	404813	4795943	1392.6	26.2	380	15.91	2.30	0.002	0.31	0.26	0.399
DS_C	DEFAULT	404817	4795949	1392.5	26.2	380	15.91	2.30	0.002	0.31	0.26	0.399
BB4	DEFAULT	404804	4795919	1392.8	60.0	494	33.30	2.99	178.59	30.55	11.45	13.200
CB3	DEFAULT	404797	4795908	1392.8	36.3	494	8.82	2.89	0.03	6.08	3.59	0.320
FLKR1	DEFAULT	404769	4795915	1392.6	56.0	293	3.47	3.74	0	0	0	0.375
FLKR2	DEFAULT	404773	4795921	1392.6	56.0	293	3.47	3.74	0	0	0	0.375
FLKR3	DEFAULT	404766	4795917	1392.6	56.0	293	3.47	3.74	0	0	0	0.375
FLKR4	DEFAULT	404770	4795923	1392.6	56.0	293	3.47	3.74	0	0	0	0.375
FLKR5	DEFAULT	404762	4795920	1392.5	56.0	293	11.36	2.07	0	0	0	0.375
FLKR6	DEFAULT	404766	4795925	1392.6	56.0	293	16.77	2.49	0	0	0	0.375
FLKR7	DEFAULT	404759	4795922	1392.5	56.0	293	16.77	2.49	0	0	0	0.375
FLKR8	DEFAULT	404763	4795927	1392.5	56.0	293	16.77	2.49	0	0	0	0.375
FLKR9	DEFAULT	404798	4795935	1392.7	56.0	293	12.12	2.00	0	0	0	0.375
FLKR10	DEFAULT	404800	4795939	1392.6	56.0	293	12.12	2.00	0	0	0	0.375
FLKR11	DEFAULT	404795	4795936	1392.6	56.0	293	12.12	2.00	0	0	0	0.375
FLKR12	DEFAULT	404797	4795940	1392.6	56.0	293	12.12	2.00	0	0	0	0.375
SD1	DEFAULT	404834	4795961	1392.5	25.2	322	3.71	2.49	0.0002	0.03	0.02	0.377
SD2	DEFAULT	404836	4795959	1392.5	25.2	322	3.71	2.49	0.0002	0.03	0.02	0.377

FBD	DEFAULT	404751	4795927	1392.5	35.0	335	16.52	3.41	0	1.1	0.57	3.550
FLKR18	DEFAULT	404766	4795921	1392.6	56	293	4.22	3.66				3.000
FLKR912	DEFAULT	404797	4795937	1392.7	56	293	2.12	3.05				1.500

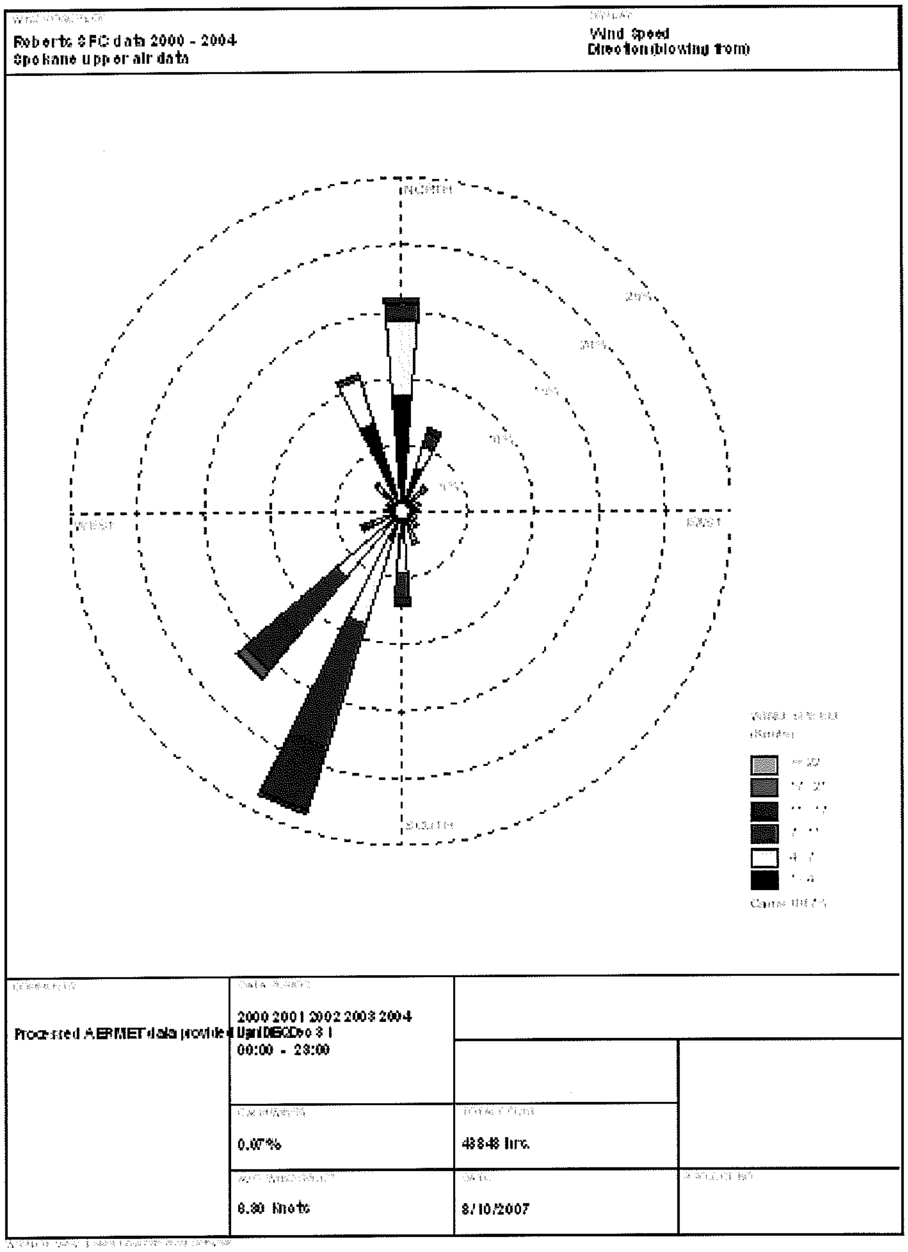
VOLUME SOURCES	Easting (X)	Northing (Y)	Base Elevation	Rel Ht	Horiz Dime	Vertical Dim	SO2	NO2	CO	PMTEN
Source ID	**(m)**	**(m)**	**(m)**	**(ft)**	**(ft)**	**(ft)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**	**(lb/hr)**
SRC1	404745.8	4795869.5	1392.5	25	46.59	10.24		0.8	0.67	0.0077
SRC2	404881.6	4795957.0	1392.5	25	93.08	10.24		1.5	1.3	0.0144
SRC3	404844.4	4796025.0	1392.5	25	97.41	10.24		0.8	0.67	0.0077
SRC4	404805.0	4795970.0	1392.5	25	97.41	10.24		0.2	0.17	0.0025

Yellow highlight indicates flaker stack data for individual stack raise scenario
Blue highlight indicates combined flaker stack scenario, which would be in place of the individual flaker stack model sources

7.4 Meteorological Data

Five years of AERMOD ready meteorological data from Roberts, Idaho, approximately 12 miles to the north, was provided by IDEQ and recommended for use in this analysis. Those five years of data, from 2000 to 2004 were used for this analysis. Model runs were for individual years, consistent with the IDEQ supplied meteorological data. Figure 7-1 shows the wind rose for the Roberts meteorological data files.

Figure 7-1 Roberts Airport Wind Rose



7.5 Ambient Air Standards

The air dispersion modeling effort compares Idaho Supreme's impact on the surrounding area with EPA National Ambient Air Quality Standards (NAAQSs) and matching Idaho standards. Emission impacts compared to NAAQS were the highest 2nd high from any of the five years for the short-term averages, and the maximum impact in any year for the annual average.

No Class I areas within 100 kilometers of the facility were identified in this environmental evaluation. Ambient air background levels applicable to this area were added to the air dispersion model output for comparison to the IDEQ standards and NAAQS. Background concentrations used in this modeling, as prescribed by IDEQ, are shown in Table 7-2.

Table 7-2 Air Pollutant Evaluation Periods, Standards and Background Concentrations

POLLUTANT	Averaging Period	NAAQS (or SIL) ($\mu g/m^3$)	Background Concentration (ug/M^3)
SO_2	Annual 24-Hour 3-Hour	80 365 1300	8 26 34
NO_2	Annual	100	17
CO	8-Hour 1-Hour	40000 1000	2300 2600
PM-10	Annual 24-hour	1 5	26 73

7.6 Air Dispersion Models

The EPA-approved model AERMOD was used for this analysis, with the Prime downwash algorithm. The modeling utilized BeeLine's compilation of AERMOD through their BEEST pre-processor. Model graphics were produced with the BEEST modeling package. All modeling input and output files are included on the enclosed compact disc.

7.6.1 Modeling Parameters

Modeling parameters used to approximate the emissions, terrain, and METdata are listed below in Table 7-3.

Table 7-3 Air Dispersion Modeling Settings

Parameter	Setting
Dispersion	Rural, by Concentration
Anemometer Height	10 Meters
Fence Line (Receptor) Boundary	Property Line as indicated Site Map
Terrain, Coordinates	Simple and Complex, Elevated, Normalized UTM Coordinates
Receptor Grid(s)	See section 1.6.3
Regulatory Options	Stack tip Downwash, Building Downwash (BPIP), Regulatory Default Options Horiz and capped stacks as per IDEQ Modeling Guidelines
Dispersion Output	Concentrations (ug/m^3)
PRIME Downwash Option	Used, as per IDEQ recommendation

7.6.2 Modeling Approach

The approach taken with this modeling effort was to build the model using the emission rates shown in Table 7-1. Emission temperatures and exit velocities identified by Idaho Supreme and manufacturer's data were used. Additional stack parameters, building dimensions, and fence line locations were taken from facility-provided information. Terrain elevations were determined by interpolating the USGS DEMs for Firth, Idaho and surrounding areas and site plan surveys. As discussed in section 7.4, multiple meteorological files were used for the PM-10 analysis because of concerns with representativeness of some aspects of the Pocatello airport meteorological data file.

7.6.3 Mapping, Model Domain, Receptors and File Names

The model runs feature a dense fine grid receptor network consistent with the modeling protocol approved by IDEQ. The receptor network includes 25-meter grid spacing along the property boundary, then 50-meter grid spacing out to 250 meters, 250-meter grid spacing out to 1250 meters, and 500-meter grid spacing out to 5 kilometers. Figure 7-2 shows the model sources and the nearest ambient air boundary receptors at and beyond the property boundary. Model sources are shown in red inside the property boundary, and facility buildings are in black. The grid the figure is laid out on is based upon UTM coordinates, which are in meters. The solid line just west of the property boundary conservatively estimates the extent of the bordering railroad and Highway 91. The fact that the dots for receptors start inside that line at the property boundary shows that that area is in ambient air. The nearest regularly occupied properties to the west are at least that far from the property boundary.

