# Permit to Construct Application:

#3 Super Phosphoric Acid Evaporator System

**Prepared for:**
Nu-West Industries, Inc.

**Submitted to:**
Idaho Department of
Environmental Quality

December 2012

RECEIVED
JAN 07 2013
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

www.erm.com

*Delivering sustainable solutions in a more competitive world.*

ERM

Nu-West Industries

# Permit to Construct Application

#3 Super Phosphoric Acid Evaporation System

December 2012

Project No. 0144311


John Koehler, Sc.D.
*Air Quality Program Director*
*Lead Engineer – SPA#3 Air Permitting*

Rob Gronewold, P.E.
*Air Quality Technical Director*
*Project Manager – SPA#3 Air Permitting*

Dave Jordan, P.E.
*Principal*

**Environmental Resources Management**
1218 3rd Avenue, Suite 1412
Seattle, Washington 98101
T: 425-462-8591
F: 425-455-3573

# TABLE OF CONTENTS


| | | |
|---|---|---|
| *LIST OF TABLES* | | *ii* |
| *EXECUTIVE SUMMARY* | | *ES-1* |
| *1.0* | *INTRODUCTION* | *1* |
| *2.0* | *DESCRIPTION OF PROCESS* | *2* |
| *2.1* | *Project Location* | *2* |
| *2.2* | *Existing Process Description* | *2* |
| *2.3* | *Proposed Project* | *3* |
| *3.0* | *EQUIPMENT INVOLVED* | *6* |
| *4.0* | *INSIGNIFICANT ACTIVITIES* | *8* |
| *5.0* | *EMISSIONS* | *9* |
| *5.1* | *Emission Factors* | *9* |
| *5.2* | *Operating Assumptions* | *10* |
| *5.3* | *Emission Estimates* | *11* |
| *6.0* | *COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS* | *15* |
| *7.0* | *APPLICABLE AIR QUALITY RULES AND REGULATIONS* | *17* |
| *7.1* | *General Requirements for all Emission Sources* | *17* |
| *7.2* | *Applicable Regulations for Existing Equipment Associated with Proposed Project* | *19* |
| *7.3* | *Applicable Regulations for New Equipment Associated with Proposed Project* | *22* |
| *7.4* | *Non-Applicable Regulations for New Equipment Associated with Proposed Project* | *24* |
| *8.0* | *APPLICATION FEE* | *26* |

*APPENDIX A – SCALED PLOT PLAN AND PROCESS BLOCK FLOW DIAGRAM*

*APPENDIX B – EMISSIONS CALCULATIONS*

*APPENDIX C – PERMIT TO CONSTRUCT APPLICATION FORMS*

*APPENDIX D – MODELING REPORT*

## LIST OF TABLES


*Table ES-1* *Project Emissions – Criteria, Fluorides, and Greenhouse Gases* ..... 2

*Table 2-1.* *Pre-Project and Post-Project Throughput* ..... 3

*Table 3-1.* *New Equipment for Permit to Construct* ..... 6

*Table 3-2.* *Existing Affected Equipment* ..... 7

*Table 4-1.* *Insignificant Activities* ..... 8

*Table 5-1.* *References Used for Emission Factors* ..... 9

*Table 5-2.* *Equipment-Specific Assumptions for Emissions Estimates* ..... 11

*Table 5-3.* *Project Emissions – Criteria, Fluorides, and Greenhouse Gases* ..... 12

*Table 5-4.* *Project Non-Carcinogenic and Carcinogenic Emissions* ..... 13

*Table 6-1.* *Stack Parameters for New and Affected Sources* ..... 15

*Table 6-2.* *Comparison of Maximum Modeled TAP Concentrations to Acceptable Ambient Air Concentrations for Carcinogens* ..... 16

*Table 7-1.* *Air Quality Rules and Regulations, Nebraska Boiler (B-5)* ..... 20

*Table 7-2.* *Air Quality Rules and Regulations, Multi-Stage Scrubber* ..... 21

*Table 7-3.* *Air Quality Rules and Regulations, Super Phosphoric Acid Oxidation* ... 21

# EXECUTIVE SUMMARY

Nu-West Industries, Inc. -- Nu-West Conda Phosphate Operations ("Nu-West") submits this Permit to Construct (PTC) application to the State of Idaho Department of Environmental Quality (DEQ), for a proposed new Super Phosphoric Acid (SPA) Evaporation System (#3 SPA train). This application is being submitted pursuant to the requirements of IDAPA 58.01.01.202.01.a as emissions associated with the new #3 SPA train are below the major source thresholds. Additionally, the project is located in an area designated as attainment or unclassifiable for all criteria pollutants. Nu-West will submit an application to revise its Tier I Operating Permit (No. T1-060308) to include the #3 SPA Evaporation System in accordance with IDAPA 58.01.01.209.05. The new #3 SPA Evaporation System will have a maximum production capacity of approximately 487 tons/day, as evaporated acid at 68-70% by weight phosphoric acid ($P_2O_5$), which is equivalent to 336 tons/day as 100% $P_2O_5$. It will be similar in size and will use similar process technology to the existing two (#1 and #2) SPA Evaporation Systems. The anticipated completion date for this project is by the second quarter of 2014.

As part of the #3 SPA Evaporation System project, in addition to the #3 SPA train, a new Therminol 55 circulation system will be installed to provide the heat media necessary for the increased production of SPA. Replacement of the three existing Plate/Frame exchangers on the PAP/SPA closed loop system will also be necessary. The additional processing capabilities will also require modifications to the existing #1/#2 SPA Feed Pumps, and/or installation of a third SPA feed pump.

### *Project Emissions*

The new emission units associated with the new #3 SPA Evaporation System Project include the #3 SPA train (evaporator, seal tanks, oxidation tanks) and the new Therminol Heater. Emissions from the #3 SPA train will be controlled by the existing SPA Scrubber. In addition to the new emission units, the project will increase emissions associated with the following existing emission units: Nebraska Boiler, SPA Oxidation Reactor, and PPA Cooling Tower.

Emissions from new and project-associated existing emission sources are described in Section 5.0 and summarized in Table ES-1 below. Emissions associated with the #3 SPA train are shown in the SPA Scrubber column. The emissions shown in Table ES-1 reflect the maximum potential to emit associated with the new #3 SPA Evaporation System project. Potential contemporaneous emission decreases associated with reduced utilization of #1 and #2 SPA evaporator systems or other plant processes were not accounted for in these project emissions estimates.

*Table ES-1 Project Emissions – Criteria, Fluorides, and Greenhouse Gases*

| Pollutant | Project Emissions (TPY) | | | | | |
|---|---|---|---|---|---|---|
| | Therminol Heater | Nebraska B-5 Boiler | SPA Scrubber | SPA Oxidation Reactor | PPA Cooling Tower | Project Total |
| $NO_x$ | 5.5 | 0.3 | - | 0.5 | - | 6.3 |
| CO | 9.2 | 0.2 | - | 7.6 | - | 16.9 (3.9 lb/hr) |
| $PM_{10}$ | 0.8 | 2.1E-2 | 1.3 | - | 0.2 | 2.3 (0.53 lb/hr) |
| $PM_{2.5}$ | 0.8 | 2.1E-2 | 0.3 | - | 0.1 | 1.3 |
| Lead (Pb) | 5.5E-5 | 2.2E-6 | - | - | - | 5.7E-5 (9.5E-3 lb/month) |
| $SO_2$ | 6.6E-2 | 2.5E-3 | - | - | - | 6.8E-2 |
| VOC | 0.6 | 7.1E-3 | - | - | - | 0.6 |
| Fluorides, as F | - | - | 0.5 | - | - | 0.5 (0.12 lb/hr) |
| GHG (as $CO_{2e}$) | 13,193 | 520 | - | - | - | 13,713 |

As reflected in Table ES-1, criteria air pollutant emission increases are minor as they are below the Prevention of Significant Deterioration (PSD) thresholds. Greenhouse gas (GHG) emissions are below the 75,000 ton/yr $CO_2$ equivalent ($CO_2e$) major modification threshold. In addition, emissions of toxic air pollutants (TAPs) increase slightly with the project, as described in Section 5.3.

### *Project Ambient Air Quality Impacts*

As discussed in Section 6.0, project emissions of criteria pollutants are below the Idaho screening levels and were conditionally exempted by Idaho DEQ from modeling. Estimated emissions of formaldehyde, arsenic, cadmium, and nickel exceed the DEQ carcinogenic screening emission levels (ELs). Accordingly, air dispersion modeling for these toxic air pollutants (TAPs) was performed. The predicted maximum ambient concentrations were below applicable DEQ acceptable ambient concentrations (AACs) demonstrating insignificant TAP impacts. This modeling is presented in the Appendix D Modeling Report.

# 1.0 INTRODUCTION

Nu-West Industries, Inc. -- Nu-West Conda Phosphate Operations ("Nu-West") submits this minor source Permit to Construct (PTC) application to the State of Idaho Department of Environmental Quality (DEQ), for a proposed new Super Phosphoric Acid (SPA) Evaporation System train (#3 SPA train). This application is being submitted pursuant to the requirements of IDAPA 58.01.01.202.01.a as emissions associated with the new #3 SPA train are below the major source thresholds. Additionally, the project is located in an area designated as attainment or unclassifiable for all criteria pollutants. Nu-West will submit an application to revise its Tier I Operating Permit (No. T1-060308) to include the #3 SPA Evaporation System in accordance with IDAPA 58.01.01.209.05.

The new #3 SPA train will be similar in size and use similar process technology to the existing two (#1 and #2) SPA Evaporation Systems. The #3 SPA Evaporation System project will also include a new Therminol 55 circulation system with heater to provide the heat media necessary for the increased SPA production.

The Conda facility produces phosphate fertilizer products including, among others, SPA. The feed for the SPA process, concentrated phosphoric acid, is produced onsite in the Phosphoric Acid process. The SPA process uses evaporators with natural-gas-fired Therminol heaters to evaporate water from the concentrated phosphoric acid stream. The superphosphoric acid is filtered prior to load out on truck or rail. The new #3 SPA train will allow for the increase in production of SPA at the Conda facility.

This application is organized as follows:

**Section 2.0** describes the existing and proposed new SPA processes.

**Section 3.0** describes the equipment involved.

**Section 4.0** lists insignificant activities.

**Section 5.0** describes the project emissions.

**Section 6.0** summarizes compliance with ambient air quality standards.

**Section 7.0** includes applicable air quality rules.

**Section 8.0** describes the application fee.

**Appendix A** contains required drawings (Scaled Plot Plan and Block Flow Diagram).

**Appendix B** includes the emission calculations.

**Appendix C** has the required Permit to Construct Application Forms, which includes the ***Certification Statement*** signed by the ***Responsible Official***.

**Appendix D** is the Modeling Report with the ambient air quality impact analysis that supports this application.

# 2.0 DESCRIPTION OF PROCESS

This section describes the project and project design parameters.

## 2.1 Project Location

The Nu-West Conda Phosphate Operations is located 7 miles north of Soda Springs, 1.2 miles east of Highway 34. The mailing address is 3010 Conda Road, Soda Springs, ID, 83276. The Facility ID No. is 029-00003.

A scaled plot plan of the facility is presented in Appendix A.

## 2.2 Existing Process Description

The proposed #3 SPA Evaporation System, which is the subject of this permit application, is described in Section 2.3. This Section 2.2 presents a brief description of the current #1 and #2 SPA evaporation systems to put the proposed new #3 SPA train into context with overall SPA production at the Nu-West Conda plant.

The current #1 and #2 SPA trains take a feed of approximately 50-60 wt% $P_2O_5$ and evaporate additional water to concentrate the $P_2O_5$ to 68-70 wt%. The #1 and #2 SPA trains are fed from Tank 47 containing 50-60 wt% equivalent $P_2O_5$. Production from the #1 and #2 SPA trains prior to the addition of the proposed new #3 SPA train is approximately 1,165 tons/day of 68-70 wt% $P_2O_5$, equivalent to 804 tons/day as 100 wt% $P_2O_5$.

The feed to each SPA train is evaporated through a shell/tube exchanger and vapor head system. The feed is combined with a circulating flow of SPA from the bottom of the process Vapor Dome back into the shell/tube exchanger. The SPA feed is heated through the exchanger via external Therminol 55 systems (one for each train). The Therminol system is a stand-alone system that provides the heat source to elevate the feed to high enough temperatures to evaporate the water necessary for concentration of the SPA product.

A two-stage jet system coupled with barometric condensing induces a vacuum on the SPA trains. The vacuum is achieved through a closed loop water circulation system. The circulating water is collected in seal tanks from each evaporator section, including the non-SPA trains, and then pumped through three parallel closed loop exchangers cooled by the PPA cooling tower. The cooled process water is then circulated back to the evaporator condensers in non-SPA trains, and the #1/#2 SPA trains.

The concentrated SPA product is then fed to the oxidation system where it is reacted with nitric acid and mixed to help control the total oxidizable carbon (TOC) content in the SPA.

The oxidized SPA is pumped to tanks and cooled. The aged and cooled SPA process stream is pumped through a filter press and then the product acid is routed to railcars and/or trucks. Filter cake (i.e., solids from the filter press along with residual acid) drops into a cake slurry tanks and then is routed to Phosphoric Acid Production.

Emissions from the existing #1 and #2 SPA Evaporation Systems are controlled by the SPA scrubber that complies with 40 CFR 63 Subpart AA, National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants.

## 2.3 Proposed Project

### 2.3.1 New #3 SPA Evaporation System

The new SPA evaporation system (#3 SPA) will utilize similar process technology to the existing SPA evaporation systems described in Section 2.2. The project will increase total SPA throughput by approximately 24.5%. Table 2-1 outlines the pre-project and post-project throughput.

*Table 2-1. Pre-Project and Post-Project Throughput*

| | SPA #1 & #2 | | SPA #3 | | Total | |
|---|---|---|---|---|---|---|
| | 69 wt% $P_2O_5$ | 100 wt% $P_2O_5$ | 69 wt% $P_2O_5$ | 100 wt% $P_2O_5$ | 69 wt% $P_2O_5$ | 100 wt% $P_2O_5$ |
| Pre-Project Production (Tons/day) | 1,165 | 804 | - | - | 1,165 | 804 |
| Project Change in Production (Tons/day) | -203 | -140 | 487 | 336 | 284 | 196 |
| Post-Project Production (Tons/day) | 962 | 664 | 487 | 336 | 1,449 | 1,000 |

Note that #3 SPA has a maximum design production rate of 487 tons/day, as evaporated acid at 68-70 wt% phosphoric acid ($P_2O_5$), which is equivalent to 336 tons/day as 100 wt% $P_2O_5$.

Post-project throughputs from normal operation of #1 SPA and #2 SPA are shown to decrease in the table above when considering maximum potential throughput increases for the new #3 SPA train. This is due to limited upstream evaporation capacity feeding the three post-project SPA trains. As described in Section 2.2, the concentrated SPA product is produced by evaporation of water from the feed dilution. There would be more water in the combined feed streams going to the three SPA evaporators with future SPA production increases than currently feeding the #1 and #2 SPA evaporators due to the limited upstream evaporation capacity. Therefore, post-project operations will not feed the same $P_2O_5$ acid strength through all three SPA trains. In the scenario shown in Table 2-1 of $P_2O_5$ feed to the #3 SPA evaporators calculated at full capacity, there is not enough upstream evaporation capacity to also feed the #1 and #2 SPA evaporators at their current operational levels. The table shows the resulting reduction in #1 SPA and #2 SPA production if #3 SPA were operated at full capacity. The emissions increases presented in Section 3.0 have been calculated at maximum #3 SPA design capacity without consideration of the corresponding decreases illustrated by the #1 and #2 SPA throughput decreases shown in Table 2-1. In other words, no contemporaneous emission decreases were accounted for in the emission estimates for the #3 SPA Evaporation System project.

Appendix A contains the Process Block Flow Diagram for the new #3 SPA Evaporation System. Feed for the #3 evaporator will come from existing Tank 47. Modifications will be made to the existing feed system. The new evaporator will operate under a 1.1-psia

vacuum and will be equipped with a forced circulation heater and circulation pump. Fumes from the evaporator will be controlled by the existing SPA Scrubber. Therminol 55 will be used as the heating fluid. The new Therminol heating system will consist of a new natural-gas-fired heater equipped with low-NOx burners, combustion air blower, circulation pump, expansion tank, storage tank and fill pump.

Vacuum will be created in the evaporator by means of a new two-stage Steam Ejector System, two new Barometric Condensers and a new Seal Tank. Water from the new Seal Tank will be pumped back into the existing closed loop cooling system. The existing Heat Exchangers in the PAP/SPA closed loop cooling system will be replaced. Cooling water will be supplied from the existing PPA Cooling Tower. The expected increase in cooling water flow will be approximately 1,200 gpm. No modifications will be required to the PPA Cooling Tower System.

Evaporated acid product from the new evaporator at 68-70 wt% $P_2O_5$ and at 350°F will be discharged from the evaporator system into a new Oxidation Feed Tank from which it will be pumped into the existing Oxidation Reactor. The new Seal Tank and new Oxidation Feed Tank will both be connected to the existing SPA scrubber's fume system. New SPA production pumps will be required.

Adequate capacity within the following process systems exists and no modifications will be made to the following equipment:

- SPA Scrubber System
- PPA Cooling Tower
- Nebraska Boiler (B-5)
- SPA Oxidation Reactor
- Aging System
- Filtration Press and Loading System.

### 2.3.2 Basis of Design

#### *2.3.2.1 P2O5 Concentration and Feed Rate to the #3 SPA Evaporator System*

The design feed rate will be 62 gpm at a concentration range of 50-60 wt % as $P_2O_5$ operating at a temperature of 190°F. $P_2O_5$ will be fed from the existing $P_2O_5$ feed tank, TK-47.

#### *2.3.2.2. SPA Product Concentration*

The SPA product concentration will be 68-70 wt % as $P_2O_5$ at 350°F.

#### *2.3.2.3 Cooling Water Temperature*

The design cooling water temperature will be 75°F.

#### *2.3.2.4 Total Phosphoric Acid Production*

Utilization of the Phosphoric Acid process will not increase as a result of the #3 SPA Evaporation System project. As described above, utilization of the Phosphoric Acid process is limited by its digestion/filtration capacity and evaporation capacity upstream of the SPA process. Alterations to increase that capacity are <u>not</u> part of this project. Additional $P_2O_5$ needed for #3 SPA will come from decreases in $P_2O_5$ throughput (i.e.,

lower $P_2O_5$ feed concentration) to #1 and #2 SPA evaporation systems (as shown in Table 2-1 above) when all three SPA evaporator trains are operational and reallocation of the $P_2O_5$ feed used for the production of granular fertilizer. That is, the $P_2O_5$ stream balance between dry (granular) and liquid (SPA) fertilizer production will be reallocated with an emphasis towards production of SPA. Utilization of the phosphoric acid in downstream processes at the Conda facility to make fertilizer products, both SPA and granular products, will vary based on market demand, but the total amount of $P_2O_5$ will not increase. Additionally, the equivalent $P_2O_5$ feed to the Phosphoric Acid process is limited to 560,000 tons per any consecutive 12-month period and the proposed project does not increase this current limit. Thus, there will be no increase in upstream phosphorous ore processing or phosphoric acid production as a result of the proposed project.

### 2.3.3 Estimated Construction Schedule

It is estimated that construction of the #3 SPA Evaporator System will take 6 to 9 months. Anticipated start-up is by the second quarter of 2014.

# 3.0 EQUIPMENT INVOLVED

Table 3-1 contains a list of new equipment for which approval for permit to construct is sought. See Appendix A for a Block Flow Diagram.

*Table 3-1. New Equipment for Permit to Construct*

| Description | Emission Unit | Capacity | PTC No. |
|---|---|---|---|
| **Fired Heater Package** | | | |
| #3 SPA Therminol Heater[1] | Yes | 25.55 MMBtu/hr | New |
| #3 SPA Burner Blower | No | 4,485 scfm | New |
| #3 Therminol Recirculation Pump | (Insignificant Per IDAPA 58.01.01.317.01(b)(i)) | Preliminary 2,000 to 2,400 gpm | New |
| #3 Therminol Expansion Tank | (Insignificant Per IDAPA 58.01.01.317.01(b)(i)) | TBD | New |
| **Evaporator Package** | | | |
| #3 SPA Evaporator Vaporhead | Note 1 | Note 2 | New |
| #3 SPA Evap. Tube Bundle | Note 1 | Note 2 | New |
| #3 SPA Evaporator Recirculation Pump | No | TBD | New |
| #3 SPA Main Condenser | Note 1 | Note 2 | New |
| #3 SPA Inter Condenser | Note 1 | Note 2 | New |
| #3 SPA Primary Ejector | No | NA | New |
| #3 SPA Secondary Ejector | No | NA | New |
| **Other Equipment** | | | |
| #3 SPA Therminol Storage Tank | (Insignificant Per IDAPA 58.01.01.317.01(b)(i)) | TBD | New |
| #3 SPA Therminol Fill Pump | (Insignificant Per IDAPA 58.01.01.317.01(b)(i)) | TBD | New |
| #3 SPA Evaporator Feed Pump | No | Preliminary 60 to 130 gpm | New |
| #3 SPA Oxidation Feed Pump | No | Preliminary 55 to 75 gpm | New |
| #3 SPA Seal Tank Recirculation Pump | No | Preliminary 1,200 to 1,400 gpm | New |
| #3 SPA Seal Tank | Vented to existing SPA Scrubber | Note 2 | New |
| #3 SPA Oxidation Feed Tank | Vented to existing SPA Scrubber | Note 2 | New |
| Cooling Water Heat Exchanger[3] | No | NA | New |
| Cooling Water Heat Exchanger[3] | No | NA | New |
| Cooling Water Heat Exchanger[3] | No | NA | New |
| #1 SPA Product Pump[3] | No | 68 gpm | New |
| #2 SPA Product Pump[3] | No | 68 gpm | New |

*Note 1: The units of the Evaporator Package are a source of emissions, which are vented from identified vent points to the SPA Scrubber.*

*Note 2: See Table 3-2, Note 1.*

*Note 3: New cooling water heat exchangers and production pumps are replacing existing equipment.*

*Table 3-2. Existing Affected Equipment*

| Item | Description | Emission Unit | Capacity | PTC No. |
|---|---|---|---|---|
| Nebraska Boiler[1] (B-5) | Model No: NSX-G-107-ECON | Yes | 213.8 MMBtu/hr (Rated Input)<br>175,000 lb/hr Steam | 029-00003, 7/26/95 |
| Super Phosphoric Acid Process | Multi-stage horizontal cross-flow scrubber | Yes | Note 1 | Note 1 |
| Oxidation Reactor | Oxidation Reactor stack | Yes | Note 2 | P-2009.0068, 10/14/10 |
| Existing 3-Cell PPA Evaporative Cooling Towers | NA | Yes | 22,650 gpm | NA |
| Existing #1 & #2 SPA Feed Pumps | NA | No | Preliminary<br>60-130 gpm per pump | NA |

*Note 1: The existing Super Phosphoric Acid process includes #1 and #2 SPA Evaporation System components. The new components of the proposed #3 SPA Evaporation System described in Table 3-1, in combination with the #1 and #2 SPA Evaporation Systems, would continue to be subject to the current limits applicable to 'Phosphoric Acid and Superphosphoric Acid Plants" as summarized in Section 6.0 of Tier 1 Operating Permit T1-060308, amended January 12, 2012.*

*Note 2. The existing Oxidation Reactor capacity is defined by applicable limits summarized in Section 6.0 of Tier 1 Operating Permit T1-060308, amended January 12, 2012. This capacity is sufficient to address the addition of the proposed #3 SPA Evaporation System.*

# 4.0 INSIGNIFICANT ACTIVITIES

Pursuant to IDAPA 58.01.01.317.01(b)(i)(20), insignificant activities include equipment used exclusively to pump, load, unload, or store high boiling point organic material, material with initial boiling point (IBP) not less than 150°C or vapor pressure (vp) not more than five (5) mm Hg at 21°C (equal to approximately 10 psi Reid vapor pressure at 100°F) with lids or other appropriate closure. The Therminol® 55 Heat Transfer Fluid is a high boiling point organic material that satisfies these criteria (Boiling Range: 335°C to 390°C at 760 mmHg; Reid vapor pressure: 0.16 psi at 100°F).

The emission units listed in Table 4-1 are associated with the storage and handling of Therminol® 55 Heat Transfer Fluid and thus are categorized as insignificant activities for Tier 1 permitting purposes. They also are used by the existing #1 and #2 SPA trains and not regulated by the DEQ.

*Table 4-1. Insignificant Activities*

| Description | Insignificant Activities IDAPA 58.01.01.317.01(b)(i) Citation |
|---|---|
| Therminol® 55 Heat Transfer Fluid | |
| #3 Therminol Recirculation Pump | |
| #3 Therminol Expansion Tank | 20 |
| #3 SPA Therminol Storage Tank | |
| #3 SPA Therminol Fill Pump | |

# 5.0 EMISSIONS

The project emission inventory is based on the maximum capacity (i.e., potential to emit) of the #3 SPA Evaporation System and anticipated emission increases from existing sources that are associated with the project. The project emission inventory does not include any potential contemporaneous emission decreases associated with decreased $P_2O_5$ acid strength throughput in the existing #1 SPA or #2 SPA Evaporation Systems when considering the #3 SPA Evaporation System at full capacity. No potential contemporaneous emission decreases from anywhere at the Conda facility were accounted for in the emission estimates.

## 5.1 Emission Factors

Emissions were calculated using the maximum capacity (potential to emit) of the new equipment combined with project-associated incremental emission increases from existing sources considering the #3 SPA train at full capacity. Source test data, established emission factors published either in United States Environmental Protection Agency (USEPA) AP-42, other technical resources, and emission factors from currently applicable federal standards (i.e., fluoride MACT per 40 CFR 63 Subpart AA) were used to calculate potential to emit for this project.

References used for emission factors and supporting information are presented in Tables 5-1 and 5-2.

*Table 5-1. References Used for Emission Factors*

| Emissions | Reference |
|---|---|
| Fluoride | MACT standard emission rate of 0.00870 lb F/ton equivalent $P_2O_5$ |
| $PM_{10}$ | SPA Scrubber Source Test (04/17/2007) (0.37 lb/hour). Multiplied higher result of past two source tests (2007 & 2009) by factor of 2 to conservatively estimate emissions taking into consideration the limited test data.<br>SPA Therminol Heater (AP-42, Table 1.4-2, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (7.6 lb/MMscf)<br>Cooling Tower (AP-42, Table 13.4-1)<br>Drift Emissions test (10/15/2010)<br>Previous Tier 1 Permit Calculations (TDS of 2,200 ppmw)<br>Nebraska Boiler B-5 (Permit Condition 5.2) |
| $PM_{2.5}$ | SPA Scrubber Source Test (04/17/2007) (0.09 lb/hr). Multiplied higher result of past two source tests (2007 & 2009) by factor of 2 to conservatively estimate emissions taking into consideration the limited test data.<br>SPA Therminol Heater $PM_{2.5}$ assumed equal to $PM_{10}$ per AP-42.<br>Cooling Tower SCAQMD, Appendix A – Updated CEIDARS Table with $PM_{2.5}$ Fractions, Final Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds (October 2006). Assume 60% $PM_{10}$ = $PM_{2.5}$.<br>Drift Emissions test (10/15/2010).<br>Previous Tier 1 Permit Calculations (TDS of 2,200 ppmw)<br>Nebraska Boiler B-5 $PM_{2.5}$ assumed equal to $PM_{10}$ per AP-42. |

| Emissions | Reference |
|---|---|
| $NO_X$ | SPA Oxidation Reactor Source Test (12/4/2008) (0.137 lb/hr $NO_X$). Multiplied by factor of 2 to conservatively estimate emissions taking into consideration the limited test data.<br><br>SPA Therminol Heater (AP-42, Table 1.4-1, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (50 lb/MMscf)<br><br>Nebraska Boiler B-5 (Permit Condition 5.2) |
| CO | SPA Oxidation Reactor Source Test (12/4/2008) (2.175 lb/hr CO). Doubled to conservatively estimate emissions taking into consideration the limited test data.<br><br>SPA Therminol Heater (AP-42, Table 1.4-1, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (84 lb/MMscf)<br><br>Nebraska Boiler B-5 (Permit Condition 5.2) |
| $CO_2$ | SPA Therminol Heater (AP-42, Table 1.4-2, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (120,000 lb/MMscf)<br><br>Nebraska Boiler B-5 (AP-42, Table 1.4-2) |
| Pb | SPA Therminol Heater (AP-42, Table 1.4-2, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (0.0005 lb/MMscf)<br><br>Nebraska Boiler B-5 (AP-42, Table 1.4-2) |
| $SO_2$ | SPA Therminol Heater (AP-42, Table 1.4-2, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (0.6 lb/MMscf)<br><br>Nebraska Boiler B-5 (Permit Condition 5.2) |
| VOC | SPA Therminol Heater (AP-42, Table 1.4-2, Small Boiler < 100 MMBtu/hr, Low $NO_X$ Burners) (5.5 lb/MMscf)<br><br>Nebraska Boiler B-5 (Permit Condition 5.2) |
| Non-Carcinogens and Carcinogens | SPA Therminol Heater (AP-42, Table 1.4-3/4)<br><br>Nebraska Boiler B-5 (AP-42, Table 1.4-3/4) |

## 5.2 Operating Assumptions

The following assumptions are used in calculating project-associated emissions.

General Assumptions Applicable to All Sources:

- Assume 8,760 hours of operation per year
- Assume 365 days of operation per year

# *Appendix B*
# *Emissions Calculations*

*Table 5-2. Equipment-Specific Assumptions for Emissions Estimates*

| Source | Assumption |
|---|---|
| **Therminol Heater** | Heater Capacity: 25.55 MMBtu/hr<br>Low-$NO_X$ Burners<br>For natural gas combustion, $PM_{2.5}$ = $PM_{10}$ per AP-42 |
| **Nebraska Boiler (B-5)** | Boiler Capacity: 213.8 MMBtu/hr (175,000 lb/hr) currently permitted to capacity.<br>SPA #3 load within permitted capacity: Estimated to be 1.01 MMBtu/hr (824 lb/hr steam).<br>Used permitted emission rates (Permit Condition 5.2) and prorated for the incremental increase in steam required at maximum $P_2O_5$ capacity of #3 SPA. |
| **SPA Scrubber** | Used $PM_{10}$ & $PM_{2.5}$ source tests and prorated in proportion to the incremental increase in feed rate at maximum $P_2O_5$ capacity of #3 SPA. Fluoride emissions calculated using MACT Standard emission rate of 0.00870 lb F/ton equivalent $P_2O_5$ feed to #3 SPA at maximum design throughput. |
| **SPA Oxidation Reactor** | Used $NO_X$ and CO source tests and prorated for the incremental increase in feed rate at maximum $P_2O_5$ capacity of #3 SPA. |
| **PPA Cooling Tower** | Assume incremental water circulation rate increase of 1,200 gpm corresponding to #3 SPA maximum feed rate capacity of $P_2O_5$. |

## 5.3 Emission Estimates

Using the emission factors of Section 5.1 and the operating assumptions of Section 5.2, project criteria pollutant emissions are calculated and shown in Table 5-3 below. Criteria air pollutant emission increases are minor as they are below the Prevention of Significant Deterioration (PSD) thresholds. Greenhouse gas (GHG) emissions are below the 75,000 ton/yr $CO_2$ equivalent ($CO_2e$) major modification threshold.

Non-carcinogenic and carcinogenic TAP emissions that increase with the project are shown in Table 5-4 below. Table 5-4 also shows the Idaho DEQ screening emission levels (ELs) for each TAP. For any TAP with project emissions that exceed its EL, a modeling demonstration is required per IDAPA 58.01.01.203.03 to demonstrate compliance with toxic standards. Compliance with IDAPA.01.01.203.03 is discussed in Section 6.0.

Appendix B presents criteria, TAP, and greenhouse gas emissions calculations tables and a CD-ROM with an electronic copy of the emissions calculations.

No contemporaneous emission decreases were accounted for in the emission estimates.

*Table 5-3. Project Emissions – Criteria, Fluorides, and Greenhouse Gases*

| Pollutant | Project Emissions (TPY) | | | | | | PSD Significant Emission Threshold (TPY) |
|---|---|---|---|---|---|---|---|
| | Therminol Heater | Nebraska B-5 Boiler | SPA Scrubber | SPA Oxidation Reactor | Cooling Tower | Project Total | |
| $NO_x$ | 5.5 | 0.3 | - | 0.5 | - | 6.3 | ≥ 40 |
| CO | 9.2 | 0.2 | - | 7.6 | - | 16.9 (3.9 lb/hr) | ≥ 100 |
| $PM_{10}$ | 0.8 | 2.1E-2 | 1.3 | - | 0.2 | 2.3 (0.53 lb/hr) | ≥ 15 |
| $PM_{2.5}$ | 0.8 | 2.1E-2 | 0.3 | - | 0.1 | 1.3 | ≥ 10 |
| Lead | 5.5E-5 | 2.2E-6 | - | - | - | 5.7E-5 (9.5E-3 lb/month) | ≥ 0.6 |
| $SO_2$ | 6.6E-2 | 2.5E-3 | - | - | - | 6.8E-2 | ≥ 40 |
| VOC | 0.6 | 7.1E-3 | - | - | - | 0.6 | ≥ 40 |
| Fluorides, as F | - | - | 0.5 | - | - | 0.5 (0.12 lb/hr) | ≥ 3 |
| GHG (as $CO_{2e}$) | 13,193 | 520 | - | - | - | 13,713 | ≥75,000 |

*Table 5-4. Project Non-Carcinogenic and Carcinogenic Emissions*

| Pollutant | Classification | Project Emissions (lb/hr) | | | Screening Emissions Levels[4] (EL) (lb/hr) | | Modeling Required |
|---|---|---|---|---|---|---|---|
| | | Therminol Heater[1] | Nebraska B-5 Boiler[1] | Project Total | Non Carcinogen | Carcinogen | Yes/No |
| 2-Methylnaphthalene[2] | Carcinogen | 6.01E-07 | 2.37E-08 | 6.25E-07 | --- | 9.10E-05 | No |
| 3-Methylchloranthrene[2] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.50E-06 | No |
| 7,12-Dimethylbenz(a)anthracene[2] | Carcinogen | 4.01E-07 | 1.58E-08 | 4.17E-07 | --- | 9.10E-05 | No |
| Acenaphthene[2] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 9.10E-05 | No |
| Acenaphthylene[2] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 9.10E-05 | No |
| Anthracene[2] | Carcinogen | 6.01E-08 | 2.37E-09 | 6.25E-08 | --- | 9.10E-05 | No |
| Benz(a)anthracene[2,3] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.00E-06 | No |
| Benzene | Carcinogen | 5.26E-05 | 2.07E-06 | 5.47E-05 | --- | 8.00E-04 | No |
| Benzo(a)pyrene[2,3] | Carcinogen | 3.01E-08 | 1.18E-09 | 3.12E-08 | --- | 2.00E-06 | No |
| Benzo(b)fluoranthene[2,3] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.00E-06 | No |
| Benzo(g,h,i)perylene[2] | Carcinogen | 3.01E-08 | 1.18E-09 | 3.12E-08 | --- | 9.10E-05 | No |
| Benzo(k)fluoranthene[2,3] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.00E-06 | No |
| Chrysene[2,3] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.00E-06 | No |
| Dibenzo(a,h)anthracene[2,3] | Carcinogen | 3.01E-08 | 1.18E-09 | 3.12E-08 | --- | 2.00E-06 | No |
| Dichlorobenzene | --- | 3.01E-05 | 1.18E-06 | 3.12E-05 | --- | --- | No |
| Fluoranthene[2] | Carcinogen | 7.51E-08 | 2.96E-09 | 7.81E-08 | --- | 9.10E-05 | No |
| Fluorene[2] | Carcinogen | 7.01E-08 | 2.76E-09 | 7.29E-08 | --- | 9.10E-05 | No |
| Formaldehyde | Carcinogen | 1.88E-03 | 7.40E-05 | 1.95E-03 | --- | 5.10E-04 | Yes |
| n-Hexane | Non-Carcinogen | 4.51E-02 | 1.78E-03 | 4.69E-02 | 12 | --- | No |
| Indeno(1,2,3-cd)pyrene[2,3] | Carcinogen | 4.51E-08 | 1.78E-09 | 4.69E-08 | --- | 2.00E-06 | No |

| Pollutant | Classification | Project Emissions (lb/hr) | | | Screening Emissions Levels[4] (EL) (lb/hr) | | Modeling Required |
|---|---|---|---|---|---|---|---|
| | | Therminol Heater[1] | Nebraska B-5 Boiler[1] | Project Total | Non Carcinogen | Carcinogen | Yes/No |
| Naphthalene | Non-Carcinogen | 1.53E-05 | 6.02E-07 | 1.59E-05 | 3.33 | --- | No |
| Phenanathrene[2] | Carcinogen | 4.26E-07 | 1.68E-08 | 4.43E-07 | --- | 9.10E-05 | No |
| Pyrene[2] | Carcinogen | 1.25E-07 | 4.93E-09 | 1.30E-07 | --- | 9.10E-05 | No |
| Toluene | Non-Carcinogen | 8.52E-05 | 3.36E-06 | 8.85E-05 | 25 | --- | No |
| Arsenic | Carcinogen | 5.01E-06 | 1.97E-07 | 5.21E-06 | --- | 1.50E-06 | Yes |
| Barium | Non-Carcinogen | 1.10E-04 | 4.34E-06 | 1.15E-04 | 0.033 | --- | No |
| Beryllium | Carcinogen | 3.01E-07 | 1.18E-08 | 3.12E-07 | --- | 2.80E-05 | No |
| Cadmium | Carcinogen | 2.76E-05 | 1.09E-06 | 2.86E-05 | --- | 3.70E-06 | Yes |
| Chromium | Non-Carcinogen | 3.51E-05 | 1.38E-06 | 3.65E-05 | 0.033 | --- | No |
| Cobalt | Non-Carcinogen | 2.10E-06 | 8.29E-08 | 2.19E-06 | 0.0033 | --- | No |
| Copper | Non-Carcinogen | 2.13E-05 | 8.39E-07 | 2.21E-05 | 0.013 | --- | No |
| Manganese | Non-Carcinogen | 9.52E-06 | 3.75E-07 | 9.89E-06 | 0.067 | --- | No |
| Mercury | --- | 6.51E-06 | 2.57E-07 | 6.77E-06 | --- | --- | No |
| Molybdenum | Non-Carcinogen | 2.76E-05 | 1.09E-06 | 2.86E-05 | 0.333 | --- | No |
| Nickel | Carcinogen | 5.26E-05 | 2.07E-06 | 5.47E-05 | --- | 2.70E-05 | Yes |
| Selenium | Non-Carcinogen | 6.01E-07 | 2.37E-08 | 6.25E-07 | 0.013 | --- | No |
| Vanadium | Non-Carcinogen | 5.76E-05 | 2.27E-06 | 5.99E-05 | 0.003 | --- | No |
| Zinc | Non-Carcinogen | 7.26E-04 | 2.86E-05 | 7.55E-04 | 0.667 | --- | No |
| PAH - B(a)P Equivalent | Carcinogen | 2.86E-07 | 1.13E-08 | 2.97E-07 | --- | 2.00E-06 | No |

Notes:
1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4
2. Polycyclic Organic Matter (POM)
3. POM as Poly-aromatic Hydrocarbons (PAH)
4. Emission level (EL) from IDAPA 58.01.01 Section 585 & 586 – Toxic Air Pollutants Non-Carcinogenic and Carcinogenic Increments.