Figure 7-2 Model Sources and NAAQS / SIL Ambient Air Boundary Receptors

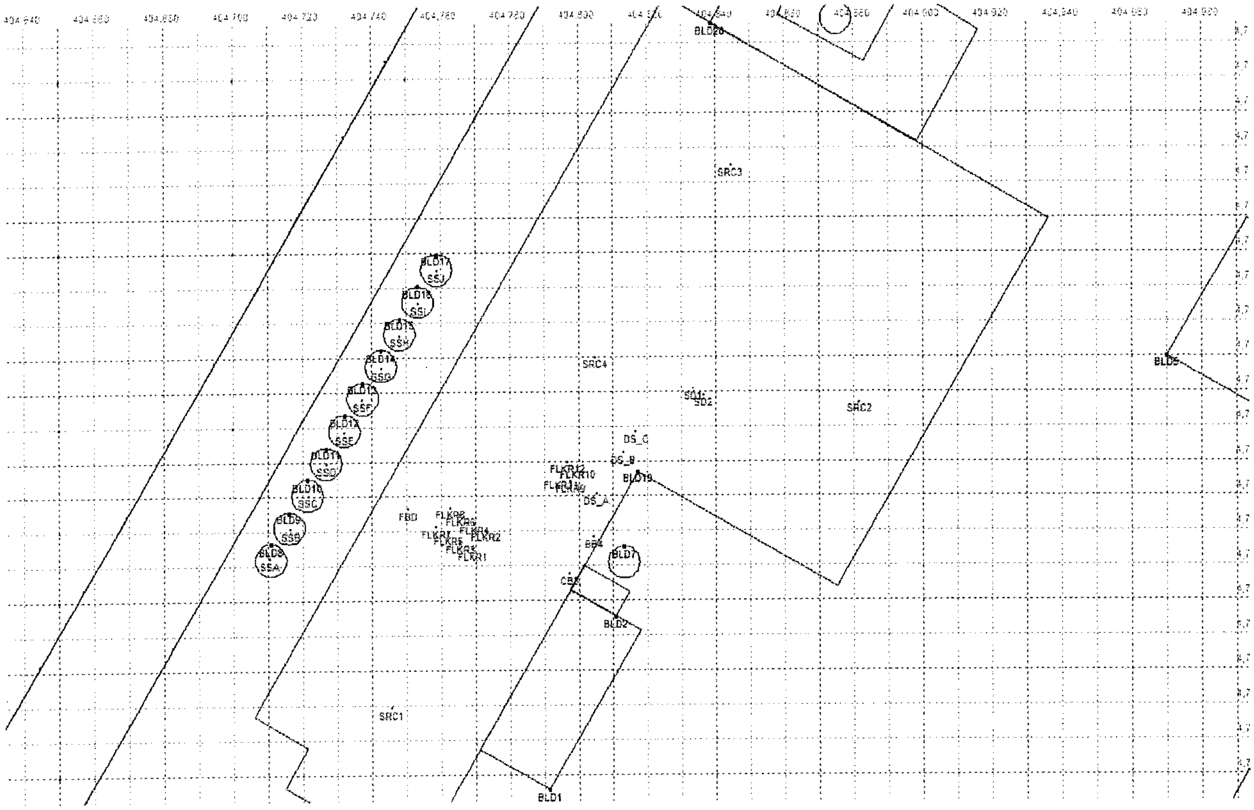


Figure 7-3 shows the entire facility layout and a larger portion of the inner receptor network. Consistent with Figure 7-1, the coordinates are UTMs in meters, model sources are in red and facility buildings are in black inside the property boundary, and the receptor network moves out from the property boundary.

Figure 7-3 Inner Receptor Network

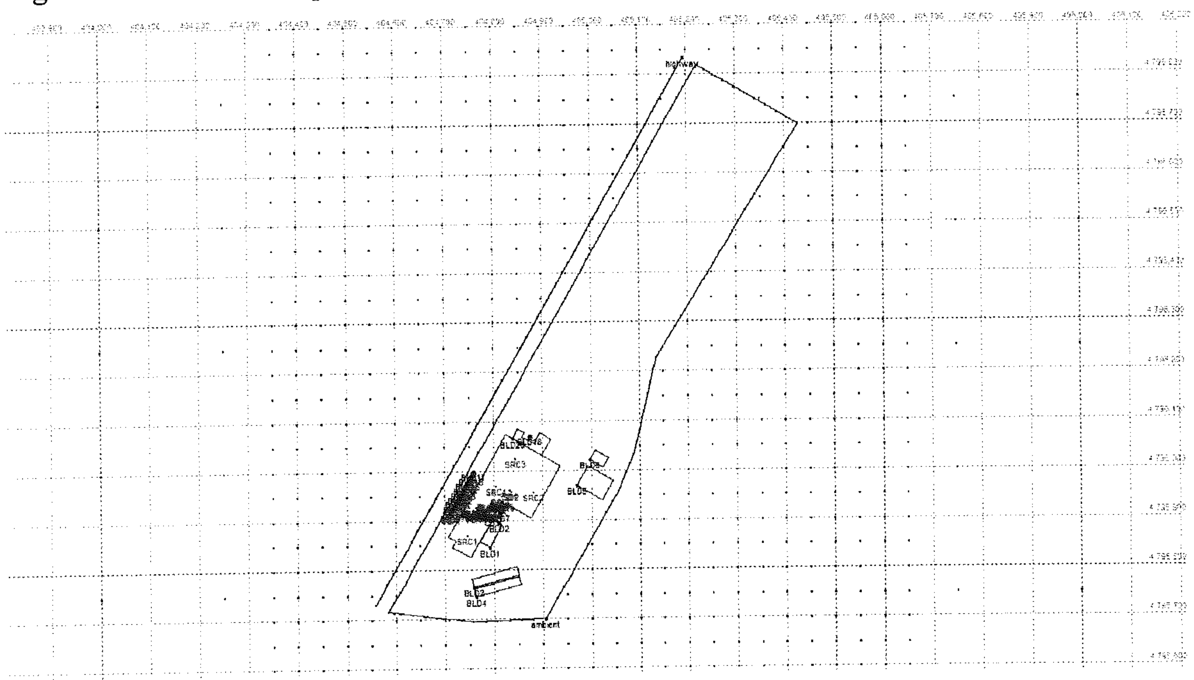
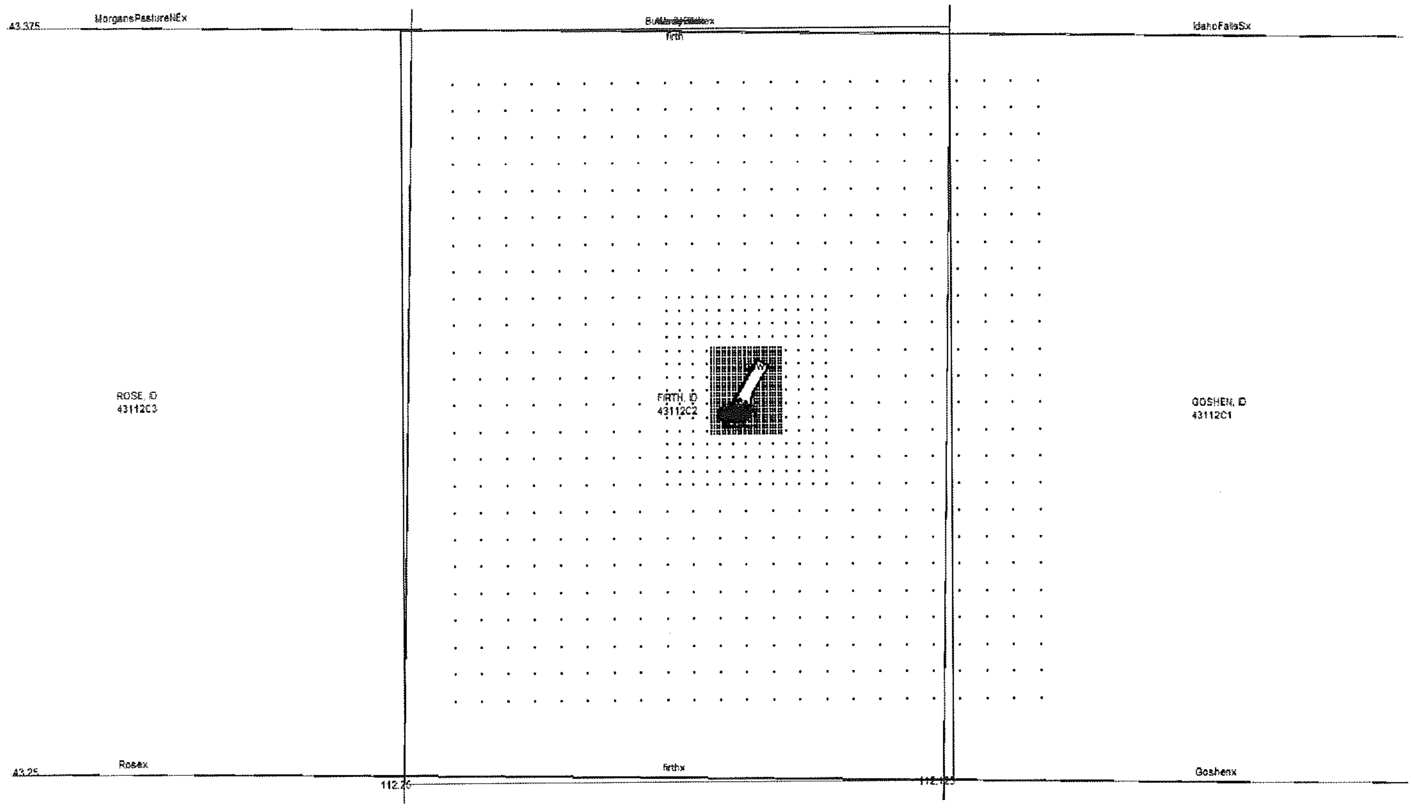


Figure 7-4 shows the extended receptor network, and the AERMOD model domain in green. The background identifies USGS topographic quad maps. The model domain was verified using the BeeLine BEEST calculations which verified all USGS quad maps with terrain meeting EPA AERMOD elevation requirements. In this case, only one USGS quad map, Firth was required.

Figure 7-4 Outer Receptor Network



All model maximum impacts occurred at the property boundary, well within the area featuring 25 meter receptor spacing.