# 6.0 COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS

An application for a PTC must demonstrate compliance with ambient air quality standards for criteria pollutant emissions (IDAPA 58.01.01.203.02). The application must also demonstrate that emissions of toxic air pollutants (TAPs) would meet toxic standards and not injure or unreasonably affect human or animal life or vegetation. For minor source PTC applications, such as the #3 SPA Evaporation System project, Idaho DEQ has established Modeling Thresholds for determining if modeling will be required to make the demonstrations (*State of Idaho, Guideline for Performing Air Quality Impact Analyses*, Rev 2, July 2011).

A modeling protocol for the proposed project was submitted to the Idaho DEQ on November 5, 2012. As part of the protocol, Nu-West estimated the project emissions of criteria pollutants and TAPs to compare to the Modeling Thresholds. In total, there is one new emission point and four existing emission points affected by the proposed project. Stack parameters for those emission points are shown in Table 6-1.

*Table 6-1. Stack Parameters for New and Affected Sources*

| Emission Source | Stack Height Above Ground Level (feet) | Stack Diameter (feet) | Stack Gas Flowrate (acfm) | Stack Gas Temperature (°F) |
|---|---|---|---|---|
| Therminol Heater[1] | 104.8 | 2.5 | 9,480 | 560 |
| B-5 Nebraska Boiler[2] | 52 | 5.3 | 33,000 | 309 |
| SPA Scrubber | 56.5 | 3.0 | 8,700 | 85 |
| SPA Oxidation | 60 | 0.98 | 1,120 | 92 |
| PPA Cooling Tower | 61.5 per cell | 30 per cell | 575,880 per cell | 75 per cell |

*Note 1: New Therminol Heater stack flow rate and temperature shown above are estimated actual operating conditions based on preliminary design work for the SPA #3 project and measurements taken on the #1 Therminol Heater.*

*Note 2: B-5 Boiler stack flow rate and temperature shown above are actual three-month averages of stack temperature and steam rates from July 1 through September 30, 2012, for the existing Nebraska boiler. The 213.8 MMBtu/hr boiler heat input capacity was multiplied by the ratio of the 3-month average steam rate to the rated steam capacity of the boiler to arrive at an estimate of 123 MMBtu/hr during the period. The additional SPA#3 steam requirements add about 1 MMBtu/hr to this, for an estimated firing rate after the SPA#3 project of 124 MMBtu/hr. The EPA F-Factor of 8710 dscf/MMBtu was applied and an adjustment made for atmospheric pressure at plant altitude to estimate the post-project stack flow rate. This does not incorporate any moisture or oxygen content adjustment, which would add to the estimated stack exhaust flow rate.*

For potentially required criteria pollutant modeling as well as modeling for four TAPs (formaldehyde, arsenic, cadmium and nickel) that exceeded their Modeling Thresholds, the modeling protocol proposed how modeling would be performed to demonstrate criteria pollutant compliance with ambient air quality standards and demonstrate that the TAPs would not injure or unreasonably affect human or animal life or vegetation.

On December 5, 2012, Idaho DEQ conditionally approved the modeling protocol. Given the estimated emission levels and source locations relative to the facility configuration, DEQ also conditionally exempted the project from criteria pollutant modeling.

Nu-West performed air dispersion modeling for the four TAPs consistent with the modeling protocol and Idaho DEQ's conditional approval. As shown in Table 6-2, the

modeling predicted maximum ambient concentrations below applicable acceptable ambient concentrations demonstrating insignificant TAP impacts as a result of the project.

*Table 6-2. Comparison of Maximum Modeled TAP Concentrations to Acceptable Ambient Air Concentrations for Carcinogens*

| TAP | CAS Number | Annual Average Concentrations µg/m$^3$ | Acceptable Ambient Air Concentrations µg/m$^3$ |
|---|---|---|---|
| Formaldehyde | 50-00-0 | 2.98E-04 | 7.7E-02 |
| Arsenic | 7440-38-2 | 7.93E-07 | 2.3E-04 |
| Cadmium | 7440-43-9 | 4.36E-06 | 5.6E-04 |
| Nickel | 7440-02-0 | 8.33E-06 | 4.2E-03 |

This modeling is described further in the Appendix D Modeling Report, along with the Modeling Protocol and correspondence with Idaho DEQ.

# 7.0 APPLICABLE AIR QUALITY RULES AND REGULATIONS

This section describes the general requirements applicable to the project.

## 7.1 General Requirements for All Emission Sources

### 7.1.1 State of Idaho Regulations

General Idaho DEQ Rule Requirements are provided in Idaho Administrative Procedures Act (IDAPA) 58.01.01, Rules for the Control of Air Pollution in Idaho. The following general requirements are applicable to the project, listed by Sections under IDAPA 58.01.01:

- **123. CERTIFICATION OF DOCUMENTS**

PTC application will be certified by signature of a Nu-West Responsible Official.

- **130. STARTUP, SHUTDOWN, SCHEDULED MAINTENANCE, SAFETY MEASURES, UPSET AND BREAKDOWN**

Sections 130 through 136 are applicable for excess emission events where the excess emissions are caused by startup, shutdown, scheduled maintenance, upset, or breakdown of any emissions unit or which occur as a direct result of the implementation of any safety measure.

- **157. TEST METHODS AND PROCEDURES**

Section 157(01) through (05) are applicable to those sources for which a performance test requirement or a compliance test requirement has been imposed by state or federal regulations, rules, permits, orders or consent decree.

- **161. TOXIC SUBSTANCES**

PTC application will include any contaminant which is by its nature toxic to human or animal life or vegetation alone or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.

- **201. PERMIT TO CONSTRUCT REQUIRED**

Construction or modification shall not commence without first obtaining a permit to construct form the Department.

- **203. PERMIT REQUIREMENTS FOR NEW AND MODIFIED STATIONARY SOURCES**

The PTC application will include an analysis showing that all stationary sources or modifications would:

- Comply with all applicable local, state or federal emission standards
- Would not cause or significantly contribute to a violation of any ambient air quality standard

- Use methods provided in Section 201 to show that emissions of toxic air pollutants from the stationary source or modification would comply with Sections 161, 585, and 586.

- **210. DEMONSTRATION OF PRECONSTRUCTION COMPLIANCE WITH TOXIC STANDARDS**

PTC application will include TAP screening per Sections 203, 585, and 586 in accordance with Section 161.

- **577. AMBIENT AIR QUALITY STANDARDS FOR FLUORIDES**

Primary and secondary air quality standards are those concentrations in the ambient air which result in a total fluoride content in vegetation used for feed and forage of no more than:

- Annual Standard. Forty (40) ppm, dry basis – annual arithmetic mean.
- Bimonthly Standard. Sixty (60) ppm, dry basis – monthly concentration for two (2) consecutive months.
- Monthly Standard. Eighty (80) ppm, dry basis – monthly concentration never to be exceeded.

- **585. TOXIC AIR POLLUTANTS NON-CARCINOGENIC INCREMENTS**

This PTC application includes TAP screening emissions levels (EL) and acceptable ambient concentrations (AAC) for non-carcinogens.

- **586. TOXIC AIR POLLUTANTS CARCINOGENIC INCREMENTS**

This PTC application includes TAP screening emissions levels (EL) and acceptable ambient concentrations (AAC) for carcinogens.

- **590. NEW SOURCE PERFORMANCE STANDARDS**

No NSPS are applicable to the #3 SPA Evaporation System.

- **591. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS**

Post-project SPA production will comply with MACT 40 CFR 63 Subpart AA standard of 0.0087 total F- per ton equivalent $P_2O_5$ feed.

- **625. VISIBLE EMISSIONS**

Current Tier 1 permit condition enforces a 20% facility-wide opacity standard

- **650 & 651. RULES FOR THE CONTROL OF FUGITIVE DUST & GENERAL RULES**

Current Tier 1 permit condition enforces facility-wide fugitive dust control.

All reasonable precautions shall be taken to prevent particulate matter from becoming airborne.

- **701. PARTICULATE MATTER – NEW EQUIPMENT PROCESS WEIGHT LIMITATIONS**

A current Tier 1 permit condition enforces process weight limits at the phosphoric acid plant.

- **775 & 776. RULES FOR CONTROL OF ODORS & GENERAL RULES**

Current Tier 1 permit condition enforces facility-wide odor rules.

No person shall allow, suffer, cause or permit the emission of odorous gases, liquids or solids into the atmosphere in such quantities as to cause air pollution.

### 7.1.2 Federal Regulations

- **PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY CRITERIA POLLUTANTS (40 CFR 52.21(b)(23)(i)).**

The project emissions will be below the PSD significant emission rates. Therefore, PSD for criteria pollutants including fluorides does not apply.

- **PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY GHGs (40 CFR 52.21(b)(49)(iv)(b)).**

The facility is a major stationary source as it emits or has the potential to emit 100 tons per year or more of any regulated New Source Review pollutant (at its sulfuric acid plant) per 40 CFR 52.21(b)(1)(i)(a). As such, beginning January 2, 2011, the pollutant GHGs is subject to regulation if the stationary source is an existing major stationary source for a regulated New Source Review pollutant that is not GHGs, and also will have an emissions increase of a regulated NSR pollutant, and an emissions increase of 75,000 tpy CO2e or more. (52.21(b)(49)(iv)(b)).

The $CO_2e$ emissions are less than 75,000 TPY for the #3 SPA Evaporation System; therefore, PSD for GHGs does not apply.

- **ACID RAIN PERMIT (40 CFR 72-75)**

The Nu-West Industries, Inc. facility is not an affected source subject to the Acid Rain Permit program in 40 CFR 72-75.

## 7.2 Applicable Regulations for Existing Equipment Associated with Proposed Project

This section describes the air quality rules and regulations applicable to existing equipment.

### 7.2.1 Nebraska Boiler (B-5)

Table 7-1 contains a summary of the Air Quality Rules and Regulations that apply to the existing Nebraska Boiler (B-5). No changes to the Nebraska Boiler permit limits or regulatory requirements are requested for the #3 SPA Evaporation System.

**Nu-West Conda Phosphate Operations**
**Permit Section 6: Superphosphoric Acid Process**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 131.528 | 62 |
| | Specific Gravity | none | *none* | 1.8118 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 119,247 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,431 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 59.21 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 70,608 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 847 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 35.3 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 309,264 | 122,759 |
| 6.4 | SPA Oxidation $NO_x$ emissions | ppm | *none* | 23.0 | 9.130 |
| 6.4 | SPA Oxidation $NO_x$ emissions* | lb/hr | *none* | 0.137 | 0.054 |
| 6.4 | SPA Oxidation $NO_x$ emissions | tons/12 consecutive months | 5 | 0.60 | 0.24 |
| | SPA Oxidation CO emissions | ppm | *none* | 600.4 | 238.3 |
| | SPA Oxidation CO emissions* | lb/hr | *none* | 2.175 | 0.863 |

* Calculated with formula from Source Test Report (12-4-2008, NOx and CO Performance Tests Conducted on the $HNO_3$ Oxidizer Exhaust

Increased NOx and CO from SPA scrubber due to the addition of SPA#3 calculated from NOx and CO emission measurements from 2008 source test, prorating to maximum P2O5 capacity of SPA#3 assuming average P2O5 feed rate from other 2007, 2009, 2010, 2011, and 2012 source tests (as corresponding feed rate during the source test was not available).

**Burner TAC Emissions**

| | SPA #3 |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 1.01 |
| Steam Capacity (lb/hr) | 824 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |

| CAS Number | Pollutant | Emission Factor[1] | | SPA #3 Emissions | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|
| | | Emissin Factor (lb/MMscf) | Emissin Factor (lb/MMBtu) | Hourly (lb/hr) | Annual (lb/year) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 2.40E-05 | 2.35E-08 | 2.37E-08 | 2.07E-04 | — | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 1.60E-05 | 1.57E-08 | 1.58E-08 | 1.38E-04 | — | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 2.40E-06 | 2.35E-09 | 2.37E-09 | 2.07E-05 | — | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 71-43-2 | Benzene | 2.10E-03 | 2.06E-06 | 2.07E-06 | 1.82E-02 | — | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 1.20E-03 | 1.18E-06 | 1.18E-06 | 1.04E-02 | — | — | No |
| 206-44-0 | Fluoranthene[2] | 3.00E-06 | 2.94E-09 | 2.96E-09 | 2.59E-05 | — | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 2.80E-06 | 2.75E-09 | 2.76E-09 | 2.42E-05 | — | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 7.50E-02 | 7.35E-05 | 7.40E-05 | 6.48E-01 | — | 5.10E-04 | No |
| 110-54-3 | n-Hexane | 1.80E+00 | 1.76E-03 | 1.78E-03 | 1.56E+01 | 12 | — | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 6.10E-04 | 5.98E-07 | 6.02E-07 | 5.27E-03 | 3.33 | — | No |
| 85-01-8 | Phenanathrene[2] | 1.70E-05 | 1.67E-08 | 1.68E-08 | 1.47E-04 | — | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 5.00E-06 | 4.90E-09 | 4.93E-09 | 4.32E-05 | — | 9.10E-05 | No |
| 108-88-3 | Toluene | 3.40E-03 | 3.33E-06 | 3.36E-06 | 2.94E-02 | 25 | — | No |
| 7440-38-2 | Arsenic | 2.00E-04 | 1.96E-07 | 1.97E-07 | 1.73E-03 | — | 1.50E-06 | No |
| 7440-39-3 | Barium | 4.40E-03 | 4.31E-06 | 4.34E-06 | 3.80E-02 | 0.033 | — | No |
| 7440-41-7 | Beryllium | 1.20E-05 | 1.18E-08 | 1.18E-08 | 1.04E-04 | — | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 1.10E-03 | 1.08E-06 | 1.09E-06 | 9.51E-03 | — | 3.70E-06 | No |
| 7440-47-3 | Chromium | 1.40E-03 | 1.37E-06 | 1.38E-06 | 1.21E-02 | 0.033 | — | No |
| 7440-48-4 | Cobalt | 8.40E-05 | 8.24E-08 | 8.29E-08 | 7.26E-04 | 0.0033 | — | No |
| 7440-50-8 | Copper | 8.50E-04 | 8.33E-07 | 8.39E-07 | 7.35E-03 | 0.013 | — | No |
| 7439-96-5 | Manganese | 3.80E-04 | 3.73E-07 | 3.75E-07 | 3.29E-03 | 0.067 | — | No |
| 7439-97-6 | Mercury | 2.60E-04 | 2.55E-07 | 2.57E-07 | 2.25E-03 | — | — | No |
| 7439-98-7 | Molybdenum | 1.10E-03 | 1.08E-06 | 1.09E-06 | 9.51E-03 | 0.333 | — | No |
| 7440-02-0 | Nickel | 2.10E-03 | 2.06E-06 | 2.07E-06 | 1.82E-02 | — | 2.70E-05 | No |
| 7782-49-2 | Selenium | 2.40E-05 | 2.35E-08 | 2.37E-08 | 2.07E-04 | 0.013 | — | No |
| 7440-62-2 | Vanadium | 2.30E-03 | 2.25E-06 | 2.27E-06 | 1.99E-02 | 0.003 | — | No |
| 7440-66-6 | Zinc | 2.90E-02 | 2.84E-05 | 2.86E-05 | 2.51E-01 | 0.667 | — | No |
| | Lead | 5.00E-04 | 4.90E-07 | 4.93E-07 | 4.32E-03 | | | |
| NA | PAH - B(a)P Equivalent | — | | 1.13E-08 | 9.86E-05 | — | 2.00E-06 | No |

1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4
2. Polycyclic Organic Matter (POM)
3. POM as Polyaromatic Hydrocarbons (PAH)

New Therminol Heater Burner TAC Emissions

| | |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 25.55 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |

| CAS Number | Pollutant | Emission Factor[1] | | Emissions | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|
| | | Emissin Factor (lb/MMscf) | Emissin Factor (lb/MMBtu) | Hourly (lb/hr) | Annual (lb/year) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 2.40E-05 | 2.35E-08 | 6.01E-07 | 5.27E-03 | --- | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 1.60E-05 | 1.57E-08 | 4.01E-07 | 3.51E-03 | --- | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 2.40E-06 | 2.35E-09 | 6.01E-08 | 5.27E-04 | --- | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 71-43-2 | Benzene | 2.10E-03 | 2.06E-06 | 5.26E-05 | 4.61E-01 | --- | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 1.20E-03 | 1.18E-06 | 3.01E-05 | 2.63E-01 | --- | --- | No |
| 206-44-0 | Fluoranthene[2] | 3.00E-06 | 2.94E-09 | 7.51E-08 | 6.58E-04 | --- | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 2.80E-06 | 2.75E-09 | 7.01E-08 | 6.14E-04 | --- | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 7.50E-02 | 7.35E-05 | 1.88E-03 | 1.65E+01 | --- | 5.10E-04 | Yes |
| 110-54-3 | n-Hexane | 1.80E+00 | 1.76E-03 | 4.51E-02 | 3.95E+02 | 12 | --- | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 6.10E-04 | 5.98E-07 | 1.53E-05 | 1.34E-01 | 3.33 | --- | No |
| 85-01-8 | Phenanathrene[2] | 1.70E-05 | 1.67E-08 | 4.26E-07 | 3.73E-03 | --- | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 5.00E-06 | 4.90E-09 | 1.25E-07 | 1.10E-03 | --- | 9.10E-05 | No |
| 108-88-3 | Toluene | 3.40E-03 | 3.33E-06 | 8.52E-05 | 7.46E-01 | 25 | --- | No |
| 7440-38-2 | Arsenic | 2.00E-04 | 1.96E-07 | 5.01E-06 | 4.39E-02 | --- | 1.50E-06 | Yes |
| 7440-39-3 | Barium | 4.40E-03 | 4.31E-06 | 1.10E-04 | 9.65E-01 | 0.033 | --- | No |
| 7440-41-7 | Beryllium | 1.20E-05 | 1.18E-08 | 3.01E-07 | 2.63E-03 | --- | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 1.10E-03 | 1.08E-06 | 2.76E-05 | 2.41E-01 | --- | 3.70E-06 | Yes |
| 7440-47-3 | Chromium | 1.40E-03 | 1.37E-06 | 3.51E-05 | 3.07E-01 | 0.033 | --- | No |
| 7440-48-4 | Cobalt | 8.40E-05 | 8.24E-08 | 2.10E-06 | 1.84E-02 | 0.0033 | --- | No |
| 7440-50-8 | Copper | 8.50E-04 | 8.33E-07 | 2.13E-05 | 1.87E-01 | 0.013 | --- | No |
| 7439-96-5 | Manganese | 3.80E-04 | 3.73E-07 | 9.52E-06 | 8.34E-02 | 0.067 | --- | No |
| 7439-97-6 | Mercury | 2.60E-04 | 2.55E-07 | 6.51E-06 | 5.71E-02 | --- | --- | No |
| 7439-98-7 | Molybdenum | 1.10E-03 | 1.08E-06 | 2.76E-05 | 2.41E-01 | 0.333 | --- | No |
| 7440-02-0 | Nickel | 2.10E-03 | 2.06E-06 | 5.26E-05 | 4.61E-01 | --- | 2.70E-05 | Yes |
| 7782-49-2 | Selenium | 2.40E-05 | 2.35E-08 | 6.01E-07 | 5.27E-03 | 0.013 | --- | No |
| 7440-62-2 | Vanadium | 2.30E-03 | 2.25E-06 | 5.76E-05 | 5.05E-01 | 0.003 | --- | No |
| 7440-66-6 | Zinc | 2.90E-02 | 2.84E-05 | 7.26E-04 | 6.36E+00 | 0.667 | --- | No |
| NA | PAH - B(a)P Equivalent | --- | | 2.86E-07 | 2.50E-03 | --- | 2.00E-06 | No |

1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4
2. Polycyclic Organic Matter (POM)
3. POM as Polyaromatic Hydrocarbons (PAH)

**B-5 Nebraska Boiler Criteria Pollutant Emissions**

| | SPA #1 and 2 | SPA #3 | |
|---|---|---|---|
| Fuel | Natural Gas (NG) | Natural Gas (NG) | |
| High Heating Value of NG (btu/scf) | 1020 | 1020 | |
| Heat Input Rating (Mmbtu/hr) | 213.8 | 1.01 | <-incremental |
| Steam Capacity (lb/hr) | 175000 | 824 | |
| Burner Type | Controlled - Low NOx burners | | |

July 1-Sept 30, 2012 Plant Data:
Average Steam Rate: 100.8

124.2 <-- Avg + incremental

| Pollutants | Permitted SPA #1 and 2 Emissions (Permit Condition 5.2) | | Emissions Increase Due to SPA #3 | |
|---|---|---|---|---|
| | Hourly (lb/hr) | Annual (tons/yr) | Hourly (lb/hr) | Annual (tons/yr) |
| NOx | 16.84 | 70.71 | 0.079 | 0.333 |
| CO | 8.42 | 35.40 | 0.040 | 0.167 |
| $SO_2$ | 0.13 | 0.53 | 0.001 | 0.002 |
| PM10 | 1.05 | 4.42 | 0.005 | 0.021 |
| VOC | 0.36 | 1.50 | 0.002 | 0.007 |

Note:
Incremental emissions due to increased steam usage by SPA #3 were estimated by prorating the permitted B-5 boiler emissions in proportion to the steam requirements.

Stack gas flow rate

| | | |
|---|---|---|
| F-Factor (dscf/MMBtu) | 8710 | |
| % Oxygen in stack exhaust | 0 | |
| Heat input rate (MMBtu/hr) | 124.16 | |
| Stack gas flow rate (dscfm) at STP (68 °F and 1 atm) | 18023.24 | |
| Actual temperature (°F) | 309.4 | (Measurement average between July 1-September 30, 2012) |
| Actual pressure (atm) | 0.797 | (standard atmospheric pressure at 6150 ft elevation) |
| Stack gas flow rate (acfm) at actual temperature and pressure | 32959 | |

**PPA Cooling Tower PM**

| Parameter | Units | Value | Data Source |
|---|---|---|---|
| **Water Circulation Rate** | gpm | 1,200 | Additional load due to SPA #3 |
| **Total Liquid Drift** | (%) | 0.00283% | Drift emissions test conducted on 10/15/2010 |
| **Maximum TDS of Circulated Water** | (ppmw) | 2,200 | Previous Tier I permit calculations |
| **Annual Operating hours** | hours/year | 8,760 | |
| **Mass Fraction of PM2.5 In PM10** | Unitless | 0.60 | SCAQMD, Appendix A - Updated CEIDARS Table with PM2.5 Fractions, Final Methodology to Calculate PM2.5 and PM2.5 Significance Thresholds (October 2006) |
| **Emission Rate** | | | |
| **PM** | lb/hr | 0.04 | |
| | ton/yr | 0.16 | |
| **PM10[1]** | lb/hr | 0.04 | |
| | ton/yr | 0.16 | |
| **PM2.5[2]** | lb/hr | 0.02 | |
| | ton/yr | 0.10 | |

**NOTES:**

1. PM10 Emission Rate = based on USEPA AP-42, Section 13.4 Wet Cooling Towers, Table 13.4-1, modified to design

   Rates calculated as follows:

   E lb/hr = Water Circulation Rate gpm * 60 min/hr * Drift % * 8.3453 lb/gal * TDS lb PM / 1,000,000 lb water

   E ton/yr = E lb/hr * 8,760 hr/yr * ton/2,000 lb

2 PM2.5 emission rate = PM2.5 mass fraction in PM10 x PM10 emission rate

**New Therminol Heater Burner Criteria Pollutant and GHG Emissions**

| | |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 25.55 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |
| Burner Type | Controlled - Low NOx burners |

| Pollutants | Emission Factor | | Emissions | | |
|---|---|---|---|---|---|
| | lb/MMscf | lb/MMbtu | Hourly (lb/hr) | Daily (lb/day) | Annual (tons/yr) |
| NOx[1] | 50 | 0.0490 | 1.25 | 30.06 | 5.49 |
| CO[1] | 84 | 0.0824 | 2.10 | 50.50 | 9.22 |
| $SO_2$[2] | 0.6 | 0.0006 | 0.02 | 0.36 | 0.07 |
| PM10 | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| PM2.5 | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| Lead[2] | 0.0005 | 0.0000 | 0.00 | 0.00 | 0.00 |
| VOC | 5.5 | 0.0054 | 0.14 | 3.31 | 0.60 |
| TOC[2] | 11 | 0.0108 | 0.28 | 6.61 | 1.21 |
| $CO_2$[2] | 120,000 | 118 | 3005.88 | 72141.18 | 13165.76 |
| $CH_4$[2] | 2.3 | 0.0023 | 0.06 | 1.38 | 0.25 |
| $N_2O$[2] | 0.64 | 0.0006 | 0.02 | 0.38 | 0.07 |
| $CO_2e$[3] | | | 3012.06 | 72289.49 | 13192.83 |
| PM (total)[2] | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| PM (condensable)[2] | 5.7 | 0.0056 | 0.14 | 3.43 | 0.63 |
| PM (filterable)[2] | 1.9 | 0.0019 | 0.05 | 1.14 | 0.21 |

Note:
1. NOx and CO emission factors from AP-42, Chapter 1.4, Table 1.4-1
2. Emission factors obtained from AP-42, Chapter 1.4, Table 1.4-2
3. $CO_2e$ Emissions = $CO_2$ Emissions + $CH_4$ Emission x GWP (21) + $N_2O$ Emissions x GWP (310)

| Small Burner Type (<100 MMBtu/hr) | NOx Emission Factor (lb/MMscf) | CO Emission Factor (lb/MMScf) | $N_2O$ Emission Factor (lb/MMscf) |
|---|---|---|---|
| Uncontrolled | 100 | 84 | 2.2 |
| Controlled - Low NOx burners | 50 | 84 | 0.64 |
| Controlled - Low NOx burners/Flue gas recirculation | 32 | 84 | 0.64 |

**Nu-West Conda Phosphate Operations**

**Superphosphoric Acid Process Line Fluoride Emissions Based on Stack Test Data Proration**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 126.4 | 62 |
| | Specific Gravity | none | *none* | 1.8 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 113,851 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,366 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 59.11 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 67,297 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 808 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 34 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 294,762 | 122,759 |
| | SPA Process Fluoride emissions* | lb F/hr | *none* | 0.181 | 0.075 |
| 6.2 | SPA Process Fluoride emissions | lb F/ton equivalent $P_2O_5$ feed | 0.00870 | 0.00538 | 0.00538 |
| | 68-70% $P_2O_5$ SPA Product | tons/day | *none* | --- | 487 |
| | 68-70% $P_2O_5$ SPA Product | lb/hr | *none* | --- | 40,619 |
| 6.6 | SPA Scrubber Flow | gpm | 559 maximum | 510.17 | |
| 6.6 | SPA Scrubber Pressure Drop | in. $H_2O$ | 6.38 maximum | 5.43 | |

* Increase proportional to feed Ems for SPA3 = Stack Ems for SPA1&2 x Eq. SPA3 Feed / Ini Eq. SPA 1&2 Feed

**Superphosphoric Acid Process Line Fluoride Emissions Based on Permit Limit**

| Permit Section | | Units | Value |
|---|---|---|---|
| 6.2 | SPA Process Fluoride Emissions Permit Limit | lb F/ton equivalent $P_2O_5$ feed | 0.00870 |
| | Post-Project SPA #1 & 2 Equivalent $P_2O_5$ Feed | tons/hr | 28 |
| | Post-Project SPA #3 Equivalent $P_2O_5$ Feed | tons/hr | 14 |
| | Post-Project Fluoride emissions from SPA #1 and 2 | lb F/hr | 0.24 |
| | Post-project Fluoride emissions from SPA #3 | lb F/hr | 0.12 |
| | Total Post-Project Fluoride Emissions from SPA process Line | tpy | 1.6 |

**Total Phosphoric Acid Plant Fluoride Emissions Including Wet and SPA Process Lines**

| | | | |
|---|---|---|---|
| | Wet Phosphoric Acid Process Line Fluoride Emission Factor from Stack Tests | lb F/ton equivalent $P_2O_5$ feed | 0.00281 |
| 6.7 | Maximum Permitted Wet Phosphoric Acid Plant Equivalent $P_2O_5$ Feed | tons/year | 560000 |
| | Fluoride Emissions from Wet Phosphoric Acid Process Line | tons/year | 0.8 |
| | Total Phosphoric Acid Plant Fluoride Emisisons (Wet + SPA Lines) | tons/year | 2.4 |
| 6.3 | Total Phosphoric Acid Plant Fluoride Emisisons Permit Limit | tons/year | 3.8 |

**Nu-West Conda Phosphate Operations**

**Permit Section 6: Superphosphoric Acid Process Stack Test Data**

| Permit Section | | Units | SPA Stack Actual 2012 | SPA Stack Actual 2011 | SPA Stack Actual 2010 | SPA Stack Actual 2009 | SPA Stack Actual 2008 | SPA Stack Actual 2007 |
|---|---|---|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | 126.4 | 133.4 | 130.4 | 138.14 | | 129.3 |
| | Specific Gravity | | 1.8 | 1.816 | 1.839 | 1.8 | | 1.804 |
| | Equivalent $P_2O_5$ Feed | wt% | 59.11 | 59.41 | 59.73 | 59.11 | | 58.70 |
| | Equivalent $P_2O_5$ Feed | tons/hr | 33.6 | 36.0 | 35.8 | 36.9 | | 34.3 |
| 6.6 | SPA Scrubber Flow | gpm | 510.17 | 506.00 | 452.00 | 465.77 | | |
| 6.6 | SPA Scrubber Pressure Drop | in. $H_2O$ | 5.43 | 5.09 | 4.97 | 5.32 | | |
| 6.2 | SPA Process Fluoride emissions | lb F/hr | 0.181 | 0.024 | 0.019 | 0.154 | | 0.113 |
| 6.2 | SPA Process Fluoride emissions | lb F/ton equivalent $P_2O_5$ feed | 5.38E-03 | 6.67E-04 | 5.20E-04 | 4.19E-03 | | 3.29E-03 |
| | SPA Process PM emissions | lb PM/hr | | | | 0.25 | | 0.28 |
| | SPA Process CPM ($PM_{2.5}$) emissions | lb CPM ($PM_{2.5}$)/hr | | | | 0.09 | | 0.09 |
| | SPA Process $PM_{10}$ emissions | lb PM10/hr | | | | 0.34 | | 0.37 |
| 6.4 | SPA Oxidation $NO_x$ emissions | lb/hr | | | | | 0.137 | |
| | SPA Oxidation CO emissions | lb/hr | | | | | 2.175 | |

**Nu-West Conda Phosphate Operations**

**Superphosphoric Acid Process Line PM10 and PM2.5 Emissions Based on Stack Test Data Proration**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 129.3 | 62 |
| | Specific Gravity | none | *none* | 1.804 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 116,722 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,401 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 58.70 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 68,516 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 822 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 34.3 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 300,099 | 122,759 |
| | SPA Process PM10 emissions* | lb PM10/hr | *none* | 0.370 | 0.151 |
| | SPA Process CPM ($PM_{2.5}$) emissions | lb CPM ($PM_{2.5}$)/hr | *none* | 0.090 | 0.037 |
| | SPA Process CPM ($PM_{2.5}$) emissions | ton CPM ($PM_{2.5}$)/yr | *none* | 0.394 | 0.161 |

* Increased PM10 and PM2.5 from SPA scrubber from the addition of SPA#3 calculated from higher result of past two source tests (2007 and 2009), prorating to maximum P2O5 capacity of SPA#3.

Increase proportional to feed Ems for SPA3 = Stack Ems for SPA1&2 x Eq. SPA3 Feed / Ini Eq. SPA 1&2 Feed

P2O5 Feed

| | Units | Estimated SPA #3 Feed |
|---|---|---|
| SPA #3 $P_2O_5$ Acid Feed | gpm | 62 |
| Specific Gravity of SPA #3 $P_2O_5$ Acid Feed | none | 1.71 |
| SPA #3 $P_2O_5$ Acid Feed | lb/hr | 52,881 |
| SPA #3 $P_2O_5$ Acid Feed | tons/day | 635 |
| Equivalent $P_2O_5$ Feed | wt% | 53.00 |
| Equivalent $P_2O_5$ Feed | lb/hr | 28,027 |
| Equivalent $P_2O_5$ Feed | tons/day | 336 |
| Equivalent $P_2O_5$ Feed | tons/hr | 14 |
| Equivalent $P_2O_5$ Feed | tons/year | 122,759 |

Let:

Ini SPA 1&2 = Initial pre-project feed into SPA #1 and 2)

Red SPA 1&2 = Reduction in Feed to SPA #1 & 2 due to the project

SPA = overall feed post-project into all three SPA trains

SPA3 = Feed to SPA #3

| | | Equivalent $P_2O_5$ Daily Feed (tons/day) | Equivalent $P_2O_5$ Annual Feed (tons/year) | Equivalent $P_2O_5$ Hourly Feed (tons/hr) |
|---|---|---|---|---|
| Weight Percentage | wt% | 100% | 100% | 100% |
| Post-project SPA #1 & #2 Feed | (Ini SPA 1&2) - (Red SPA 1&2) | 664 | 242,360 | 28 |
| Feed to SPA #3 | SPA3 | 336 | 122,759 | 14 |
| Post-project SPA #1, 2, & 3 Feed | SPA = (Ini SPA 1&2) - (Red SPA 1&2) + (SPA3) | 1000 | 365,119 | 42 |
| Overall Change | Δ = (SPA) - (Ini SPA 1&2) | 196 | 71,540 | 8 |
| Initial pre-project feed into SPA #1 and 2 | Ini SPA 1&2 | 804 | 293,579 | 34 |
| Reduction in Feed to SPA #1 & 2 due to the project | Red SPA 1&2 | 140 | 51,219 | 6 |
| % Change in overall feed due to the project | %Δ = Δ*100/(Ini SPA 1&2) | 24.4% | 24.4% | 24.4% |
| | | | | |
| Feed distribution post-project | | SPA #1&2 | SPA #3 | Total |
| Annual Feed post-project | ton/year | 242,360 | 122,759 | 365119 |
| % Distribution | % | 66% | 34% | |

Note:

1. No contemporaneous emission decreases were included in the emission inventory for the decreased throughput through SPA #1 and #2 or other plant processes.