Table 7-4 identifies the computer modeling file names that are included in the electronic submittal. The yy in the names represent the year, which ranges from 00 to 04 for years 2000 to 2004Computer input files for this evaluation end in the suffix; '* .DAT', output files labeled '*.LST', and downwash files end in '*.PIP' and '*.SO'.

Table 7-4 Computer Modeling File Names

File Name	Evaluation
IDSupr0208_yy_SO2,	**SO_2** - 3-Hour, 24-Hour, and Annual Average impacts
IDSupr0208_yy_NO2	**NOx** - Annual Average impacts
IDSupr0208_yy_CO	**CO** - 1- and 8-Hour impacts
IDSupr0208_yy_PM10 IDSupr0208combflaker_87_PM10	**PM-10** - 24-Hour and Annual Average impacts

The electronic files submission also includes all files necessary to duplicate that BPIP-Prime, AERMAP, and AERMOD runs, the BeeLine BEEST file that includes all model input data including considerably more than required in IDEQ permit application submission guidance, and a spreadsheet showing the model source data included in Table 7-1.

7.7 Results

The NAAQS modeling results demonstrate compliance with all criteria pollutant NAAQS with no operational restrictions beyond those documented in the permit application.

Results from this environmental evaluation are presented in the enclosed computer disk in their full EPA ISCST3 electronic format. Table 7-10 identifies the air pollutant, averaging period, maximum ambient air impact, receptor location, IDEQ background concentration, and total predicted ambient concentration. The air dispersion modeling is based on 365 days of meteorological data and 365 days of emissions at the loads described in the previous paragraph. Attachment A provides more detail on the TAP compliance demonstration.

7.7.1 SO_2 Modeling

The facility SO_2 sources were modeled for the 3-hour, 24-hour, and annual averaging times. The results are summarized in Table 7-5 below. The appropriate background concentrations have been added to determine compliance with NAAQS.

Table 7-5 Refined SO_2 Modeling Results

Parameter	Modeled Impacts (µg/m³)		
	Annual	**3-hour**	**24-hour**
Year with Max Impact	2003	2002	2002
Concentrations	17.0	287.9	93.3
Background	8	34	26
Total µg/m³	25.0	321.9	119.3
NAAQS (µg/m³)	80	1300	365

All impacts are well below NAAQS.

7.7.2 PM-10 Modeling

Impacts from facility-wide PM-10 emissions were modeled for the annual and 24-hour averaging times for two scenarios, each with ball stacks at GEP stack height of 56 feet: flaker stacks raised individually, or two conservative flaker stacks in the center of each current flaker stack grouping. The results are summarized in Tables 7-6 and 7-7 below.

Table 7-6 Refined PM-10 Modeling Results Existing Stacks Raised to GEP

Parameter	Modeled Impacts (µg/m^3)	
	Annual	24-hour
Year with Max Impact	2003	2003
Concentrations	15.8	70.4
Background	26	73
Total µg/m^3	41.8	143.4
NAAQS (µg/m^3)	50	150

Table 7-7 Refined PM-10 Modeling Results Combined Stacks at GEP

Parameter	Modeled Impacts (µg/m^3)	
	Annual	24-hour
Year with Max Impact	2003	2001
Concentrations	19.5	73.3
Background	26	73
Total µg/m^3	45.5	146.3
NAAQS (µg/m^3)	50	150

As shown, the ambient PM-10 concentrations are predicted to be within applicable NAAQS impact limits under each scenario modeled. Attachment A documents the 1007 modeling protocol addendum and IDEQ concurrence by IDEQ Stationary Source Modeling Coordinator Kevin Schilling that this modeling with GEP stacks as conservative as conceivable shows that the facility will meet the NAAQS ambient impact limits with any stack configuration as long as all flaker stacks release at least GEP stack height of 56 feet.

7.7.3 NOx Modeling

The facility NOx sources were modeled for the annual averaging period. The results are summarized in Table 7-8 below. The appropriate background concentrations have been added to determine compliance with NAAQS.

Table 7-8 Refined NO_x Modeling Results

Parameter	Modeled Impacts (µg/m^3)
	Annual
Year of Max impact	2002
Concentrations	17.5
Background	17
Total µg/m^3	34.5
NAAQS (µg/m^3)	100

All impacts are well below NAAQS.

7.7.4 CO Modeling

The facility CO sources were modeled for the 1-hour and 6-hour averaging times. The 6-hour average results were conservatively compared against 8-hour average impact limits. The results are summarized in Table 7-9 below. The appropriate background concentrations have been added to determine compliance with NAAQS.

Table 7-9 Refined CO Modeling Results

Parameter	Modeled Impacts ($\mu g/m^3$)	
	1-hour	8-hour
Concentrations	196.8	117.0
Background	3600	2300
Total $\mu g/m^3$	3796.8	2417.0
NAAQS ($\mu g/m^3$)	40000	10000
SIL ($\mu g/m^3$)	2000	500

All impacts are well below the Class II Significant Impact levels (SILs) and the NAAQS.

A summary of the modeling results is shown in Table 7-10.

Table 7-10 Air Dispersion Modeling Results Summary

Pollutant	Averaging Period	Result (ug/M^3)	Location (UTME, UTMN)	Background (ug/M^3)	Result + Background (ug/M^3)	NAAQS Or SIL (ug/M^3)
SO_2	3-Hour	287.9	S boundary S of plant	34	321.9	1,300
	24-Hour	93.3	S boundary S of plant	26	119.3	365
	Annual	17.0	S boundary S of plant	8	25.0	80
PM-10	24-Hour	70.4 73.3	W boundary W of plant W boundary W of plant	73	143.4 146.3	150
	Annual	15.8 19.5	W boundary W of plant W boundary W of plant	26	41.8 45.5	50
NOx	Annual	17.5	S boundary S of plant	17	34.5	100
CO	1-Hour	197	Insignificant impact	3600	3797	40000
	8-Hour	117	Insignificant impact	2300	2417	10000
HAPs (normalized 1 lb/hr emission)	Ann	0.09510	W boundary N of plant	NA	NA	NA
	24-hour	0.59090	W boundary N of plant	NA	NA	NA

Red entries for PM-10 reflect worst-case GEP stack height impacts. Black entries represent the case where each individual flaker stack is at GEP height

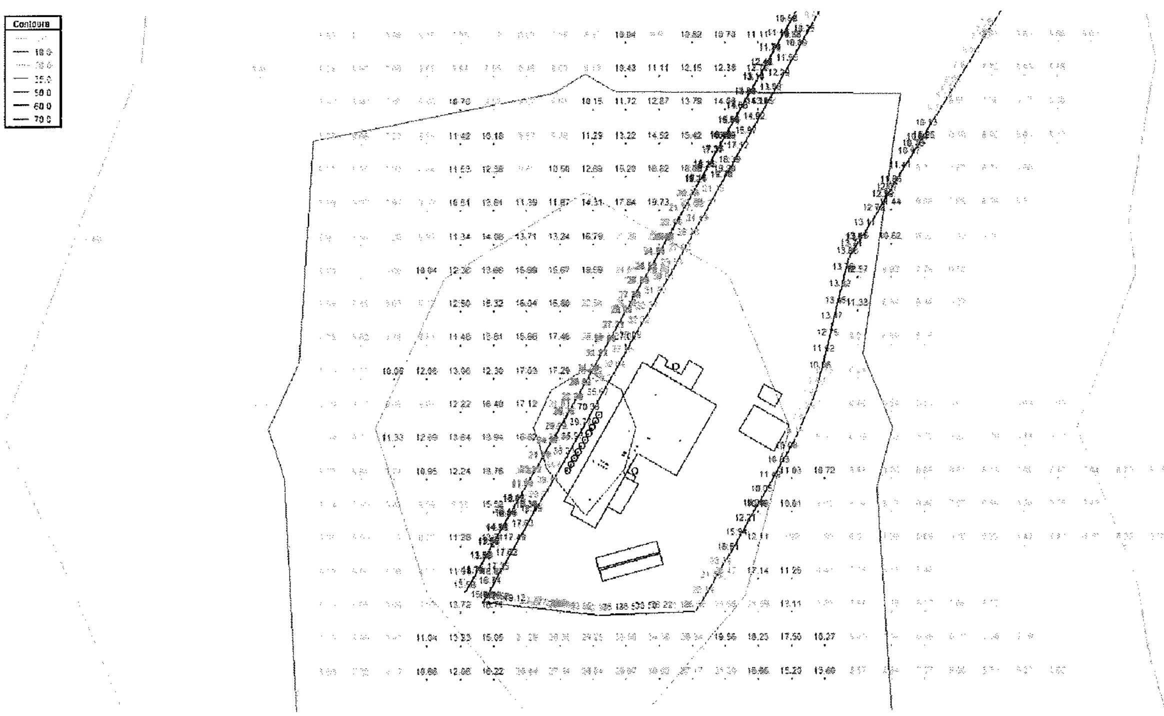
Predicted ambient concentrations with worst case facility impacts are less than half of allowable ambient impact limits for all criteria pollutants. When background concentrations are included, predicted maximum ambient concentrations are under 50% of the NAAQS for all pollutants except for PM-10. Maximum PM-10 impacts with worst case GEP stack assumptions approach but do not reach or exceed NAAQS PM-10 impact limits, in part because background concentrations are estimated at half those standards.

The maximum predicted impact locations are driven by building downwash. For all pollutants except PM-10, maximum predicted impacts are predicted to occur within the plant building wake on the south property boundary. Maximum PM-10 impact locations for both stack scenarios and both averaging periods are on the west property boundary, in the wake of the plant building. Building downwash is accentuated in that area due to a long, squat building close to the property boundary, with the flaker and fluidized bed dryer stacks off-center toward that boundary.

Attachment A provides the assessment of TAP impacts, showing compliance with all applicable TAP impact standards.

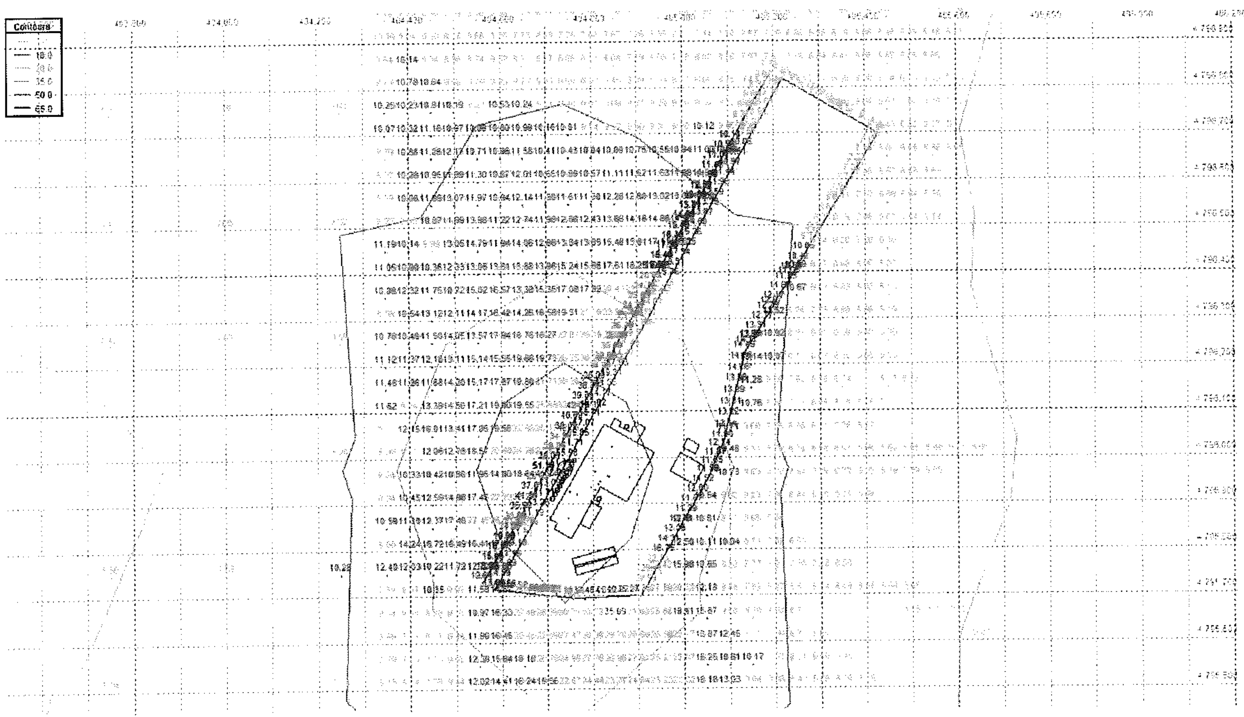
Maximum model predicted 24-hour average impacts assuming all flaker stacks are individually raised to GEP stack height are shown in Figure 7-5. Most receptors with predicted significant facility impacts are highlighted. Note that the figure shows that predicted impacts are quite low everywhere except in the immediate building wake.

Figure 7-5 Location of Maximum 24-Hour Average Impacts, Separate Flaker Stacks



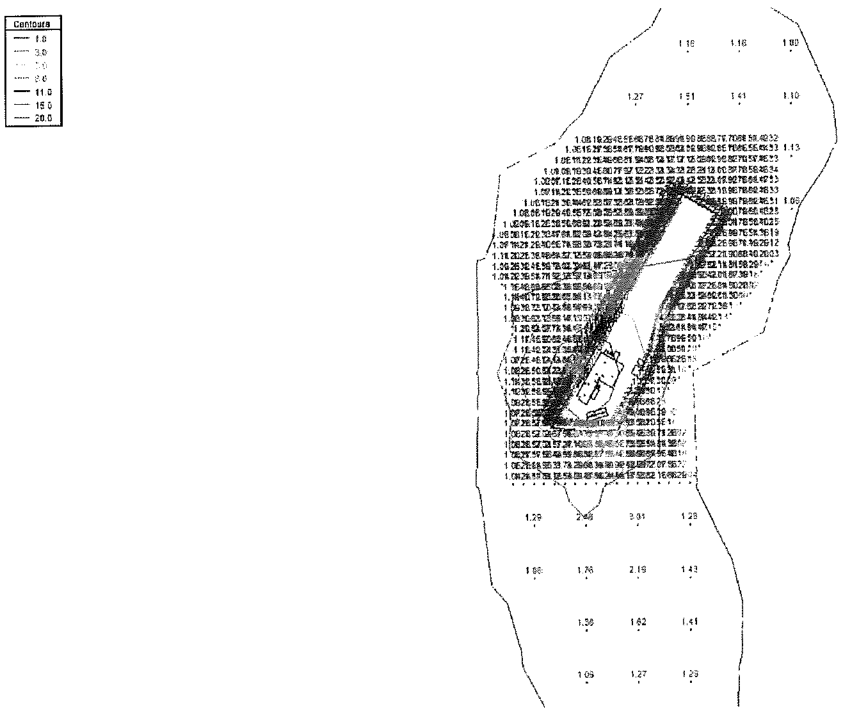
Maximum model predicted 24-hour average impacts with worst-case combined GEP height flaker stacks are shown in Figure 7-6. Most receptors with predicted significant facility impacts are highlighted. Note that this figure also shows that predicted impacts are quite low everywhere except in the immediate building wake.

Figure 7-6 Location of Maximum 24-Hour Average Impacts, Combined Flaker Stacks



Maximum model predicted annual PM-10 impact locations from the combined flaker stack scenario, the higher impacting of the two scenarios modeled, are shown in Figure 7-7. All predicted significant facility impacts are highlighted. As with the shorter term averaging period, maximum predicted impacts drop off sharply from the near in building wake area.

Figure 7-7 Location of Maximum Annual Average Impacts, Combined Flaker Stacks



Summary

The modeling results demonstrate that facility operations will result in ambient air quality levels that comply with all applicable ambient impact limits.

Attachment A

AIR DISPERSION MODELING REPORT
for
IDAHO SUPREME POTATOES, INC.
FIRTH FACILITY

This report describes updates to the air quality modeling analysis previously provided in support of the Idaho Supreme Firth, Idaho facility's air permit, and approved by Idaho DEQ in support of that permit application.

The facility proposes changes from current permitted actions would not affect the emissions from any other source included in the IDEQ-approved modeling analysis but the primary boiler, the #4 Bigelow boiler.

The revised emission inventory includes emissions of TAPs from the #4 Bigelow boiler as a result of the proposed revision. Those total emissions were assumed to represent an increase of emissions from the boiler over previously permitted emissions. That assumption is very conservative, since the previously permitted conditions included TAP emissions. The increase in TAP emissions was compared against IDAPA 58.01.01.585 and 586 Emission Limits (ELs). That analysis showed one 585 non-carcinogen (hydrogen chloride), and seven 586 carcinogens (acetaldehyde, arsenic, beryllium, cadmium, chromium VI, formaldehyde, and nickel) are emitted above ELs. A modeling analysis was performed to estimate the maximum ambient impacts of each of those TAPs in ambient air. Those predicted maximum impacts were compared against IDAPA 58.01.01.585 AACs or 586 AACCs to verify compliance with IDEQ ambient impact limits for TAPs. The choice of models and all model parameters were as in this modeling report. The reported 24-hour average is the highest predicted value over five years of meteorological data at any receptor, as is the reported annual average maximum impact. The model included only one pollutant, TAPs, with a normalized emission rate of 1 lb/hr (0.126 g/sec). For comparisons against IDAPA 58.01.01.585 AACs, the maximum predicted 24-hour average impact from Table 10 was multiplied by the emission rate for the TAP emitted above the EL to estimate maximum ambient impacts for that TAP. Similarly, the maximum impact for the IDAPA 58.01.01.586 TAPs was estimated by multiplying the maximum predicted annual average impact from Table 7-10 by the emission rate for the TAP emitted above the IDAPA EL to estimate maximum ambient impacts for that TAP. The table at the end of this appendix documents the checks against modeling thresholds for all TAPs, and compares calculated maximum model predicted impacts for each TAPs emitted above EL threshold against the applicable IDAPA impact limit.

Figure 7-8 shows the maximum impact location for the normalized TAP emissions modeled for the annual average period, which occurred on the property / ambient air boundary NW of the boiler. Maximum impacts are shown to be elongated north and south of the facility due to prevailing winds.

Figure 7-8 Maximum Annual Impact for 1 lb/hr Normalized Model TAP Source

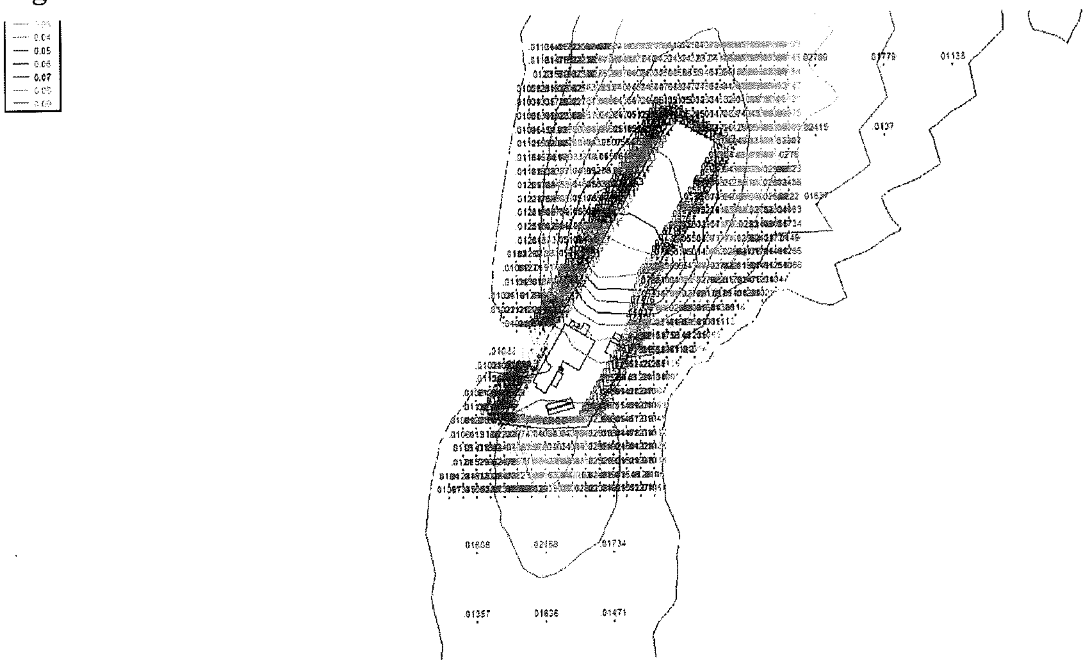
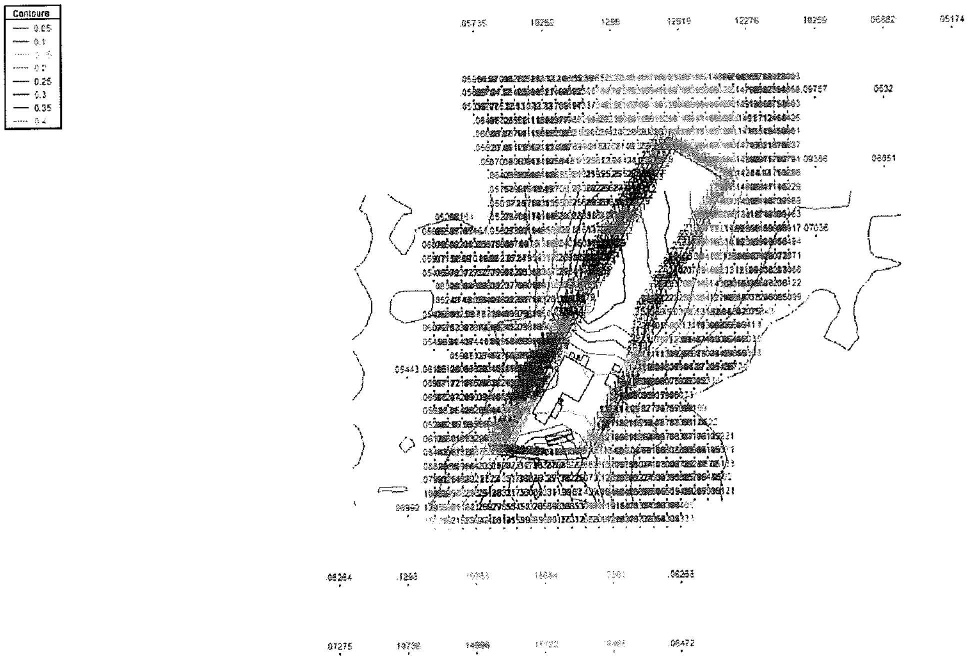