Criteria Emissions Summary - Modeling Protocol

| Source | NOx | | CO | | $PM_{10}$ | | $PM_{2.5}$ | | $SO_2$ | | Lead | Fluoride |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/month | lb/hr |
| Therminol Heater[1] | 1.25 | 5.49 | 2.10 | 9.22 | 0.19 | 0.834 | 0.19 | 0.83 | 0.015 | 0.066 | 0.0274 | — |
| #3 SPA Scrubber[2] | — | — | — | — | 0.303 | 1.33 | 0.074 | 0.323 | — | — | — | 0.12 |
| SPA Oxidation[3] | 0.109 | 0.48 | 1.73 | 7.56 | | | | | | | | |
| B-5 Boiler[4] | 0.08 | 0.33 | 0.04 | 0.17 | 0.005 | 0.02 | 0.005 | 0.021 | 0.001 | 0.0025 | 0.0011 | — |
| Cooling Tower[5] | — | — | — | — | 0.037 | 0.164 | 0.022 | 0.098 | — | — | — | — |
| TOTALS | 1.44 | 6.29 | 3.87 | 16.95 | 0.535 | 2.34 | 0.29 | 1.28 | 0.016 | 0.068 | 0.029 | 0.12 |
| Level I Modeling Threshold | 0.2 | 1.2 | 15 | — | 0.22 | — | 0.054 | 0.35 | 0.21 | 1.2 | 14 | 0.167 |
| Level II Modeling Threshold | 2.4 | 14 | 175 | — | 2.6 | — | 0.63 | 4.1 | 2.5 | 14 | | |
| Modeling Required (Yes/No/Maybe) | No per DEQ email 12/5/2012 | No per DEQ email 12/5/2012 | No | No | No per DEQ email 12/5/2012 | No | No per DEQ email 12/5/2012 | No per DEQ email 12/5/2012 | No | No | No | No |

Note for Pb:
ERM followed a spreadsheet sent by IDEQ. Their spreadsheet was dividing annual emissions by 4, not 12, calling it a rolling 3-month number. Implies a quarterly total, even though modeling guidance states lb/month.

1. Low-NOx burner. For natural gas combustion, PM2.5 = PM10 per AP-42.
2. Increased PM10 and PM2.5 from SPA scrubber from the addition of SPA#3 calculated from higher result of past two source tests (2007 and 2009), prorating to maximum P2O5 capacity of SPA#3, and then multiplying by a safety factor of two.
3 Increased NOx and CO from SPA scrubber due to the addition of SPA#3 calculated from NOx and CO emission measurements from 2008 source test, prorating to maximum P2O5 capacity of SPA#3 assuming average P2O5 feed rate from other 2007, 2009, 2010, 2011, and 2012 source tests, and then multiplying by a safety factor of two.
4 Increased emissions (within current permit limits) from existing Nebraska boiler from a small load increase to provide steam for SPA #3 vacuum jets. The estimates provided were derived by prorating the Tier I emission limits for this boiler for the expected additional steam demand for SPA #3. PM2.5 was assumed equal to PM10 per AP-42.
5 Increased PM10 and PM2.5 from the PPA cooling tower (above current actual emissions) due to an approximate 1200 gpm increase in circulating water to provide additional cooling for SPA #3. The estimates provided in Table 1 were derived from 2010 drift rate measurements from PPA cooling tower, a TDS loading of 2,200 ppmw, and an assumption that all drift PM was PM10. PM2.5 estimate assumed 60% PM10 = PM2.5. This is expected to be overpredictive.

## #3 SPA Project Hazardous and Toxic Air Pollutants

### HAP & TAP Emissions

| CAS Number | Pollutant | Emissions from New Therminol Heater[4] | | | Incremental Emissions from Existing B-5 Boiler[5] | | | Total Emissions | | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 6.01E-07 | 5.27E-03 | 2.63E-06 | 2.37E-08 | 2.07E-04 | 1.04E-07 | 6.25E-07 | 5.47E-03 | 2.74E-06 | --- | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 4.01E-07 | 3.51E-03 | 1.76E-06 | 1.58E-08 | 1.38E-04 | 6.92E-08 | 4.17E-07 | 3.65E-03 | 1.82E-06 | --- | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 6.01E-08 | 5.27E-04 | 2.63E-07 | 2.37E-09 | 2.07E-05 | 1.04E-08 | 6.25E-08 | 5.47E-04 | 2.74E-07 | --- | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 71-43-2 | Benzene | 5.26E-05 | 4.61E-01 | 2.30E-04 | 2.07E-06 | 1.82E-02 | 9.08E-06 | 5.47E-05 | 4.79E-01 | 2.39E-04 | --- | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 3.01E-05 | 2.63E-01 | 1.32E-04 | 1.18E-06 | 1.04E-02 | 5.19E-06 | 3.12E-05 | 2.74E-01 | 1.37E-04 | --- | --- | No |
| 206-44-0 | Fluoranthene[2] | 7.51E-08 | 6.58E-04 | 3.29E-07 | 2.96E-09 | 2.59E-05 | 1.30E-08 | 7.81E-08 | 6.84E-04 | 3.42E-07 | --- | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 7.01E-08 | 6.14E-04 | 3.07E-07 | 2.76E-09 | 2.42E-05 | 1.21E-08 | 7.29E-08 | 6.39E-04 | 3.19E-07 | --- | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 1.88E-03 | 1.65E+01 | 8.23E-03 | 7.40E-05 | 6.48E-01 | 3.24E-04 | 1.95E-03 | 1.71E+01 | 8.55E-03 | --- | 5.10E-04 | Yes |
| 110-54-3 | n-Hexane | 4.51E-02 | 3.95E+02 | 1.97E-01 | 1.78E-03 | 1.56E+01 | 7.78E-03 | 4.69E-02 | 4.11E+02 | 2.05E-01 | 12 | --- | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 1.53E-05 | 1.34E-01 | 6.69E-05 | 6.02E-07 | 5.27E-03 | 2.64E-06 | 1.59E-05 | 1.39E-01 | 6.96E-05 | 3.33 | --- | No |
| 85-01-8 | Phenanathrene[2] | 4.26E-07 | 3.73E-03 | 1.87E-06 | 1.68E-08 | 1.47E-04 | 7.35E-08 | 4.43E-07 | 3.88E-03 | 1.94E-06 | --- | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 1.25E-07 | 1.10E-03 | 5.49E-07 | 4.93E-09 | 4.32E-05 | 2.16E-08 | 1.30E-07 | 1.14E-03 | 5.70E-07 | --- | 9.10E-05 | No |
| 108-88-3 | Toluene | 8.52E-05 | 7.46E-01 | 3.73E-04 | 3.36E-06 | 2.94E-02 | 1.47E-05 | 8.85E-05 | 7.75E-01 | 3.88E-04 | 25 | --- | No |
| 7440-38-2 | Arsenic | 5.01E-06 | 4.39E-02 | 2.19E-05 | 1.97E-07 | 1.73E-03 | 8.65E-07 | 5.21E-06 | 4.56E-02 | 2.28E-05 | --- | 1.50E-06 | Yes |
| 7440-39-3 | Barium | 1.10E-04 | 9.65E-01 | 4.83E-04 | 4.34E-06 | 3.80E-02 | 1.90E-05 | 1.15E-04 | 1.00E+00 | 5.02E-04 | 0.033 | --- | No |
| 7440-41-7 | Beryllium | 3.01E-07 | 2.63E-03 | 1.32E-06 | 1.18E-08 | 1.04E-04 | 5.19E-08 | 3.12E-07 | 2.74E-03 | 1.37E-06 | --- | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 2.76E-05 | 2.41E-01 | 1.21E-04 | 1.09E-06 | 9.51E-03 | 4.76E-06 | 2.86E-05 | 2.51E-01 | 1.25E-04 | --- | 3.70E-06 | Yes |
| 7440-47-3 | Chromium | 3.51E-05 | 3.07E-01 | 1.54E-04 | 1.38E-06 | 1.21E-02 | 6.05E-06 | 3.65E-05 | 3.19E-01 | 1.60E-04 | 0.033 | --- | No |
| 7440-48-4 | Cobalt | 2.10E-06 | 1.84E-02 | 9.22E-06 | 8.29E-08 | 7.26E-04 | 3.63E-07 | 2.19E-06 | 1.92E-02 | 9.58E-06 | 0.0033 | --- | No |
| 7440-50-8 | Copper | 2.13E-05 | 1.87E-01 | 9.33E-05 | 8.39E-07 | 7.35E-03 | 3.67E-06 | 2.21E-05 | 1.94E-01 | 9.69E-05 | 0.013 | --- | No |
| 7439-96-5 | Manganese | 9.52E-06 | 8.34E-02 | 4.17E-05 | 3.75E-07 | 3.29E-03 | 1.64E-06 | 9.89E-06 | 8.67E-02 | 4.33E-05 | 0.067 | --- | No |
| 7439-97-6 | Mercury | 6.51E-06 | 5.71E-02 | 2.85E-05 | 2.57E-07 | 2.25E-03 | 1.12E-06 | 6.77E-06 | 5.93E-02 | 2.96E-05 | --- | --- | No |
| 7439-98-7 | Molybdenum | 2.76E-05 | 2.41E-01 | 1.21E-04 | 1.09E-06 | 9.51E-03 | 4.76E-06 | 2.86E-05 | 2.51E-01 | 1.25E-04 | 0.333 | --- | No |
| 7440-02-0 | Nickel | 5.26E-05 | 4.61E-01 | 2.30E-04 | 2.07E-06 | 1.82E-02 | 9.08E-06 | 5.47E-05 | 4.79E-01 | 2.39E-04 | --- | 2.70E-05 | Yes |
| 7782-49-2 | Selenium | 6.01E-07 | 5.27E-03 | 2.63E-06 | 2.37E-08 | 2.07E-04 | 1.04E-07 | 6.25E-07 | 5.47E-03 | 2.74E-06 | 0.013 | --- | No |
| 7440-62-2 | Vanadium | 5.76E-05 | 5.05E-01 | 2.52E-04 | 2.27E-06 | 1.99E-02 | 9.94E-06 | 5.99E-05 | 5.25E-01 | 2.62E-04 | 0.003 | --- | No |
| 7440-66-6 | Zinc | 7.26E-04 | 6.36E+00 | 3.18E-03 | 2.86E-05 | 2.51E-01 | 1.25E-04 | 7.55E-04 | 6.61E+00 | 3.31E-03 | 0.667 | --- | No |
| NA | PAH - B(a)P Equivalent | 2.86E-07 | 2.50E-03 | 1.25E-06 | 1.13E-08 | 9.86E-05 | 4.93E-08 | 2.97E-07 | 2.60E-03 | 1.30E-06 | --- | 2.00E-06 | No |

*Note:*

*1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4*

*2. Polycyclic Organic Matter (POM)*

*3. POM as Polyaromatic Hydrocarbons (PAH)*

*4. Potential to emit.*

*5. Incremental emissions.*

*6. Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA or other plant processes.*

## *#3 SPA Project Greenhouse Gases*

***Project GHG Emissions***

| Equipment | Calculation Methodology | Methodology Citation | GHGs to Report | Heat Input (MMBtu/yr) | Electricity Use (MWhr/yr) | $CO_2$ | | $CH_4$ | | $N_2O$ | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ | $CO_2e$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | EF | EF Units | EF | EF Units | EF | EF Units | (kg/yr) | (kg/yr) | (kg/yr) | (kg/yr) | (metric ton/yr) | ton/yr |
| New Therminal Heater | AP-42, Chapter 1.4, Table 1.4-2 | Note 1,2,3 | CO2, CH4, N2O | 223,818 | - | 118 | lb/MMBtu | 0.0023 | lb/MMBtu | 0.00063 | lb/MMBtu | 11,943,903 | 229 | 64 | 11,968,458 | 11,968 | 13,193 |
| Existing Nebraska B-5 Boiler | AP-42, Chapter 1.4, Table 1.4-2 | Note 1,2,4 | CO2, CH4, N2O | 8,819 | - | 118 | lb/MMBtu | 0.0023 | lb/MMBtu | 0.00063 | lb/MMBtu | 470,600 | 9 | 3 | 471,568 | 472 | 520 |
| | | | | | | | | | | | | | | | Total | 12,440 | 13,713 |

*Note:*

*1) $CO_2e$ Emissions = $CO_2$ Emissions + $CH_4$ Emission x GWP (21) + $N_2O$ Emissions x GWP (310)*

*2) Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA.*

*3) Potential to emit.*

*4) Incremental emissions.*

**Agrium #3 SPA**
**Critieria Emissions Summary**
**12/11/2012**

## *#3 SPA Project: Criteria and Fluoride Emissions*

***#3 SPA Project Emissions***

| Equipment | $NO_X$ (TPY) | CO (TPY) | PM (TPY) | $PM_{10}$ (TPY) | $PM_{2.5}$ (TPY) | $SO_2$ (TPY) | $O_3$ (TPY) | Pb (TPY) | $H_2SO_4$ (TPY) | $H_2S$ (TPY) | VOC (TPY) | Flouride (TPY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Therminol Heater[1,2,3] Potential To Emit | 5.5 | 9.2 | - | 0.8 | 0.8 | 6.6E-02 | - | 5.5E-05 | - | - | 0.6 | - |
| Existing Nebraska Boiler (B-5)[1,4] | 0.3 | 0.2 | - | 2.1E-02 | 2.1E-02 | 2.5E-03 | - | 2.2E-06 | - | - | 7.1E-03 | - |
| Existing SPA Scrubber[1,5,6] | - | - | - | 1.3 | 0.3 | - | - | - | - | - | - | 0.5 |
| Existing SPA Oxidation Reactor[1,7] | 0.5 | 7.6 | - | - | - | - | - | - | - | - | - | - |
| Existing Cooling Tower[1,8] | - | - | - | 0.2 | 0.1 | - | - | - | - | - | - | - |
| **Totals:** | 6.3 | 16.9 | - | 2.3 | 1.3 | 6.8E-02 | - | 5.7E-05 | - | - | 0.6 | 0.5 |
| **PSD Significance Emission Rate** | 40 | 100 | - | 15 | 10 | 40 | - | 0.6 | 7 | - | 40 | 3 |
| **Does the Project Emission Increase Exceed the Significant Emission Rate Threshold?** | NO | NO | - | NO | NO | NO | - | NO | - | - | - | - |

*Note:*

*1) Assume 8,760 operating hours per year.*

*2) Low-$NO_X$ burners Emission Factors. For natural gas combustion, $PM_{2.5}$ = $PM_{10}$ per AP-42.*

*3) Potential to emit.*

*4) Calculated incremental emission increase (within current permit limits) using Tier 1 permit condition (5.2) emission factors and additional steam demand for #3 SPA. $PM_{2.5}$ was assumed equal to $PM_{10}$ per A*

*5) $PM_{10}$ and $PM_{2.5}$ incremental emissions found using source test data and prorated by ratio of throughput at maximum design of #3 SPA to throughput of source test. Calculated emissions then doubled.*

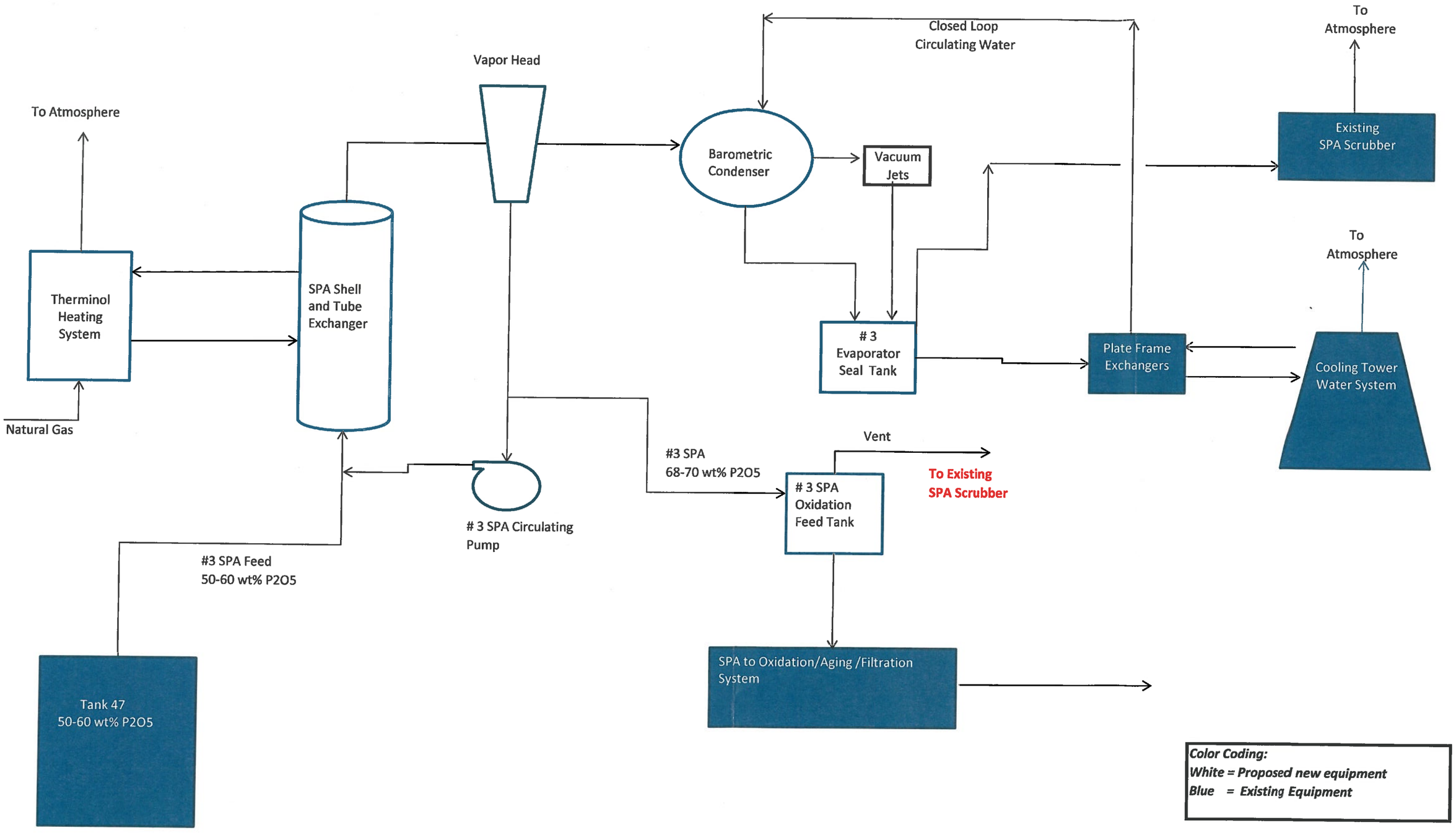
*6) Fluoride incremental emissions calculated using MACT Standard emission rate of 0.00870 lb F/ton equivalent $P_2O_5$ feed to #3 SPA at maximum design throughput.*

*7) $NO_X$ and CO incremental emissions calculated using source test data and prorated by ratio of throughput at maximum design of #3 SPA to throughput of source test. Calculated emissions then doubled.*

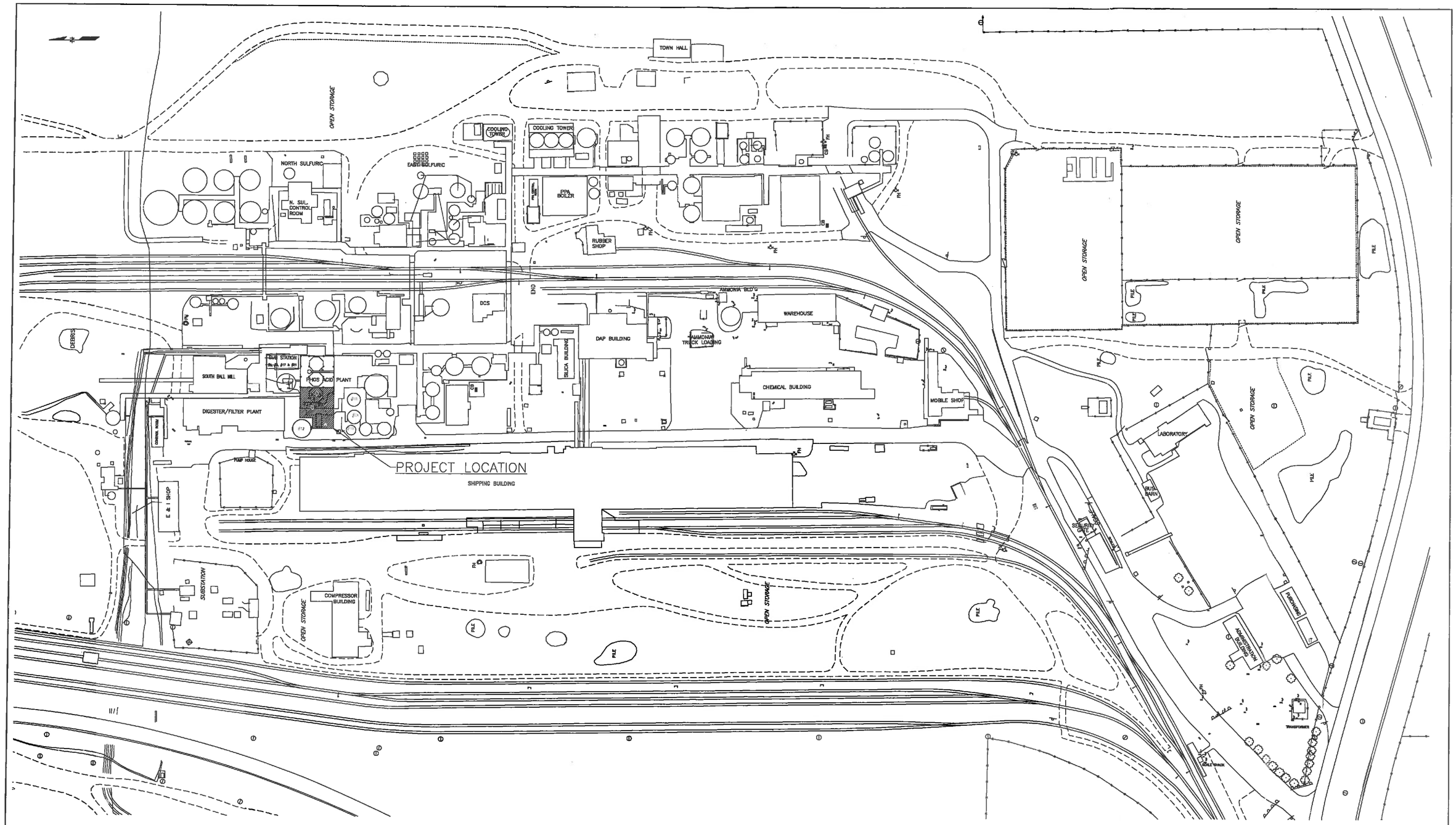
*8) Assume incremental increase of 1,200 gpm circulating water due to #3 SPA, 2010 drift rate measurements from PPA Cooling Tower, and TDS loading of 2,200 ppmw. Assume all drift PM as $PM_{10}$. Conservatively assume 60% $PM_{10}$ = $PM_{2.5}$.*

*9) All emissions are below significant threshold defined in 40 CFR 52.21(b)(40)*

*10) Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA or other plant processes.*




**Simplified Evaporator Block Flow - Agrium #3 Super Phosphoric Acid (SPA) Production**




## OVERALL SITE PLAN – PLAN VIEW

SCALE: 1"=100'

| REV | DATE | REVISION DESCRIPTION | DRAWN | DRAFT CHK | DESIGNED | ENG CHK | APPROVED | CUSTOMER | REF DRAWING No |
|---|---|---|---|---|---|---|---|---|---|
| A | 11/30/12 | ISSUED FOR REVIEW | JHK | BDW | JHK | | | | |

SCALE AS NOTED

OneWay to zero harm

WorleyParsons resources & energy

WORLEYPARSONS PROJECT No. 208020-00064

DRAWING STATUS **ISSUED FOR REVIEW**

CUSTOMER Agrium

NU-WEST AGRIUM CPO, INC.
#3 SPA EVAPORATOR EXPANSION
OVERALL SITE PLAN
PROJECT LOCATION

DRG No 06-01-180 REV A

ANSI D 22x34

DATE & TIME: 23/11/2012 015:34 PM

*Table 7-1. Air Quality Rules and Regulations, Nebraska Boiler (B-5)*

| Permit conditions as found in Tier I Operating Permit (T1-060308) | Parameter | Permit Limit/Standard Summary | Applicable Requirements Reference |
|---|---|---|---|
| 5.1 | NOx emissions | 0.20 lb/MMBtu | 40 CFR 60.44b(a)(1) |
| 5.2 | NOx emissions | 16.84 lb/hr, 70.71 T/yr | PTC No. 029-00003, 7/7/95 |
| | PM emissions | 1.05 lb/hr, 4.42 T/yr | |
| | PM10 emissions | 1.05 lb/hr, 4.42 T/yr | |
| | SO2 emissions | 0.13 lb/hr, 0.53 T/yr | |
| | CO emissions | 8.42 lb/hr, 35.4 T/yr | |
| | VOC emissions | 0.36 lb/hr, 1.50 T/yr | |
| 5.3 | PM emissions | 0.015 gr/dscf corrected to 3% oxygen | IDAPA 58.01.01.677 |

#### *7.2.1.1 Operating Requirements*

The boiler shall be equipped with a COEN low-NOx burner, or a DEQ-approved equivalent for the control of NOx emissions. PTC No. 029-00003, 8/14/96.

The existing B-5 boiler shall only use natural gas as fuel, and shall not burn more than 1,768,000,000 scf of natural gas fuel per year. PTC No. 029-0003, 7/7/95.

#### *7.2.1.2 NSPS 40 CFR 60 Subpart Db*

The monitoring, recordkeeping, and reporting requirements at NSPS 40 CFR 60 Subpart Db and general provisions of 40 CFR 60 Subpart A are applicable as outlined in the Tier 1 Operating Permit T1-060308.

#### *7.2.1.3 PTC General Provisions*

Additional requirements are outlined in the Tier 1 Operating Permit T1-060308.

### 7.2.2 Superphosphoric Acid Processing – Existing #1 and #2 SPA Process Lines

This section describes the air quality rules and regulations applicable to the existing Super Phosphoric Acid process - #1 SPA and #2 SPA. No changes to the #1 SPA and #2 SPA Evaporative Systems permit limits are requested for the #3 SPA Evaporative System.

#### *7.2.2.1 NESHAP 40 CFR 63 Subpart AA – Super Phosphoric Acid Process Line Fluoride Standard*

Table 7-2 contains a summary of the Air Quality Rules and Regulations that apply to the existing SPA process lines. Emissions from the existing SPA process lines are controlled by the SPA Scrubber (A-Pb-1). No changes to the SPA process permit limits or regulatory requirements are requested for the #3 SPA Evaporative System.

*Table 7-2. Air Quality Rules and Regulations, Multi-Stage Scrubber*

| Permit conditions as found in Tier I Operating Permit (T1-060308)[1] | Parameter | Permit Limit/Standard Summary | Applicable Requirements Reference |
|---|---|---|---|
| 6.2 | Fluoride emissions from super phosphoric acid process line | 4.350 gram/metric ton of equivalent P2O5 feed (0.00870 lb/ton) | 40 CFR 63.603(b) |

[1] *As determined by a pollutant-specific EPA reference method, DEQ approved alternative, or as determined by DEQ's emissions estimation methods used in the PTC application analysis.*

The emissions standards, operating requirements, monitoring, recordkeeping and reporting requirements of NESHAP Subpart AA and general requirements of 40 CFR 63 Subpart A are applicable as outlined in the Tier 1 Operating Permit T1-060308 to the SPA process lines, including the SPA scrubber.

#### *7.2.2.2 NSPS 40 CFR 63 Subparts T, U, and NN*

Per 40 CFR 63 Subpart AA – Phosphoric Acid Manufacturing Plant Exemption from New Source Performance Standards 40 CFR 63.610, the existing sources at the phosphoric acid manufacturing plant are subject to the provisions of 40 CFR 63 Subpart AA, and are exempted from any otherwise applicable new source performance standard contained in 40 CFR 60, Subpart T, Subpart U, or Subpart NN. To be exempt, a source must have a current operating permit pursuant to Title V of the Act and the source must be in compliance with all requirements of 40 CFR 63, Subpart AA.

#### *7.2.2.3 Oxidation Reactor*

Table 7-3 contains a summary of the Air Quality Rules and Regulations that apply to the existing SPA Oxidation Process. No changes to the SPA Oxidation Process permit limits are requested for the #3 SPA Evaporative System.

*Table 7-3. Air Quality Rules and Regulations, Super Phosphoric Acid Oxidation*

| Permit conditions as found in Tier I Operating Permit (T1-060308) | Parameter | Permit Limit/Standard Summary | Applicable Requirements Reference |
|---|---|---|---|
| 6.4 | Nitrogen oxide emissions from Super Phosphoric Acid Oxidation Process | Five tons per consecutive 12-month period. | PTC Condition, July 12, 2000 |

In addition, $NO_X$ Performance Test for the Super Phosphoric Acid Oxidation Process is applicable as outlined in Permit Conditions 6.9 and 6.19 in the Tier 1 Operating Permit (T1-060308), PTC No. P-2009.0068, 10/14/10.

#### *7.2.2.4 PTC General Provisions*

Additional requirements are outlined in the Tier 1 Operating Permit T1-060308.

### 7.2.3 Cooling Tower

This section describes the air quality rules and regulations applicable to the PPA Cooling Tower.

*40 CFR 63 Subpart AA – Standard for Evaporative Cooling Towers*

No owner or operator shall introduce into any evaporative cooling tower any liquid effluent from any wet scrubbing device installed to control emissions from process equipment. In addition, each operator must certify annually that the requirements contained in that section have been met. The requirements of 40 CFR 63.603(e) are applicable.

## 7.3 Applicable Regulations for New Equipment Associated with Proposed Project

This section describes the air quality rules and regulations applicable to the new equipment for the #3 SPA Evaporation System

### 7.3.1 Therminol Heater

#### *7.3.1.1 State Regulations*

- **IDAPA 58.01.01.675 Fuel Burning Equipment – Particulate Matter**

Per IDAPA 58.01.01.676 Standards for New Sources, a person shall not discharge into the atmosphere from any fuel burning equipment with a maximum rated input of ten (10) million BTU's per hour or more, and commencing operation on or after October 1, 1979, particulate matter in excess of 0.015 gr/dscf (for gas fuel types) corrected to 3% oxygen. The new Therminol heater is 25.55 million BTU/hr, and as such is subject to this requirement.

- **IDAPA 58.01.01.679 Averaging Period**

This section establishes the averaging period, and it is applicable to Section 675.

- **IDAPA 58.01.01.680. Altitude Correction**

This section establishes an altitude correction protocol, and it is applicable to Section 675.

#### *7.3.1.2 Federal Regulations*

There are no federal regulations applicable to the Therminol heater.

### 7.3.2 #3 Super Phosphoric Acid System

#### *7.3.2.1 State Regulations*

- **IDAPA 58.01.01.751(01) Rules for Control of Fluoride Emissions – Emission Limitations for Phosphate Fertilizer Plants**

The provisions of this rule are applicable to phosphate fertilizer plant sources including super phosphoric acid production. The new #3 SPA Evaporation System is a super

phosphoric acid production facility. As such, the source shall not allow, suffer, cause or permit the discharge into the atmosphere of total fluoride emissions in gaseous and in particulate form expressed as fluoride (F-), from the super phosphoric acid production facility in excess of 0.30 pounds of fluoride per ton of $P_2O_5$ input to the calciner operation, calculated at maximum rated capacity.

#### *7.3.2.2 Federal Regulations*

**National Emission Standards for Hazardous Air Pollutants**

- **40 CFR SUBPART AA – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM PHOSPHORIC ACID MANUFACTURING PLANTS (40 CFR 63.600)**

The requirements of this subpart (40 CFR 63.600) apply to each super phosphoric acid process line (40 CFR 63.600(b)(5)). The requirements of this subpart apply to the following emission points which are components of a super phosphoric acid process line: evaporators, hot wells, acid sumps, and cooling tanks. As such, no owner or operator shall cause to be discharged into the atmosphere from any affected source any gases which contain total fluorides in excess of 4.350 gram/metric ton of equivalent $P_2O_5$ feed (0.00870 lb/ton).

**New Source Performance Standards**

- **40 CFR PART 60 SUBPART U—STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: SUPER PHOSPHORIC ACID PLANTS (40 CFR 60.210)**

The new #3 SPA Evaporation System is a super phosphoric acid plant having a design capacity of more than 15 tons of equivalent $P_2O_5$ feed per calendar day. The new #3 SPA Evaporation System includes evaporators, and cooling tanks.

Construction of #3 SPA Evaporation System and modification to the existing #1 and #2 SPA Evaporation Systems shall commence after October 22, 1974.

No owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 5.0 g/megagram (Mg) of equivalent $P_2O_5$ feed (0.010 lb/ton).

The requirements in this rule are applicable to the new #3 SPA Evaporation System; however, the new #3 SPA Evaporation System is exempt from NSPS, as it is subject to 40 CFR Part 63 Subpart AA -- National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants (40 CFR 63.600). As such, any affected source subject to the provisions of this subpart is exempted from any otherwise applicable new source performance standard contained in 40 CFR Part 60, Subpart T, Subpart U or Subpart NN. To be exempt, a source must have a current operating permit pursuant to Title V of the Act and the source must be in compliance with all requirements of Part 63 Subpart AA (40 CFR 63.600). For each affected source, this exemption is effective upon the date that the owner or operator demonstrates to the Administrator that the requirements of §§63.604, 63.605, and 63.606 have been met.

## 7.4 Non-Applicable Regulations for New Equipment Associated with Proposed Project

### 7.4.1 Therminol Heater

#### *7.4.1.1 Federal Regulations*

<u>National Emission Standards for Hazardous Air Pollutants</u>

- **40 CFR PART 63, SUBPART DDDDD – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR MAJOR SOURCES: INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL BOILERS AND PROCESS HEATERS (40 CFR 63.7480)**

The requirements of this subpart establish national emission limitations and work practice standards for HAP emissions from boilers and process heaters at major sources of HAPs. The Conda facility is not a major source of HAPs; therefore, Subpart DDDDD is not applicable.

### 7.4.2 #3 Super Phosphoric Acid System

#### *7.4.2.1 Federal Regulations*

<u>National Emission Standards for Hazardous Air Pollutants</u>

- **40 CFR 63 SUBPART AA – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM PHOSPHORIC ACID MANUFACTURING PLANTS (40 CFR 63.600)**

The new #3 SPA Evaporation System does not create a purified phosphoric acid product (40 CFR 63.600(b)(6)). A purified phosphoric acid process line is defined as any process line which uses a HAP as a solvent in the separation of impurities from the product acid for the purposes of rendering that product suitable for industrial, manufacturing or food grade uses. As such, the requirements of this subpart as they apply to purified phosphoric acid process lines do not apply.

- **40 CFR 63 SUBPART BB – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM PHOSPHATE FERTILIZERS PRODUCTION PLANTS (40 CFR 63.620)**

The requirements of this subpart (40 CFR 63.620) apply to the following new or existing sources from a phosphate fertilizer production plant: each diammonium and/or monoammonium phosphate process line, each granular triple superphosphate process line, and each granular triple superphosphate storage building. A diammonium and/or monoammonium phosphate process line means any process line manufacturing granular diammonium and/or monoammonium phosphate by reacting ammonia with phosphoric acid which has been derived from or manufactured by reacting phosphate rock and acid. A granular triple superphosphate process line means any process line, not including storage buildings, manufacturing granular triple superphosphate by reacting phosphate rock with phosphoric acid. A granular triple superphosphate storage building means any building curing or storing fresh granular triple superphosphate. The new #3 SPA Evaporation System is not a diammonium and/or monoammonium phosphate process

line, nor is it a granular triple superphosphate process line or a granular triple superphosphate storage building. As such, the requirements of 40 CFR Subpart BB are not applicable.

New Source Performance Standards

- **40 CFR PART 60 SUBPART T—STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: WET-PROCESS PHOSPHORIC ACID PLANTS (40 CFR 60.200)**

The provisions of this rule are applicable to wet-process phosphoric acid plants defined as any facility manufacturing phosphoric acid by reacting phosphate rock and acid. The new #3 SPA Evaporation System is not a wet-process phosphoric acid plant, and 40 CFR Part 60 Subpart T is not applicable.

- **40 CFR PART 60 SUBPART V—STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: DIAMMONIUM PHOSPHATE PLANTS (40 CFR 60.220)**

The provisions of this rule are applicable to granular diammonium phosphate plants defined as any plant manufacturing granular diammonium phosphate by reacting phosphoric acid with ammonia. The new #3 SPA Evaporation System is not a granular diammonium phosphate plant, and thus 40 CFR Part 60 Subpart V is not applicable.

- **40 CFR PART 60 SUBPART W—STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: TRIPLE SUPERPHOSPHATE PLANTS (40 CFR 60.230)**

The provisions of this rule are applicable to triple superphosphate plants defined as any facility manufacturing triple superphosphate by reacting phosphate rock with phosphoric acid. The new #3 SPA Evaporation System is not a triple superphosphate plant, and thus 40 CFR Part 60 Subpart W is not applicable.

- **40 CFR PART 60 SUBPART X—STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: GRANULAR TRIPLE SUPERPHOSPHATE STORAGE FACILITIES (40 CFR 60.240)**

The provisions of this rule are applicable to granular triple superphosphate storage facilities defined as any facility curing or storing fresh granular triple superphosphate. The new #3 SPA Evaporation System is not a granular triple superphosphate storage facility, and thus 40 CFR Part 60, Subpart X is not applicable.

- **40 CFR PART 60 SUBPART NN—STANDARDS OF PERFORMANCE FOR PHOSPHATE ROCK PLANTS (40 CFR 60.400)**

The provisions of this rule are applicable to a phosphate rock plant defined as any plant which produces or prepares phosphate rock product by any or all of the following processes: Mining, beneficiation, crushing, screening, cleaning, drying, calcining, and grinding. The new #3 SPA Evaporation System is not a phosphate rock plant, and thus 40 CFR Part 60, Subpart NN is not applicable.