Figure 7-9 shows the same for the 24-hour averaging period, where the maximum predicted impact occurred on the property / ambient air boundary west of the boiler. Maximum impacts are shown to be elongated north and south of the facility due to prevailing winds.

Figure 7-9 Maximum 24-hour Impact for 1 lb/hr Normalized Model TAP Source



The table at the end of this document shows the emissions resulting from the proposed action and estimates of maximum predicted impact for each TAP and its comparison with the respective IDAPA impact limit. Only one of the TAPs had predicted impacts over half the IDAPA impact limit (arsenic at 76% of the AACC of 2.3E-04 ug/m^3), and only one more had predicted impacts over 10% of the IDAPA impact limit (chromium VI at 41% of the AACC of 2.3E-04 ug/m^3).

All model input files, and all files needed to duplicate this analysis or review the results are included in the Idaho Supreme 0208 AQ Modeling Files.zip file.

Table 7-11 TAPs Modeling Results

Pollutant	Emission Controls	Control Type	Emission Factor (EF)	EF Units	AP-42 Reference Table	Emissions (lb/hr)	Emissions (lb/yr)	Emissions (tons/yr)	IDAPA 586 ELs	IDAPA 585 ELs	Requires Modeling?	Requires Modeling?	IDAPA AACC	IDAPA AAC	Model Pred Max Impact	Model Pred Max Impact	Modeling Shows Compliance?	% of AAC or AACC
HCl	N		1.2	lb/ton	1.1-15	6.4775	56,743	28.4		0.05		yes		375		0.62	yes	0.16%
HF	N		0.15	lb/ton	1.1-15	0.8097	7,093	3.5										
POM	N		2.08	lb/10^{12} Btu	1.1-17	0.0003	3	1.28E-03										
Sb	Y	FF	0.000018	lb/ton	1.1-18	0.0001	1	4.26E-04										
As	Y	FF	0.00041	lb/ton	1.1-18	0.0022	19	9.69E-03	1.56E-06		yes		2.30E-04		1.75E-04		yes	75.91%
Be	Y	FF	0.000021	lb/ton	1.1-18	0.0001	1	4.96E-04	2.85E-05		yes		4.20E-03		8.94E-06		yes	0.21%
Cd	Y	FF	0.000051	lb/ton	1.1-18	0.0003	2	1.21E-03	3.70E-06		yes		5.60E-04		2.17E-05		yes	3.88%
Cr	Y	FF	0.00026	lb/ton	1.1-18	0.0014	12	6.15E-03		0.033		no						
Cr (VI)	Y	FF	0.000079	lb/ton	1.1-18	0.0004	4	1.87E-03	5.60E-07		yes		8.30E-05		3.36E-05		yes	40.53%
Co	Y	FF	0.0001	lb/ton	1.1-18	0.0005	5	2.36E-03		0.0033		no						
Pb	Y	FF	0.00042	lb/ton	1.1-18	0.0023	20	9.93E-03		0.6 t/yr								
Mg	Y	FF	0.011	lb/ton	1.1-18	0.0594	520	2.60E-01		0.667		no						
Mn	Y	FF	0.00049	lb/ton	1.1-18	0.0026	23	1.16E-02		0.067		no						
Hg	Y	FF	0.000083	lb/ton	1.1-18	0.0004	4	1.96E-03		0.001		no						
Ni	Y	FF	0.00028	lb/ton	1.1-18	0.0015	13	6.62E-03	2.75E-05		yes		4.20E-03		1.19E-04		yes	2.84%
Se	Y	FF	0.0013	lb/ton	1.1-18	0.0070	61	3.07E-02		0.013		no						
Formaldehyde	N		0.00024	lb/ton	1.1-14	0.0013	11	5.67E-03	0.00051		yes		0.077		1.02E-04		yes	0.13%
Acetaldehyde	N		0.00057	lb/ton	1.1-14	0.0031	27	1.35E-02	0.003		yes		0.45		2.43E-04		yes	0.05%
Acrolein	N		0.00029	lb/ton	1.1-14	0.0016	14	6.86E-03		0.017		no						

8.0 Demonstration of Pre-construction Compliance with Toxic Standards

8.1 TAPs Comparison to Emission Limit / HAP Emissions

Table 8-1 summarizes the TAP emissions and the respective EL thresholds from IDAPA 58.01.01 585 and 586. Non-carcinogens that exceed the EL include cobalt. Carcinogens exceeding the EL are arsenic, beryllium, cadmium, chromium VI, formaldehyde, nickel, and total PAHs.

Table 8-1 TAPs Compared to the EL

NON-CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Antimony	3.4E-03	3.3E-02	N	1.5E-02
Barium	2.1E-03	3.3E-02	N	9.0E-03
Chromium	6.8E-04	3.3E-02	N	2.9E-03
Cobalt	3.9E-03	3.3E-03	Y	1.7E-02
Copper	1.2E-03	6.7E-02	N	5.3E-03
Ethylbenzene	4.1E-05	2.9E+01	N	1.8E-04
Fluoride	2.4E-02	1.7E-01	N	1.1E-01
Hexane	4.2E-01	1.2E+01	N	1.8E+00
Manganese	2.0E-03	3.3E-01	N	8.7E-03
Mercury	4.5E-04	3.0E-03	N	1.9E-03
Molybdenum	6.2E-04	6.7E-01	N	2.7E-03
Naphthalene	7.9E-04	3.3E+00	N	3.4E-03
Pentane	6.0E-01	1.2E+02	N	2.5E+00
Phosphorous	6.1E-03	7.0E-03	N	2.7E-02
Selenium	2.1E-03	1.3E-02	N	9.2E-03
1,1,1 - Trichlorethane (Methyl Chloroform)	1.5E-04	1.3E+02	N	6.7E-04
Toluene	4.4E-03	2.5E+01	N	1.9E-02
o-Xylene	7.1E-05	2.9E+01	N	3.1E-04
Vanadium, V_2O_5 Respirable Dust and Fume	2.1E-02	3.0E-03	Y	9.1E-02
Zinc	2.2E-02	6.7E-01	N	9.4E-02

CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Arsenic	8.8E-04	1.5E-06	Y	3.8E-03
Benzene	4.9E-04	8.0E-04	N	2.5E-03
Beryllium	4.2E-04	2.8E-05	Y	2.1E-03
Cadmium	5.3E-04	3.7E-06	Y	2.1E-03
Chromium VI	1.6E-04	5.6E-07	Y	8.6E-04
Formaldehyde	2.9E-02	5.1E-04	Y	1.1E-01
Nickel	5.5E-02	2.7E-05	Y	2.4E-01
Benzo(a)pyrene	2.8E-07	2.0E-06	N	3.3E-01
Benz(a)anthracene	2.8E-06	NA	NA	8.2E-05
Benzo(b)fluoranthene	1.1E-06	NA	NA	5.2E-05
Benzo(k)fluoranthene	1.1E-06	NA	NA	2.1E-04
Chrysene	1.7E-06	NA	NA	1.2E-04
Dibenzo(a,h)anthracene	1.2E-06	NA	NA	4.8E-01
Indeno(1,2,3-cd)pyrene	1.6E-06	NA	NA	6.4E-06
Total PAHs	9.7E-06	2.0E-06	Y	4.4E-05

Modeling was conducted for the 24-hour averaging time for the AAC evaluation and the annual averaging time for the AACC evaluation. No scaling factor was applied to the hourly emission rates for the boilers since emissions are based on the maximum hourly fuel usage. Receptors were the same as for the criteria pollutant modeling.

Table 8-2 shows the modeled ambient concentrations, which are compared to the AAC or AACC.

Table 8-2 TAPs Compared to the AAC or AACC (for those exceeding the EL)

Non-Carcinogens			
Pollutant	**Modeled 24-hour µg/m3**	**AAC µg/m3**	**% AAC**
Cobalt	0.009	2.5	0.4%
Carcinogens			
Pollutant	**Modeled Annual µg/m3**	**AACC µg/m3**	**% AACC**
Arsenic	2.2E-04	2.30E-04	95.7%
Beryllium	8E-05	4.20E-03	1.9%
Cadmium	1.5E-04	5.60E-04	26.8%
Chromium VI	4E-05	8.30E-05	48.2%
Formaldehyde	9.3E-03	7.70E-02	12.1%
Nickel	1.1E-02	4.20E-03	261.9%
Vanadium	1.5E-01	2.5E-00	6.4%
Total PAHs	<1E-05	1.40E-02	<0.1%

For all pollutants compliance is demonstrated assuming 8,760 hours per year of operation on fuel oil, which gives the worst-case hourly emission rate for all TAPs. For nickel, assuming 8,760 hours per year of operation on fuel oil gives an annual concentration of 1.1E-02 µg/m^3, which exceeds the AACC. Because modeling for nickel shows exceedance of the AACC, a cumulative risk analysis was conducted. According to the current Tier II Technical Memorandum (May 29, 2002), as long as the cumulative risk does not exceed the cancer risk by $1x10^{-5}$ the modeled carcinogen concentrations are acceptable by DEQ. Compliance with the cumulative risk criteria is demonstrated and is further discussed in Section 8.3.

HAPs emissions are shown below in Table 8-3. Idaho Supreme is a minor source for HAPs, as no one pollutant exceeds 10 tpy and facility-wide HAPs emissions do not exceed 25 tpy.

Table 8-3 HAP Emissions

HAPs Inventory Pollutant	**Emissions (tons/yr)**	
Arsenic	3.80E-03	
Benzene	2.47E-03	
Beryllium	2.10E-03	
Cadmium	2.07E-03	
Ethylbenzene	1.8E-04	

HAPs Inventory	Emissions	
Pollutant	**(tons/yr)**	
Formaldehyde	1.08E-01	
Chromium	3.80E-03	
Lead	2.25E-01	
Mercury	1.9E-03	
1,1,1 - Trichlorethane (Methyl Chloroform)	6.7E-04	
Naphthalene	3.4E-03	
Nickel	2.41E-01	
Xylene	3.1E-04	
Selenium	9.2E-03	
Toluene	1.9E-02	
POM	3.95E-02	
Dichlorobenzene	5.37E-01	
Phosphorous	2.69E-02	
Hexane	1.75E+00	
Total	**2.98E+00**	

Note: Emission Factors for lead, POM, dichlorobenzene and hexane are as follows (i.e., for those HAPs not included with TAP calculations):

Lead	1.20E-07	lb/gal
	5.00E-04	lb/MMscf
POM	8.82E-05	lb/MMscf
Dichlorobenzene	1.20E-03	lb/MMscf
Hexane	1.8	lb/MMscf

8.2 TAPs Modeling Results

8.2.1 Cobalt Modeling

The facility cobalt sources were modeled for the 24-hour averaging time. The results for cobalt are summarized in Table 8-4 below. All impacts are below AAC; no further cobalt modeling is required.

Table 8-4 Cobalt Modeling Results

Parameter	Maximum Modeled Impacts (µg/m³) 24-hour
Concentration	0.007
Background	NA
Total µg/m³	0.007
AAC (µg/m³)	2.5

8.2.2 Vanadium (V_2O_5) Modeling

The facility vanadium sources were modeled for the 24-hour averaging time. The results for vanadium are summarized in Table 8-5 below. All impacts are below AAC; no further vanadium modeling is required.

Table 8-5 Vanadium (V_2O_5) Modeling Results

Parameter	Maximum Modeled Impacts (µg/m³) 24-hour
Concentration	0.158
Background	NA
Total µg/m³	0.158
AAC (µg/m³)	2.5

8.2.3 Arsenic Modeling

The facility arsenic sources were modeled for the annual averaging time. The results for arsenic are summarized in Table 8-6below. All impacts are below AACC; no further arsenic modeling is required.

Table 8-6 Arsenic Modeling Results

Parameter	Maximum Modeled Impacts ($\mu g/m^3$) Annual
Concentration	1.8E-04
Background	NA
Total $\mu g/m^3$	1.8E-04
AACC ($\mu g/m^3$)	2.3E-04

8.2.4 Beryllium Modeling

The facility beryllium sources were modeled for the annual averaging time. The results for beryllium are summarized in Table 8-7 below. All impacts are below AACC; no further beryllium modeling is required.

Table 8-7 Beryllium Modeling Results

Parameter	Maximum Modeled Impacts ($\mu g/m^3$) Annual
Concentration	7E-05
Background	NA
Total $\mu g/m^3$	7E-05
AACC ($\mu g/m^3$)	0.0042

8.2.5 Cadmium Modeling

The facility cadmium sources were modeled for the annual averaging time. The results for cadmium are summarized in Table 8-8 below. All impacts are below AACC; no further cadmium modeling is required.

Table 8-8 Cadmium Modeling Results

Parameter	Maximum Modeled Impacts (µg/m³) Annual
Concentration	1.4E-04
Background	NA
Total µg/m³	1.4E-04
AACC (µg/m³)	0.00056

8.2.6 Formaldehyde Modeling

The facility formaldehyde sources were modeled for the annual averaging time. The results for formaldehyde are summarized in Table 8-9 below. All impacts are below AACC; no further formaldehyde modeling is required.

Table 8-9 Formaldehyde Modeling Results

Parameter	Maximum Modeled Impacts (µg/m³) Annual
Concentration	9.8E-03
Background	NA
Total µg/m³	9.8E-03
AACC (µg/m³)	0.077

8.2.7 Chromium VI Modeling

The facility chromium VI sources were modeled for the annual averaging time. The results for chromium VI are summarized in Table 8-10 below. All impacts are below AACC; no further chromium VI modeling is required.

Table 8-10 Chromium VI Modeling Results

Parameter	Maximum Modeled Impacts ($\mu g/m^3$) Annual
Concentration	3E-05
Background	NA
Total $\mu g/m^3$	3E-05
AACC ($\mu g/m^3$)	0.000083

8.2.8 Nickel Modeling

Nickel was modeled for the annual averaging time. Assuming 8,760 hours per year of operation on fuel oil gives an annual concentration of 1.1E-02 $\mu g/m^3$, which exceeds the AACC. A cumulative risk analysis was conducted to determine if the cumulative cancer risk exceeds $1x10^{-5}$ of the cancer risk. The analysis demonstrates compliance with this criteria. The cumulative risk analysis is presented in Section 8.3.

Table 8-11 Nickel Modeling Results

Parameter	Maximum Modeled Impacts ($\mu g/m^3$) Annual
Concentration	1.1E-02
Background	NA
Total $\mu g/m^3$	1.1E-02
AACC ($\mu g/m^3$)	0.0042

8.2.9 PAH Modeling

The facility PAH sources were modeled for the annual averaging time. The results for PAH are summarized in Table 8-12 below. All impacts are below AACC; no further PAH modeling is required.

Table 8-12 PAH Modeling Results

Parameter	Maximum Modeled Impacts (μg/m³) Annual
Concentration	<1E-05
Background	NA
Total μg/m³	<1E-05
AACC (μg/m³)	0.014

8.3 Cumulative Risk Analysis

A cumulative risk analysis was conducted to determine if the cumulative cancer risk exceeds $1x10^{-5}$ of the cancer risk. The analysis was performed due to the fact that the modeled annual nickel ambient concentration exceeds the AACC. The original Technical Memorandum (May 29, 2002), with respect to Idaho Supreme's current Tier II permit, stated that as long as the cumulative risk does not exceed the cancer risk by $1x10^{-5}$ the modeled carcinogen concentrations are acceptable. Table 8-13 depicts the analysis.

Table 8-13 Cumulative Risk Analysis

Cumulative Risk Determination					
Toxic	URF (ug/m³)	AACC (ug/m³)	Cancer Risk (ug/m³)	Modeled Concentration (ug/m³)	Cumulative Risk (ug/m³)
Arsenic	4.3E-03	2.3E-04	9.89E-07	1.8E-04	7.7E-07
Beryllium	2.4E-04	4.2E-03	1.01E-06	7.0E-05	1.7E-08
Cadmium	1.8E-03	5.6E-04	1.01E-06	1.4E-04	2.5E-07
Chromium VI	1.2E-02	8.3E-05	9.96E-07	3.0E-05	3.6E-07
Formaldehyde	1.3E-05	7.7E-02	1.00E-06	8.6E-03	1.1E-07
Nickel	2.4E-04	4.2E-03	1.01E-06	1.1E-02	2.6E-06
PAH	7.3E-05	1.4E-02	1.02E-06	1.0E-05	7.3E-10
TOTAL			7.03E-06		4.2E-06
CUMULATIVE CANCER RISK DOES NOT EXCEED 1 x 10^{-5}.					

Appendix A
Additional Dispersion Modeling Information

From: Kevin.Schilling@deq.idaho.gov
Sent: Sunday, February 10, 2008 11:09 AM
To: Dan Heiser
Cc: Chris Johnson; wade@idahosupreme.com; Cheryl.Robinson@deq.idaho.gov
Subject: RE: Idaho Supreme Stack Parameter Verification -- Correction

Attachments: image001.gif
Dan and Chris,

The revised stack parameters submitted on February 5 appear to be reasonably accurate and appropriate for use in revised dispersion modeling. The documentation/justification of the parameters, for all but one source, meet DEQ's request. As previously stated in an earlier email, the temperature for Boiler #3 was based on "engineering judgment" and is considerably higher than the temperature for Boiler #4. Considering that previously used parameters were found to be inaccurate (even after the submitted application claimed that a detailed assessment was performed by the facility and such values were accurate), DEQ questions the accuracy of such a value without any stated basis except "engineering judgment." If this value is based on "engineering judgment," then please provide the reasoning that went into that judgment. If data are truly lacking for this source, then a conservatively low-typical value should be used. Perhaps a value equal to Boiler #4 would be a good place to start.

Chris - Thank you for your comments on DEQ providing improved guidance on modeling protocols, implications of protocol approval, and the requested level of documentation/justification in the submitted modeling analyses. I will be working on revisions to the guideline and checklists to accomplish this. I will provide you with a first draft of those materials as soon as I complete them. Our goal is to achieve a clear understanding of what DEQ needs in permit applications, such that high quality, well documented, accurate, and complete applications are initially submitted, and permits that meet both the applicant's needs and assure compliance with regulations can be efficiently generated without the need for supplemental submittals or corrections.

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112

Documentation of Stack Parameter Source Data

Source ID	Actual Flow Rate Based on Reference, to be Used in Modeling	Temperature (K) from Source Data	Reference
Storage Silos	1,818 acfm	Ambient	Compressor Pump and Services
National Dryer A	19,454 acfm	380	National Dryer; 15,000 scfm
National Dryer B	12,977 acfm	380	National Dryer; 10,000 scfm
National Dryer C	12,977 acfm	380	National Dryer; 10,000 scfm
Boiler #4	45,886 acfm	494	Source Test, 2/1/05
Boiler #3	11,366 acfm	494	NG F-factor is 8,710 dscf/MMBtu @ 68 °F (40 CFR 60, Appendix A-7, Table 19-2). Temperature based on engineering judgment.
Flaker #1	7,503 acfm	293	Air meter measurement
Flaker #2	7,503 acfm	293	Air meter measurement
Flaker #3	7,503 acfm	293	Air meter measurement
Flaker #4	7,503 acfm	293	Air meter measurement
Flaker #5	7,503 acfm	293	Air meter measurement
Flaker #6[1]	16,116 acfm	293	Aerovent Bulletin 185
Flaker #7	16,116 acfm	293	Aerovent Bulletin 185
Flaker #8	16,116 acfm	293	Aerovent Bulletin 185
Flaker #9	7,503 acfm	293	Air meter measurement
Flaker #10	7,503 acfm	293	Air meter measurement
Flaker #11	7,503 acfm	293	Air meter measurement
Flaker #12	7,503 acfm	293	Air meter measurement
Secondary Dryer Vent #1	3,570 acfm	322	New York Blower Company, 6500 scfm for two vents
Secondary Dryer Vent #2	3,570 acfm	322	New York Blower Company, 6500 scfm for two vents
Fluidized Bed	29,732 acfm	335	Twin City Fan & Filter for 26,000 scfm; North American Foods source test for temperature.