## 8.0 APPLICATION FEE

The Permit to Construct (PTC) application fee of $1,000 is attached.

*Appendix C*
*Permit to Construct Application Forms*

**DEQ AIR QUALITY PROGRAM**
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline – 1-877-5PERMIT**

Cover Sheet for Air Permit Application – Permit to Construct **Form CSPTC**

*Please see instructions on page 2 before filling out the form.*

## COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

| | | | |
|---|---|---|---|
| 1. Company Name | Nu-West Industries, Inc.; Nu-West Conda Phosphate Operations | | |
| 2. Facility Name | Nu-West Conda Phosphate Operations<br>Soda Springs, Idaho | 3. Facility ID No. | 029-00003 |
| 4. Brief Project Description - One sentence or less | Install new #3 super phosphoric acid (SPA) evaporation system (#3 SPA Train). | | |

## PERMIT APPLICATION TYPE

5. ☐ New Source ☒ New Source at Existing Facility ☐ PTC for a Tier I Source Processed Pursuant to IDAPA 58.01.01.209.05.c
☐ Unpermitted Existing Source ☐ Facility Emissions Cap ☐ Modify Existing Source: Permit No.:_____ Date Issued:_____
☐ Required by Enforcement Action: Case No.:_____

6. ☒ Minor PTC ☐ Major PTC

## FORMS INCLUDED

| Included | N/A | Forms | | DEQ Verify |
|---|---|---|---|---|
| ☒ | ☐ | Form CSPTC – Cover Sheet | | ☐ |
| ☒ | ☐ | Form GI – Facility Information | | ☐ |
| ☒ | ☐ | Form EU0 – Emissions Units General | | ☐ |
| ☐ | ☒ | Form EU1– Industrial Engine Information | Please specify number of EU1s attached: ____ | ☐ |
| ☐ | ☒ | Form EU2– Nonmetallic Mineral Processing Plants | Please specify number of EU2s attached: ____ | ☐ |
| ☐ | ☒ | Form EU3– Spray Paint Booth Information | Please specify number of EU3s attached: ____ | ☐ |
| ☐ | ☒ | Form EU4– Cooling Tower Information | Please specify number of EU3s attached: ____ | ☐ |
| ☐ | ☒ | Form EU5 – Boiler Information | Please specify number of EU4s attached: ____ | ☐ |
| ☐ | ☒ | Form CBP– Concrete Batch Plant | Please specify number of CBPs attached: ____ | ☐ |
| ☐ | ☒ | Form HMAP – Hot Mix Asphalt Plant | Please specify number of HMAPs attached: ____ | ☐ |
| ☐ | ☒ | PERF – Portable Equipment Relocation Form | | ☐ |
| ☐ | ☒ | Form AO – Afterburner/Oxidizer | | ☐ |
| ☐ | ☒ | Form CA – Carbon Adsorber | | ☐ |
| ☐ | ☒ | Form CYS – Cyclone Separator | | ☐ |
| ☐ | ☒ | Form ESP – Electrostatic Precipitator | | ☐ |
| ☐ | ☒ | Form BCE– Baghouses Control Equipment | | ☐ |
| ☐ | ☒ | Form SCE– Scrubbers Control Equipment | | ☐ |
| ☐ | ☒ | Form VSCE – Venturi Scrubber Control Equipment | | ☐ |
| ☐ | ☒ | Form CAM – Compliance Assurance Monitoring | | ☐ |
| ☒ | ☐ | Forms EI– Emissions Inventory **(Included in Tables in Permit Application text)** | | ☐ |
| ☒ | ☐ | PP – Plot Plan **(Appendix A in Permit Application and Figures 3-1, 3-2 in Modeling Report)** | | ☐ |
| ☒ | ☐ | Forms MI1 – MI4 – Modeling **(Attachment 3 in Modeling Report)** (Excel workbook, all 4 worksheets) | | ☐ |

| ☒ | ☐ | Form FRA – Federal Regulation Applicability | ☐ |
|---|---|---|---|

# Instructions for Form CSPTC

This form is the cover sheet for an air quality permit application. It provides DEQ with basic information regarding the company and the proposed permitting action. This form helps DEQ efficiently determine whether the application is administratively complete. This form also provides the applicant with a list of forms available to aid the applicant to successfully submit a complete application.

## Company Name, Facility Name, and Facility ID Number

1-3. Provide the name of your company, the name of the facility (if different than company name), and the facility identification (ID) number (Facility ID No.) in the boxes provided. The facility ID number is also known as the AIRS number or AIRS/AFS number (example: 095-00077). If you already have a permit, the facility ID number is located in the upper right hand corner of the cover page. The facility ID number must be provided unless your facility has not received one, in which case you may leave this box empty. **Use these same names and ID number on all forms.** This is useful in case any pages of the application are separated.

4. Provide a brief description of this permitting project in one sentence or less. Examples might be "Install/construct a new boiler" or "Increase the allowable process throughput." **This description will be used by DEQ as a unique identifier for this permitting project, in conjunction with the name(s) and ID number referenced in 1-3.** You will need to put this description, using the exact same words, on all other forms that are part of this project application. This is useful in case any pages of the application are separated.

## Permit Application Type

5. Provide the reason you are submitting the permit application by checking the appropriate box (e.g., a new facility being constructed, a new source being constructed at an existing facility, an unpermitted existing source (as-built) applying for a permit for the first time, a permitted source to be modified, or the permit application is the result of an enforcement action, in which case provide the case number). If you are modifying an existing permitted source, provide the number and issue date of the most recent permit.

   If this PTC is for a Tier I source issued pursuant to the procedures contained at IDAPA 58.01.01.209.05.c, the source or modification may operate upon submittal of a Tier I Administrative Amendment issued pursuant to IDAPA 58.01.01.381.

6. Indicate if the application is a minor permit to construct application or a major permit to construct application by checking the appropriate box (e.g., major PTC or minor PTC). If the permit to construct application is for a major new source or major modification, you must ensure that all necessary information required by IDAPA 58.01.01.202, and .204, or .205, as applicable, is provided.

## Forms Included

Check the "Included" box for each form included in this permit to construct application. If there are multiples of a form for multiple units of that type, check the box and fill in the number of forms in the blank provided.

The "N/A" box should only be checked if the form is absolutely unnecessary to complete the application. Additional information may be requested.

## Application Fee

**All applicants for a PTC shall submit a PTC application fee of $1000.00 to DEQ <u>at the time of the original submission of the application</u> as required by IDAPA 58.01.01.224. An application fee is not required for exemption applicability determinations, typographical errors, and name or ownership changes. An application fee can be paid by check, credit card, or Electronic Funds Transfer (EFT). If you choose to pay by credit card or EFT, call DEQs Fiscal Office to complete the necessary paperwork. Paper checks must be submitted with the original application as described below.**

## Submit Application

**When complete, enclose a check for the application fee along with the hardcopy application certified by a responsible official (as defined in IDAPA 58.01.01.006.94), and send to:**

Air Quality Program Office – Application Processing
Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706-1255

**DEQ AIR QUALITY PROGRAM**
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline: 1-877-5PERMIT**

General Information **Form GI**
Revision 7
6/29/12

**Please see instructions on back page before filling out the form. All information is required. If information is missing, the application will not be processed.**

## Identification

**1. Facility name** Nu-West Conda Phosphate Operations

**2. Existing facility identification number** 029-00003

☐ **Check if new facility (not yet operating)**

**3. Brief project description** Install new #3 super phosphoric acid (SPA) evaporation system (#3 SPA train)

## Facility Information

**4. Primary facility permitting contact name** Clint Humpherys **Contact type** Facility permitting contact

**Telephone number** (208) 547-4381 ext 244 **E-mail** Clint.Humpherys@agrium.com

**5. Alternate facility permitting contact name** Tom Miller **Alternate contact type** Facility permitting contact

**Telephone number** (208) 547-4381 ext 308 **E-mail** Tom.Miller@agrium.com

**6. Mailing address where permit will be sent (street/city/county/state/zip code)** 3010 Conda Road/Soda Springs/Caribou/Idaho/83276

**7. Physical address of permitted facility (if different than mailing address) (street/city/county/state/zip code)** N/A

**8. Is the equipment portable?** ☐ **Yes*** ☒ **No** ***If yes, complete and attach PERF; see instructions.**

**9. NAICS codes: Primary NAICS** 325312 **Secondary NAICS** NA

**10. Brief business description and principal product produced** Phosphate-based fertilizer products

**11. Identify any adjacent or contiguous facility this company owns and/or operates** None

**12. Specify type of application** ☒ **Permit to construct (PTC); application fee of $1,000 required. See instructions.**

☐ **Tier I permit** ☐ **Tier II permit** ☐ **Tier II/Permit to construct**

**For Tier I permitted facilities only:** If you are applying for a PTC then you must also specify how the PTC will be incorporated into the Tier I permit.

☐ **Co-process Tier I modification and PTC** ☒ **Incorporate PTC at the time of Tier I renewal** ☐ **Administratively amend the Tier I permit to incorporate the PTC upon applicant's request (IDAPA 58.01.01.209.05.a, b, or c)**

## Certification

In accordance with IDAPA 58.01.01.123 (Rules for the Control of Air Pollution in Idaho), I certify based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

**13. Responsible official's name** Josh Regan **Official's title** Plant Manager

**Official's address** 3010 Conda Road, Soda Springs, ID, 83276

**Telephone number** (208) 547-4381 **E-mail** Josh.Regan@agrium.com

**Official's signature** [signature] **Date** 1/3/2013

☒ **14. Check here to indicate that you want to review the draft permit before final issuance.**

## Instructions for Form GI

**This form is used by DEQ to identify a company or facility, equipment locations, and personnel involved with the permit application. Additional information may be required.**

### Identification

1. Provide the facility name. If the facility is *doing business as* (dba) a facility different in name than the primary facility, provide the dba name.
2. If the facility is an existing permitted facility in Idaho, provide the facility identification number. If the facility is new and not yet operating, check the box.
3. Provide a brief project description as on Form CS, Cover Sheet. This is useful in case any pages of the application are separated.

### Facility information

4. Provide name of the *primary* person who should be contacted regarding this permit. Provide telephone number and e-mail address for the primary person.
5. Provide name of an *alternate* person who should be contacted if the person listed in 4 is not available. Provide telephone number and e-mail address for the alternate person.
6. Provide the mailing address where DEQ should mail the permit.
7. Provide the physical address where the equipment is located (if different than 6).
8. Indicate if the permitted equipment is portable by checking the appropriate box. If the permitted equipment is portable, complete and attach the Portable Equipment Relocation Form (PERF) to this application. The PERF is available from DEQ's website at http://www.deq.idaho.gov/media/576773-ptc_relocation.pdf or http://www.deq.idaho.gov/media/576769-ptc_relocation.doc (for Word format).
9. Provide the North American Industry Classification System (NAICS) code for your facility. NAICS codes can be found at http://www.census.gov/epcd/naics02/naicod02.htm.
10. Describe the primary activity and principal product of your business as it relates to the NAICS code listed in 9.
11. Identify and describe any other sources or equipment owned and operated by the primary facility that are located on contiguous or adjacent properties and the role the source or equipment plays in supporting the primary facility.
12. Check the box describing the type of permit application.

    **Important note:** If application is for a permit to construct (PTC), include the application fee of $1,000 when submitting the application. Per IDAPA 58.01.01.226.02, DEQ cannot process the application without the fee, which must be submitted with the application.

    For existing Tier I facilities that are applying for a PTC, the applicant must specify how the PTC will be incorporated into the Tier I permit (IDAPA 58.01.01.209.05). If you have questions, call the Air Permit Hotline at 1-877-573-7648.

### Certification

13. Provide the name, title, address, telephone number, and e-mail of the facility's responsible official. Responsible official is defined in IDAPA 58.01.01.006.99. The responsible official must sign and date the application before it is submitted to DEQ.
14. Check this box to indicate that you want to review a draft before the final permit is issued.

**DEQ AIR QUALITY PROGRAM**
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline – 1-877-5PERMIT**

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

*Please see instructions on page 2 before filling out the form.*

## IDENTIFICATION

| 1. Company Name: | 2. Facility Name: | 3. Facility ID No: |
|---|---|---|
| Nu-West Industries, Inc. | Nu-West Conda Phosphate Operations | 029-00003 |

4. Brief Project Description: Install new #3 super phosphoric acid (SPA) evaporation system. (#3 SPA train)

## EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

| | |
|---|---|
| 5. Emissions Unit (EU) Name: | #3 SPA THERMINAL HEATER WITH LOW NOX BURNER |
| 6. EU ID Number: | NA |
| 7. EU Type: | ☒ New Source ☐ Unpermitted Existing Source<br>☐ Modification to a Permitted Source -- Previous Permit #: Date Issued: |
| 8. Manufacturer: | TO BE DETERMINED |
| 9. Model: | TO BE DETERMINED |
| 10.. Maximum Capacity: | 25.55 MMBTU/HR |
| 11. Date of Construction: | TO BE DETERMINED |
| 12. Date of Modification (if any): | NA |
| 13. Is this a Controlled Emission Unit? | ☒ No ☐ Yes If Yes, complete the following section. If No, go to line 22. |

## EMISSIONS CONTROL EQUIPMENT

| | | | |
|---|---|---|---|
| 14. Control Equipment Name and ID: | NA | | |
| 15. Date of Installation: | NA | 16. Date of Modification (if any): | NA |
| 17. Manufacturer and Model Number: | NA | | |
| 18. ID(s) of Emission Unit Controlled: | NA | | |
| 19. Is operating schedule different than emission units(s) involved? | ☐ Yes ☐ No | | |
| 20. Does the manufacturer guarantee the control efficiency of the control equipment? | ☐ Yes ☐ No (If Yes, attach and label manufacturer guarantee) | | |

| | Pollutant Controlled | | | | | |
|---|---|---|---|---|---|---|
| | PM | PM10 | $SO_2$ | NOx | VOC | CO |
| Control Efficiency | NA | NA | NA | NA | NA | NA |

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. NA

## EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

| | |
|---|---|
| 22. Actual Operation: | NA |
| 23. Maximum Operation: | 8,760 HOURS PER 365 DAYS |

## REQUESTED LIMITS

| | |
|---|---|
| 24. Are you requesting any permit limits? | ☐ Yes ☒ No (If Yes, indicate all that apply below) |
| ☐ Operation Hour Limit(s): | |
| ☐ Production Limit(s): | |
| ☐ Material Usage Limit(s): | |
| ☐ Limits Based on Stack Testing: | Please attach all relevant stack testing summary reports |
| ☐ Other: | |
| 25. Rationale for Requesting the Limit(s): | NA |

## Instructions for Form EU0

This form provides DEQ with information about an emissions unit. An emissions unit is the equipment or process that generates emissions of regulated air pollutant(s). This form is used by the permit writer to become familiar with the emissions unit (EU). This form is also used by DEQ to identify the control equipment and the emission point (stack or vent) used for the emission unit(s) proposed in this permit application. This form also asks for supporting documents to verify stated control efficiencies and details about the emission point. Additional information may be requested.

1 - 4. Provide the same company name, facility name (if different), facility ID number, and brief project description as on Form CS in the boxes provided. This is useful in case any pages of the application get separated.

5. Provide the name of the emissions unit (EU), such as "Union boiler," etc. A separate EU0 form is required for each emissions unit.

6. Provide the identification (ID) number of the EU. It can be any unique identifier you choose; however, this ID number should be unique to this EU and should be used consistently throughout this application and any other air quality permit application(s) (e.g., operating permit application) to identify this EU.

7. Indicate the type of EU by checking the appropriate box (e.g., a new source to be constructed, an unpermitted existing source (as-built) applying for the first time, or an existing permitted source to be modified). If the EU is being modified, indicate on the form the most recent permit issued for the EU.

8. Provide the manufacturer's name for the EU. If the EU is custom-designed or homemade, indicate so.

9. Provide the model number of the EU. If the EU is custom-designed or homemade, indicate so.

10. Provide the maximum capacity of the EU. For example, a boiler's rated capacity may be modified in units of MMBtu/hr in terms of heat input of natural gas; an assembly line capacity may be in parts produced per day. Capacity should be based on a rated nameplate or as stated in the manufacturer's literature.

11. The date of construction is the month, day, and year in which construction or modification was commenced.

**Definitions:**

***Construction*** fabrication, erection, or installation of an affected facility.

***Commenced*** an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

***Modification*** any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted to the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) to the atmosphere not previously emitted.

12. If the EU has been or will be modified, provide the month, day, and year of the most recent or future modification as defined in IDAPA 58.01.01.006.

13. Indicate if emissions from the EU are controlled by air pollution control equipment. If the answer is yes, complete the next section. If the answer is no, go to line 18.

14. Provide the name of the air pollution control equipment (e.g., wet scrubber) and the control equipment's identification number. This identification number should be unique to this air pollution control equipment and should be used consistently throughout this and all other air quality permit applications (e.g., operating permit application) to identify this air pollution control equipment.

15. Provide the date the air pollution control equipment was installed.

16. If the air pollution control equipment has been modified, provide the date of the modification.

17. Provide the name of the manufacturer and the model number for the air pollution control equipment.

18. If this air pollution control equipment controls emissions from more than this EU, provide the identification number(s) of the other EU(s).

19. Indicate if this air pollution control equipment operates on a schedule different from the EU(s) it controls.

20. Indicate if the air pollution control manufacturer guarantees the control efficiency of the control equipment. If the answer is yes, attach the manufacturer's guarantee and label it with the air pollution control equipment identification number. Indicate the control efficiency for the target pollutant(s).

21. If the control efficiency of the air pollution control equipment is not guaranteed, attach the design specifications and any performance data to support the control efficiency stated in part 16. Label the supporting documentation with the air pollution control equipment identification number.

22. Provide the projected actual operating schedule for the emission unit in hours/day, hours/year, or other.

23. Provide the maximum operating schedule for the emission unit in hours/day, hours/year, or other.

24. If you are requesting to have limits placed on this EU, mark "Yes." Then, check the applicable requested limit(s) and provide the limit(s). For example, production limits may be in terms of parts produced per year, material usage limits may be in gallons per day.

25. Please provide the reason you are requesting limits, if any. This helps DEQ and the applicant determine whether the limits are necessary, and if they will accomplish the desired purpose. Provide supporting documentation (calculations, modeling assessment, regulatory review, etc.) for each limit requested.