[1]Flakers #6 - #8 are equipped with fans

↑ ↑

These columns are the new parameters to be used in modeling.

Idaho Supreme Exhaust Flow Documentation and Calculations

Calculations below assume standard pressure of 1 atm

Adjustments for temperature are noted below

1. Storage Silos

   Referenced value: 1,818 scfm, Compressor-Pump and Services, Inc. for DuroFlow Model 4516

   $Silo_{Flow} := 1818 \quad scfm$

   No further adjustment is needed as silos operate outside at standard conditions.

2. National Dryer

   Referenced value: 15,000 scfm for stage A, 10,000 scfm for Stage B, and 10,000 scfm Stage C, National Dryer. Temperature = 225 °F

   Referenced value: 15,000 scfm for stage A, 10,000 scfm for Stage B, and 10,000 scfm Stage C, National Dryer

   Stage A:

   $StageA_{StdFlow} := 15000 \quad scfm$

   Adjust for temperature:

   Convert to Kelvin:

$$225°F \equiv \frac{225 \cdot °F - 32 \cdot °F}{\frac{1.8°F}{°C}} \rightarrow 107 \cdot °C$$

$$107 + 273 = 380 \qquad deg\ K$$

$$StageA_{ActFlow} := StageA_{StdFlow} \cdot \frac{380deg}{293deg}$$

$$StageA_{ActFlow} = 19453.9 \quad acfm$$

Stages B and C:

$StageB_{StdFlow} := 10000$ scfm

Temperature = 380 deg K -- see above:

$$StageBorC_{ActFlow} := StageB_{StdFlow} \cdot \frac{380deg}{293deg}$$

$StageBorC_{ActFlow} = 12969.3$ acfm

3. Boiler #4 (Plant Boiler)

See source test data.

4. Boiler #3

Temperature based on engineering judgment.

Flow rate calculated as follows:

$F_{factor} := 8710 \quad \frac{dscf}{MMBTU}$ at 68 ^{o}F, 40 CFR 60 Appendix A-7, table 19-2

At 43 MMBTU/hr and 494 ^{o}K (temperature based on engineering judgment):

At 43 MMBTU/hr, an estimated 8% moisture, and 60 hr/min:

$$Boiler3_{actflow} := F_{factor} \cdot \frac{43}{60} \cdot \frac{494 \cdot 1.08}{273 + \frac{68 - 32}{1.8}}$$

$Boiler3_{actflow} = 11366.3$ acfm

5. Flakers

Flakers #s 1-5 and #s 9 -12, the estimated flow rate is 7,503 acfm based on air meter measurement taken 1/15/08.

Flakers # 6, 7, and 8 are exhausted with a blower @ 16,116 acfm -- source is Aerovent Bulletin 185.

6. Secondary Dryer

6,500 scfm and 120 °F from New York Blower.

$second_{scfm} := 6500$ scfm

$$120°F \equiv \frac{120 \cdot °F - 32 \cdot °F}{\frac{1.8°F}{°C}} = 48.89 \cdot °C$$

$48.89 + 273 = 321.9$ deg K

$$second_{act} := second_{scfm} \cdot \frac{321.9}{293}$$

$second_{act} = 7141.1$ acfm

For two vents:

$$flowpervent := \frac{second_{act}}{2}$$

$flowpervent = 3570.6$ acfm

7. Fluidized Bed Dryer

Twin City Fan & Filter for 26,000 scfm; North American Foods source test for temperature of 143.7 °F.

$FBD_{std} := 26000$ scfm

$$143.7°F \equiv \frac{143.7 \cdot °F - 32 \cdot °F}{\frac{1.8°F}{°C}} \rightarrow 62.055 \cdot °C$$

$62.1 + 273 = 335.1$ deg K

$$FBD_{act} := FBD_{std} \cdot \frac{335.1}{293}$$

$FBD_{act} = 29735.8$

PG. 9

Compressor-Pump & Service, Inc.
3333 W. 2400 South
Salt Lake City, UT 84119
801-973-0154
compressor-pump.com

1/9/2008

Idaho Supreme Potatoe

Performance with:

Storage Silo Fans

40 HP Motor
4,000 rpm
7 psig discharge
With inlet filter, inlet silencer, and discharge silencer.
4,300' Elevation

DuroFlow Industrial 45 Series Model 4518

Price:

Click to enter price

Project Specifications

Corrected Values	Original Units	English Units	Metric Units
Barometer	4300 ALTI-FT	12.533 PSIA	0.864 bar a
Elevation	4300 ALTI-FT	4300 ALTI-FT	1311 alti-m
Inlet Pressure	7 PSIG	7 PSIG	0.483 bar g
Inlet Temp.	68 °F	68 °F	20 °C
Inlet Flow	1887 ICFM	1887 ICFM	3206 m³/h
Dis. Flow	1816 CFM	1816 CFM	3085 m³/h
Dis. Pressure	8.991 PSIG	8.991 PSIG	0.62 bar g
Rel. Humidity	36 %	36 %	36 %
Delta Pressure	2.491 PSI	2.491 PSI	0.172 bar

Measured Values	Plot Units	English Units	Metric Units
Blower Speed	3999 RPM	3999 RPM	3999 RPM
% of Max Speed	100 %	100 %	100 %
Blower Power**	36 HP	36 HP	26.8 kW
Efficiency	54.5 %	54.5 %	54.5 %
Discharge Temp.	100 °F	100 °F	38 °C
Estimated Noise	95 db	95 db	95 db

**Drive losses not included

Physical:

Weight	470 lbs.
Gear Diameter	4.5 in.
Case Length	18 in.
Flange Size	0 in.
WR²	4.14 lb-ft²
Configuration	Vertical

Performance:

Max Delta P	10 PSI
Max Temp	325 °F
Max speed	4000 rpm
Min speed	1272 rpm
Max Case Pressure	25 PSIG
Max Delta T	225 °F
Max T	325 °F

Gas Parameters	English Units	Metric Units
Molecular Weight	28.9 lbm/lbmol	28.9 kg/kgmol
R Value	53.47 ft.lbf/lbm.R	0.29 kJ/kg.K
Density	0.098 lbm/ft³	1.571 kg/m³
Sp. Heat @ Const. P	0.24 BTU/lbm.R	1.01 kJ/kg.K
Ratio of Sp. Heats	1.4	1.4
Saturated Vapor Pres.	0.3388 PSIA	0.023 bar a
Partial Pres. of Gas	19.4115 PSIA	1.338 bar a
Partial Pres. of Vapor	0.122 PSIA	0.0083 bar a
Reference Pressure	14.696 PSIA	0.864 bar a
Reference Temperature	68 °F	0 °C
Reference Rel. Humid.	36 %	0 %

Gas mix: % by volume

Air 100 %

PG. 5

National Dryer Stages
A, B and C

THE NATIONAL DRYING MACHINERY COMPANY

2190 Hornig Road • Philadelphia, PA 19116

PHONE 215-464-6070 • TELEX 4972310 (ITT) • FAX 215-464-4096 • CABLE NADRYMA PHA

NATIONAL®

IDAHO SUPREME POTATOES, INC.	ORD. 59656
P. O. BOX 246	DATE 4/14/93
614 EAST 800 NORTH	C.O. 26189
FIRTH, IDAHO 83236-0426	EST. 4834
	MACH
	S.E. R. E.
DESCRIPTION: THREE STAGE APRON CONVEYOR DRYER	P.E.
ELEC. 460V, 3PH, 60HZ HEAT GAS	
DEV. ENG. MFG.	SHIP
DRAWINGS	
GENR'L. ARRANGM'NT.:	
HEATER SCHEMATICS:	

THIS MACHINE OR PARTS THEREOF ARE COVERED BY ONE OR MORE OF THE FOLLOWING PATENTS:

ANY WARRANTIES SET FORTH IN THE PURCHASE CONTRACT EXTEND ONLY TO THE ORIGINAL INSTALLATION AND ANY REPLACEMENT PARTS AND/OR ADDITIONS INSTALLED AND/OR APPROVED BY THE NATIONAL DRYING MACHINERY COMPANY.

PG. 6

National Dryer,
cont'd

II.

STATEMENT OF USE

This machine has been designed, constructed and installed to safely process ____FOOD____ material, specifically

____POTATOES____.

Any other comparable material used should be checked with the manufacturer.

Operating Limits:

Electrical ________

Heat Gas: X Exp. Vent. Req'd. 675 Sq. Ft.

Oil: ________

Steam: ________

Temperature: 225 °F Hi Temp. Limit Set 300 °F

Conveyor Speed: ____ Ft/Min. MIN. 0.03 FPM - MAX. 2.25 FPM

Maximum Allowable Solvents: NONE

Exhaust Fan Set For: 15000 STAGE A - 10000 STAGE B, 10000 STAGE C S.C.F.M.

Purge Time Required: 3 Minutes

"All warranties and certifications have been predicated on this mode of operation. Any changes in use, location or machinery modification without the design or consultation of the Manufacturer will invalidate all liabilities and responsibilities associated herewith."

3.0 Summary of Source Test Results

The following tables summarize the PM/PM-10 emission testing results for the boiler.

Table 3-1 Boiler PM/PM-10 Emission Results

Idaho Supreme
Firth, Idaho

February 1, 2005

Test	acfm	dscf/min	Temp, °F	H_2O %	O_2 %	Front gr/dscf	Back gr/dscf	Total gr/dscf	PM, lb/hr	gr/dscf @ 3% O_2	gr/dscf @ 3% O_2 & Altitude
1	43,766	20,500	429.0	8.0	5.6	0.0215	0.0106	0.0321	5.65	0.0376	0.0318
2	46,664	21,623	429.0	9.0	5.2	0.0210	0.0086	0.0296	5.49	0.0337	0.0285
3	47,228	22,101	429.0	8.1	5.6	0.0215	0.0178	0.0393	7.44	0.0460	0.039
Ave	**45,886**	**21,408**	**429**	**8.4**	**5.5**	**0.0213**	**0.0123**	**0.0337**	**6.19**	**0.0391**	**0.0331**

Information on fuel consumption is contained in section 10.0 of this report.

Performance Data
Model FBD Type FG Belt Driven Fiberglass Tubeaxial

Catalog Numbering System

To identify a specific fan for ordering or engineering specifications, it is necessary to show the complete information listed in the tables below under the catalog number. All performance data is available in curve form upon request.

All capacities shown in the performance tables below are for standard air conditions: 70°F at sea level (0.075 lbs./cu.ft. air density).

14 FG 7 28 FBD 2036 1/3

- 14 – Propeller Diameter
- FG – Blade Design
- 7 – No. of Blades
- 28 – Blade Angle
- FBD – Fan Type
- 2036 – Fan RPM
- 1/3 – Motor HP

Size 14 FBD Type FG Belt Driven Fiberglass Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE AND HORSEPOWER AT STATIC PRESSURE																			
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
14FG728	FBD	2036	1/3	2032	0.32	1845	0.32	1629	0.33														
14FG728	FBD	2332	1/2	2327	0.48	2167	0.48	1991	0.49	1768	0.50												
14FG728	FBD	2669	3/4	2664	0.72	2525	0.72	2376	0.72	2216	0.73	2005	0.75										
14FG728	FBD	2938	1	2932	0.96	2807	0.96	2674	0.96	2534	0.97	2380	0.99	2169	1.01								

Size 16 FBD Type FG Belt Driven Fiberglass Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE AND HORSEPOWER AT STATIC PRESSURE																			
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
16FG728	FBD	1637	1/3	2439	0.33	2170	0.33	1819	0.34														
16FG728	FBD	1874	1/2	2792	0.49	2562	0.49	2304	0.50														
16FG728	FBD	2145	3/4	3196	0.73	2997	0.73	2781	0.74	2532	0.75												
16FG728	FBD	2361	1	3518	0.98	3339	0.97	3146	0.98	2941	0.99	2678	1.01										

Size 18 FBD Type FG Belt Driven Fiberglass Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE AND HORSEPOWER AT STATIC PRESSURE																			
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
18FG728	FBD	1633	1/2	3756	0.45	3480	0.47	3170	0.49	2721	0.50												
18FG728	FBD	1869	3/4	4299	0.68	4061	0.70	3801	0.72	3511	0.75	3068	0.75										
18FG728	FBD	2057	1	4731	0.91	4517	0.93	4286	0.95	4039	0.98	3746	1.00	3253	0.99								
18FG728	FBD	2335	1½	5370	1.32	5183	1.35	4985	1.38	4775	1.41	4554	1.44	4299	1.46	3952	1.46						

Size 24 FBD Type FG Belt Driven Fiberglass Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE AND HORSEPOWER AT STATIC PRESSURE																			
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
24FG728	FBD	999	1/2	5667	0.45	5024	0.48	4221	0.50														
24FG728	FBD	1144	3/4	6490	0.67	5934	0.71	5346	0.74														
24FG728	FBD	1259	1	7142	0.90	6641	0.94	6117	0.98	5476	1.01												
24FG728	FBD	1586	2	8997	1.79	8604	1.84	8195	1.89	7779	1.94	7336	1.99	6732	2.01								
24FG728	FBD	1815	3	10296	2.68	9954	2.74	9602	2.80	9238	2.86	8876	2.91	8495	2.97	8024	3.01						

Size 30 FBD Type FG Belt Driven Fiberglass Tubeaxial

CATALOG NUMBER				CUBIC FEET PER MINUTE AND HORSEPOWER AT STATIC PRESSURE																			
PROP	FAN TYPE	RPM	HP	0" SP		1/8" SP		1/4" SP		3/8" SP		1/2" SP		5/8" SP		3/4" SP		1" SP		1¼" SP		1½" SP	
				CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
30FG720	FBD	906	1/2	7476	0.35	6670	0.43	5732	0.48	4113	0.50												
30FG720	FBD	1142	1	9424	0.71	8797	0.80	8128	0.88	7378	0.95	6380	0.99										
30FG720	FBD	1439	2	11875	1.42	11384	1.54	10871	1.65	10338	1.75	9777	1.84	9136	1.91	8367	1.97						
30FG720	FBD	1647	3	13591	2.13	13164	2.27	12723	2.40	12267	2.52	11799	2.63	11312	2.73	10779	2.82	9468	2.97	7367	2.99		
30FG720	FBD	1953	5	16116	3.55	15758	3.72	15391	3.88	15016	4.03	14631	4.17	14239	4.31	13840	4.43	12987	4.66	11979	4.85	10677	4.99

Performance shown is with outlet ducts.
BHP includes belt drive losses.

Secondary Dryer PG. 7

The New York Blower Company
Fan-to-Size
Fan Selection Data

Project:	Idaho Supreme
Location:	Idaho
Contact:	Steve Boodry

Fan Tagging: #8 Furnace Buss Cooling Fan

Fan Design

Product:	General Purpose	Arrangement:	10
Size/Model:	22	Drive type:	Belt
Wheel Type:	PLR		
Wheel Material:	Mild Steel		
Wheel Width:	100.0 %	Wheel Diameter:	100.0 %

Operating Conditions

Volume Flow Rate:	6,500 CFM	Fan Speed:	1677 rpm
Fan Static Pressure:	~~4.0 in wg~~	Fan Input Power:	5.7 bhp
Outlet Velocity:	2281 ft/min	VP/SP ratio:	0.0742
Altitude (above mean sea level):	0 ft	Operating Temperature:	120 Deg F
Operating Inlet Airstream Density:	0.0685 lb/ft3		
Static Efficiency:	71.95%	Mechanical Efficiency:	77.29%
Maximum Operating Temperature:	120 Deg F	Maximum Safe Operating Speed:	2281 rpm

Conditions at 70 Deg F and 0 ft

Volume Flow Rate:	6,500 CFM	Fan Speed:	1677 rpm
Fan Static Pressure:	4.38 in wg	Fan Input Power:	6.2 bhp
Density at Altitude (0 ft):	0.0750 lb/ft3	Max. Safe Speed at 70 Deg F:	2305 rpm

Sound Power Level Ratings Levels expressed in dB (power levels reference 10^(-12) watts)

Center Frequency (Hz):	63	125	250	500	1000	2000	4000	8000	
Octave Bands:	1	2	3	4	5	6	7	8	Overall
Total Fan Power Levels*:	97.7	95.7	96.8	98.5	91.7	85.7	80.7	73.7	103.7
Inlet Power Levels**:	94.7	92.7	93.8	95.5	88.7	82.7	77.7	70.7	100.7
Outlet Power Levels**:	94.7	92.7	93.8	95.5	88.7	82.7	77.7	70.7	100.7

*As corrected for point of operation (location on fan curve)
**Unsilenced Inlet and Outlet power ratings are 3 dB lower than total fan power levels under the assumption that "half" of the sound power can be attributed to each opening. Silenced power ratings include this 3 dB reduction as well as the silencer attenuation.

Estimated Sound Pressure Levels Expressed in dB (pressure levels reference $2x10^{-7}$ microbar)

Directivity/Reflection Factor (Q) is 2, hemispherical radiation; Distance is 5 ft.; A-weighting is in use.

The estimated sound pressure level outside the fan due to an open inlet OR outlet is 83.6 dBA at 5.0 feet. The estimated sound pressure level outside the fan when BOTH inlet and outlet are ducted is 73.5 dBA at 5.0 feet (Housing Radiated Noise).

Your Representative:
Air Control Technology
104 E. Fairview Ave, Suite 240
Meridian, ID 83642
Phone: (208) 888-2836
Fax: (208) 888-2835
E-Mail: hyearsley@msn.com

amca CERTIFIED RATINGS AIR PERFORMANCE

The New York Blower Company certifies that the General Purpose fan is licensed to bear the AMCA Air Performance Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings program.

AMCA Licensed for Air Performance without Appurtenances (Accessories). Power (bhp) excludes drives.

Performance certified is for installation type: B - free inlet, ducted outlet.

Version: 1.74.60-R (January 2007)

Printed: 01/10/2008 PDF. Calc Mode: 1

PG. 8

Fluidized
Bed Dryer

Twin City Fan & Blower
A Twin City Fan Company
5959 Trenton Lane • Minneapolis, MN 55442-3238
Phone (612) 551-7600 • Fax (612) 551-7601

Customer: Burner Control Technology, Inc.
Job Name: Blowers
Job ID: BCT11900

November 10, 2000
Page: 4

Sold & Invoice To

Burner Control Technology, Inc.
PO Box 68
Star, ID 83669

SO#:

Sold To PO #:	004801
Rep Office:	REYCO Systems
Salesperson:	Harry Yearsley
Reference:	G1221
TCF Contact:	
Order Status:	Release For Production

Ship To

REYCO Systems
2095 E. Commercial St.
Meridian, ID 83642

Requested Ship Date:	12-15-00
Shipping Terms:	Collect
Ship Via:	Consolidated Freightways
Mark Shipment:	004801

Tag: EF

Description: Exhaust Fan

Product Description

Quantity	Size	Type	Width	Arr.	Class	Rot	Disch	% Width	% Dia.	Mtr. Pos.
1	402	BC-SW	SWSI	9	II	CW	UBD	100	100	R

Fan Performance

CFM	SP @ Std	SP @ Cond	Density	Temp	Elev	RPM	BHP @ Std	BHP @ Cond	Outlet Velocity
26,000	7.5 in.wg	7.5 in.wg	0.075 lb/ft³	70 °F	0 ft	1111	40.50	40.50	2,793 fpm

Weight	Codes	Description	Price each
1,465		BC-SW 402, Class II, Arrangement 9 Bare fan	5,700.00
0	001 1001	Access Door - Bolted	176.00
0	003 1001	Flange - Inlet, Punched	210.00
0	003 1006	Flange - Outlet, Punched	0.00
42	004 1002	Guard - Belt, OSHA Type	560.00
20	004 1005	Guard - Shaft & Bearing	170.00
195	008 1004	Damper - Outlet, Opposed Blade (Std Type) Use OBD per Drawing AC14940A.	1,113.00
0	016 1001	Shaft Seal - Std Type	134.00
0	074 1003	Extended Lube Lines to Drive Side	150.00
485		40 HP, 1800 RPM, 460V, 3-phase, 60Hz, TEFC, Std. Eff/EPACT*, 324T	2,209.00
0	075 1001	Mount TCF Motor	200.00
60		Constant Speed V-belt Drive, 1.5 SF	1,100.00

Fluidized Bed Dryer, Temperature

Table 3–3 Fluidized Bed Dryer PM/PM-10 Emission Rates

BLF Dehydration Division

Dubois, Idaho
November 19, 2004

Test	Temp °F	H_2O %	Front gr/dscf	Back gr/dscf	Total gr/dscf	lb/hr
1	109.1	3.92	0.1259	0.0121	0.1379	3.40
2	161.2	1.19	0.0613	0.0278	0.0891	2.35
3	160.8	0.97	0.0082	0.012	0.0201	0.53
Ave	**143.7**	**2.03**	**0.0651**	**0.0173**	**0.0824**	**2.09**