**DEQ AIR QUALITY PROGRAM**
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline – 1-877-5PERMIT**

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

*Please see instructions on page 2 before filling out the form.*

## IDENTIFICATION

| 1. Company Name: | 2. Facility Name: | 3. Facility ID No: |
|---|---|---|
| Nu-West Industries, Inc. | Nu-West Conda Phosphate Operations | 029-00003 |

4. Brief Project Description: Install new #3 super phosphoric acid (SPA) evaporation system. (#3 SPA train)

## EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

| | |
|---|---|
| 5. Emissions Unit (EU) Name: | SUPERPHOSPHORIC ACID PROCESS |
| 6. EU ID Number: | S-PB-1 |
| 7. EU Type: | ☒ New Source ☐ Unpermitted Existing Source<br>☒ Modification to a Permitted Source -- Previous Permit #: Date Issued: |
| 8. Manufacturer: | TO BE DETERMINED |
| 9. Model: | TO BE DETERMINED |
| 10.. Maximum Capacity: | 336 TONS PER DAY EQUIVALENT P2O5 FEED |
| 11. Date of Construction: | TO BE DETERMINED |
| 12. Date of Modification (if any): | NA |
| 13. Is this a Controlled Emission Unit? | ☐ No ☒ Yes If Yes, complete the following section. If No, go to line 22. |

## EMISSIONS CONTROL EQUIPMENT

| | |
|---|---|
| 14. Control Equipment Name and ID: | Multi-stage horizontal cross-flow scrubber (A-Pb-1) |
| 15. Date of Installation: | NA 16. Date of Modification (if any): NA |
| 17. Manufacturer and Model Number: | NA |
| 18. ID(s) of Emission Unit Controlled: | S-Pb-1 |
| 19. Is operating schedule different than emission units(s) involved? | ☐ Yes ☒ No |
| 20. Does the manufacturer guarantee the control efficiency of the control equipment? | ☐ Yes ☒ No (If Yes, attach and label manufacturer guarantee) |

| | Pollutant Controlled | | | | | |
|---|---|---|---|---|---|---|
| | PM | PM10 | $SO_2$ | NOx | VOC | CO |
| Control Efficiency | NA | NA | NA | NA | NA | NA |

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. NA

## EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

| | |
|---|---|
| 22. Actual Operation: | NA |
| 23. Maximum Operation: | 8,760 HOURS PER 365 DAYS |

## REQUESTED LIMITS

| | |
|---|---|
| 24. Are you requesting any permit limits? | ☐ Yes ☒ No (If Yes, indicate all that apply below) |
| ☐ Operation Hour Limit(s): | |
| ☐ Production Limit(s): | |
| ☐ Material Usage Limit(s): | |
| ☐ Limits Based on Stack Testing: | Please attach all relevant stack testing summary reports |
| ☐ Other: | |
| 25. Rationale for Requesting the Limit(s): | NA |

## Instructions for Form EU0

This form provides DEQ with information about an emissions unit. An emissions unit is the equipment or process that generates emissions of regulated air pollutant(s). This form is used by the permit writer to become familiar with the emissions unit (EU). This form is also used by DEQ to identify the control equipment and the emission point (stack or vent) used for the emission unit(s) proposed in this permit application. This form also asks for supporting documents to verify stated control efficiencies and details about the emission point. Additional information may be requested.

1 - 4. Provide the same company name, facility name (if different), facility ID number, and brief project description as on Form CS in the boxes provided. This is useful in case any pages of the application get separated.

5. Provide the name of the emissions unit (EU), such as "Union boiler," etc. A separate EU0 form is required for each emissions unit.

6. Provide the identification (ID) number of the EU. It can be any unique identifier you choose; however, this ID number should be unique to this EU and should be used consistently throughout this application and any other air quality permit application(s) (e.g., operating permit application) to identify this EU.

7. Indicate the type of EU by checking the appropriate box (e.g., a new source to be constructed, an unpermitted existing source (as-built) applying for the first time, or an existing permitted source to be modified). If the EU is being modified, indicate on the form the most recent permit issued for the EU.

8. Provide the manufacturer's name for the EU. If the EU is custom-designed or homemade, indicate so.

9. Provide the model number of the EU. If the EU is custom-designed or homemade, indicate so.

10. Provide the maximum capacity of the EU. For example, a boiler's rated capacity may be modified in units of MMBtu/hr in terms of heat input of natural gas; an assembly line capacity may be in parts produced per day. Capacity should be based on a rated nameplate or as stated in the manufacturer's literature.

11. The date of construction is the month, day, and year in which construction or modification was commenced.

**Definitions:**

***Construction*** fabrication, erection, or installation of an affected facility.

***Commenced*** an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

***Modification*** any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted to the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) to the atmosphere not previously emitted.

12. If the EU has been or will be modified, provide the month, day, and year of the most recent or future modification as defined in IDAPA 58.01.01.006.

13. Indicate if emissions from the EU are controlled by air pollution control equipment. If the answer is yes, complete the next section. If the answer is no, go to line 18.

14. Provide the name of the air pollution control equipment (e.g., wet scrubber) and the control equipment's identification number. This identification number should be unique to this air pollution control equipment and should be used consistently throughout this and all other air quality permit applications (e.g., operating permit application) to identify this air pollution control equipment.

15. Provide the date the air pollution control equipment was installed.

16. If the air pollution control equipment has been modified, provide the date of the modification.

17. Provide the name of the manufacturer and the model number for the air pollution control equipment.

18. If this air pollution control equipment controls emissions from more than this EU, provide the identification number(s) of the other EU(s).

19. Indicate if this air pollution control equipment operates on a schedule different from the EU(s) it controls.

20. Indicate if the air pollution control manufacturer guarantees the control efficiency of the control equipment. If the answer is yes, attach the manufacturer's guarantee and label it with the air pollution control equipment identification number. Indicate the control efficiency for the target pollutant(s).

21. If the control efficiency of the air pollution control equipment is not guaranteed, attach the design specifications and any performance data to support the control efficiency stated in part 16. Label the supporting documentation with the air pollution control equipment identification number.

22. Provide the projected actual operating schedule for the emission unit in hours/day, hours/year, or other.

23. Provide the maximum operating schedule for the emission unit in hours/day, hours/year, or other.

24. If you are requesting to have limits placed on this EU, mark "Yes." Then, check the applicable requested limit(s) and provide the limit(s). For example, production limits may be in terms of parts produced per year, material usage limits may be in gallons per day.

25. Please provide the reason you are requesting limits, if any. This helps DEQ and the applicant determine whether the limits are necessary, and if they will accomplish the desired purpose. Provide supporting documentation (calculations, modeling assessment, regulatory review, etc.) for each limit requested.

**DEQ AIR QUALITY PROGRAM**
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline – 1-877-5PERMIT**

# AIR PERMIT APPLICATION

Revision 6
10/7/09

For each box in the table below, CTRL+click on the blue underlined text for instructions and information.

| IDENTIFICATION | |
|---|---|
| 1. Company Name: | 2. Facility Name: |
| Nu-West Industries, Inc. | Nu-West Conda Phosphate Operations |
| 3. Brief Project Description: | Install new #3 super phosphoric acid (SPA) evaporation system (#3 SPA train). |

| APPLICABILITY DETERMINATION | |
|---|---|
| 4. List applicable subparts of the New Source Performance Standards (NSPS) (40 CFR part 60).<br><br>Examples of NSPS affected emissions units include internal combustion engines, boilers, turbines, etc. The applicant must thoroughly review the list of affected emissions units. | List of applicable subpart(s):<br><br>Subpart U – Standards of Performance for the Phosphate Fertilizer Industry: Super Phosphoric Acid Plants (40 CFR 60.210) – project is exempt from NSPS, as it is subject to 40 CFR Part 63, Subpart AA – National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants (40 CFR 64.600).<br><br>☑ Not Applicable |
| 5. List applicable subpart(s) of the National Emission Standards for Hazardous Air Pollutants (NESHAP) found in 40 CFR part 61 and 40 CFR part 63.<br><br>Examples of affected emission units include solvent cleaning operations, industrial cooling towers, paint stripping and miscellaneous surface coating. EPA has a web page dedicated to NESHAP that should be useful to applicants. | List of applicable subpart(s):<br><br>Subpart AA – National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants (40 CFR 63.600).<br><br>☐ Not Applicable |
| 6. For each subpart identified above, conduct a complete a regulatory analysis using the instructions and referencing the example provided on the following pages.<br><br>**Note** - Regulatory reviews must be submitted with sufficient detail so that DEQ can verify applicability and document in legal terms why the regulation applies. Regulatory reviews that are submitted with insufficient detail will be determined incomplete. | ☑ A detailed regulatory review is provided (Follow instructions and example).<br><br>☐ DEQ has already been provided a detailed regulatory review. Give a reference to the document including the date. |

**IF YOU ARE UNSURE HOW TO ANSWER ANY OF THESE QUESTIONS, CALL THE AIR PERMIT HOTLINE AT 1-877-5PERMIT**

***It is emphasized that it is the applicant's responsibility to satisfy all technical and regulatory requirements, and that DEQ will help the applicant understand what those requirements are prior to the application being submitted but that DEQ will not perform the required technical or regulatory analysis on the applicant's behalf.***

# Instructions for Form FRA

**Item 4 & 5.** It is important that facilities review the most recent federal regulations when submitting their permit application to DEQ. Current federal regulations can be found at the following Web site: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?&c=ecfr&tpl=/ecfrbrowse/Title40/40tab_02.tpl.

**Item 6.** For each applicable subpart identified under items 4-5 conduct a complete regulatory analysis. The facility must follow the procedure given below or obtain permission from DEQ to provide the necessary information using an alternative procedure:

1. Retrieve a TEXT or PDF copy of the applicable federal regulation subpart(s) online at http://www.gpoaccess.gov/cfr/retrieve.html

2. Copy and paste the regulation(s) into your DEQ air permit application.

3. Highlight or underline sections in the regulation(s) that are applicable to the source(s).

4. Under each section of the subpart, explain why the source is subject to the section, or why the source is not subject to the section. When providing the explanation use a different font than the regulation (i.e. ***bold, italic***) so that it is easy for the reader to determine the text that the applicant has provided. An example NSPS regulatory analysis is attached. The applicant must provide all necessary information needed to determine applicability. If information is lacking or the analysis is incomplete the application will be determined incomplete.

   EPA provides a web site dedicated to NSPS/NESHAP applicability determinations that may be useful to applicants. Follow this link to the applicability determination index Clean Air Act Applicability Determination Index - Compliance Monitoring - EPA. Another useful source of information is the preamble to the regulation which is published in the Federal Register on the date the regulation was promulgated. Federal Registers may be found online at Federal Register: Main Page. The date the regulation was published in the Federal Register is included in the footnotes of the regulation.

5. DEQ will assist in identifying the applicable requirements that the applicant must include in the application but will not perform the required technical or regulatory analysis on the applicant's behalf. Applicants should contact the Air Quality Permit Hotline (1-877-573-7648) to discuss NSPS/NESHAP regulatory analysis requirements or to schedule a meeting.

6. It also benefits facilities to document a non-applicability determination on federal air regulations which appear to apply to the facility but actually do not. A non-applicability determination will avoid future confusion and expedite the air permit application review. If you conduct an applicability determination and find that your activity is not NSPS or NESHAP affected facility an analysis should be submitted using the methods described above.

7. **It is not sufficient to simply provide a copy of the NSPS or NESHAP. The applicant must address each section of the regulation as described above and as shown in the example that is provided.**

## EXAMPLE OF A NSPS REGULATORY ANALYSIS

[Title 40, Volume 6]
[Revised as of July 1, 2008]
From the U.S. Government Printing Office via GPO Access
[CITE: 40CFR60]

TITLE 40--PROTECTION OF ENVIRONMENT

CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

PART 60_STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES--
Table of Contents

Subpart H_Standards of Performance for Sulfuric Acid Plants

Sec.60.80 Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to each sulfuric acid production unit, which is the affected facility.
(b) Any facility under paragraph (a) of this section that commences construction or modification after August 17, 1971, is subject to the requirements of this subpart.

***ACME Chemicals, Inc. is proposing to construct after August 17, 1971 a sulfuric acid plant which burns elemental sulfur as defined by 40 CFR 60.81(a). ACME is therefore affected by this subpart.***

***(Be sure to use the terms of the regulation to describe applicability; usually applicability is determined based on a specific date, definition of an affected facility, and rated input capacity. All of the applicability criteria must be addressed by the applicant.)***

***Note - if a determination of non-applicability is being submitted it is not necessary to address the remaining non-applicable regulatory sections. Be sure to provide the applicability determination in terms of the regulation (i.e. construction/modification date, rated input capacity, definition of affected facility).***

Sec.60.81 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in subpart A of this part.
(a) Sulfuric acid production unit means any facility producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides and mercaptans, or acid sludge, but does not include facilities where conversion to sulfuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulfur dioxide or other sulfur compounds.
(b) Acid mist means sulfuric acid mist, as measured by Method 8 of appendix A to this part or an equivalent or alternative method.

***ACME Chemicals, Inc. has read and understands these definitions and used them in providing this regulatory analysis.***

Sec.60.82 Standard for sulfur dioxide.

(a) On and after the date on which the performance test required to be conducted by Sec.60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of 2 kg per metric ton of acid produced (4 lb per ton), the production being expressed as 100 percent H2/SO4/.

***ACME Chemicals, Inc. is subject to this standard and has provided a documented emission inventory (or manufacturer guarantee) which shows compliance.***

Sec.60.83 Standard for acid mist.

(a) On and after the date on which the performance test required to be conducted by Sec.60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any affected facility any gases which:

(1) Contain acid mist, expressed as H2/SO4/, in excess of 0.075 kg per metric ton of acid produced (0.15 lb per ton), the production being expressed as 100 percent H2/SO4/.

***ACME Chemicals, Inc. is subject to this standard and has provided a documented emission inventory (or manufacturer guarantee) which shows compliance.***

(2) Exhibit 10 percent opacity, or greater.

***ACME Chemicals, Inc. understands that this will become a permit condition and has supplied a manufacturer guarantee that the sulfuric acid plant will comply with this standard.***

Sec.60.84 Emission monitoring.

(a) A continuous monitoring system for the measurement of sulfur dioxide shall be installed, calibrated, maintained, and operated by the owner or operator. The pollutant gas used to prepare calibration gas mixtures under Performance Specification 2 and for calibration checks under Sec.60.13(d), shall be sulfur dioxide (SO2/). Method 8 shall be used for conducting monitoring system performance evaluations under Sec.60.13(c) except that only the sulfur dioxide portion of the Method 8 results shall be used. The span value shall be set at 1000 ppm of sulfur dioxide.

(b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton). The conversion factor shall be determined, as a minimum, three times daily by measuring the concentration of sulfur dioxide entering the converter using suitable methods (e.g., the Reich test, National Air Pollution Control Administration Publication No. 999-AP-13) and calculating the appropriate conversion factor for each eight-hour period as follows:

$$CF=k[(1.000-0.015r)/(r-s)]$$

where:

CF=conversion factor (kg/metric ton per ppm, lb/ton per ppm).
k=constant derived from material balance. For determining CF in metric units, k=0.0653. For determining CF in English units, k=0.1306.
r=percentage of sulfur dioxide by volume entering the gas converter. Appropriate corrections must be made for air injection plants subject to the Administrator's approval.
s=percentage of sulfur dioxide by volume in the emissions to the atmosphere determined by the continuous monitoring system required under paragraph (a) of this section.

(c) The owner or operator shall record all conversion factors and values under paragraph (b) of this section from which they were computed (i.e., CF, r, and s).

***ACME Chemicals, Inc. is not proposing to utilize Sections 60.84(a)-(c)listed above to monitor emissions. Instead ACME Chemicals is utilizing 40 CFR 60.84(d) listed below to monitor emissions of sulfur dioxide.***

(d) Alternatively, a source that processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen may use the following continuous emission monitoring approach and calculation procedures in determining SO2/ emission rates in terms of the standard. This procedure is not required, but is an alternative that would alleviate problems encountered in the measurement of gas velocities or production rate. Continuous emission monitoring systems for measuring SO2/, O2/, and CO2/ (if required) shall be installed, calibrated, maintained, and operated by the owner or operator and subjected to the certification procedures in Performance Specifications 2 and 3. The calibration procedure and span value for the SO2/ monitor shall be as specified in paragraph (b) of this section. The span value for CO2/ (if required) shall be 10 percent and for O2/ shall be 20.9 percent (air). A conversion factor based on process rate data is not necessary. Calculate the SO2/ emission rate as follows:

Es/=(Cs/ S)/[0.265-(0.126 %O2/)-(A %CO2/)]

where:

Es/=emission rate of SO2/, kg/metric ton (lb/ton) of 100 percent of H2/SO4/ produced.
Cs/=concentration of SO2/, kg/dscm (lb/dscf).
S=acid production rate factor, 368 dscm/metric ton (11,800 dscf/ton) of 100 percent H2/SO4/ produced.
%O2/=oxygen concentration, percent dry basis.
A=auxiliary fuel factor,
=0.00 for no fuel.
=0.0226 for methane.
=0.0217 for natural gas.
=0.0196 for propane.
=0.0172 for No 2 oil.
=0.0161 for No 6 oil.
=0.0148 for coal.
=0.0126 for coke.
%CO2/= carbon dioxide concentration, percent dry basis.

Note: It is necessary in some cases to convert measured concentration units to other units for these calculations:

Use the following table for such conversions:

| From-- | To-- | Multiply by-- |
|---|---|---|
| g/scm..... | kg/scm..... | 10-3 |
| mg/scm..... | kg/scm..... | 10-6 |
| ppm (SO2)..... | kg/scm..... | 2.660x10-6 |
| ppm (SO2)..... | lb/scf..... | 1.660x10-7 |

***ACME Chemicals, Inc. has elected to use the monitoring requirements of the preceding section.***

(e) For the purpose of reports under Sec.60.7(c), periods of excess emissions shall be all three-hour periods (or the arithmetic average of three consecutive one-hour periods) during which the integrated average sulfur dioxide emissions exceed the applicable standards under Sec.60.82.

***ACME acknowledges that this section applies to the sulfuric acid plant.***

Sec.60.85 Test methods and procedures.

(a) In conducting the performance tests required in Sec.60.8, the owner or operator shall use as reference methods and procedures the test methods in appendix A of this part or other methods and procedures as specified in this section, except as provided in Sec.60.8(b). Acceptable alternative methods and procedures are given in paragraph (c) of this section.

(b) The owner or operator shall determine compliance with the SO2/ acid mist, and visible emission standards in Sec. Sec. 60.82 and 60.83 as follows:

(1) The emission rate (E) of acid mist or SO2/ shall be computed for each run using the following equation:

E=(CQsd/)/(PK)

where:

E=emission rate of acid mist or SO2/ kg/metric ton (lb/ton) of 100 percent H2/SO4/ produced.
C=concentration of acid mist or SO2/, g/dscm (lb/dscf).
Qsd/=volumetric flow rate of the effluent gas, dscm/hr (dscf/hr).
P=production rate of 100 percent H2/SO4/, metric ton/hr (ton/hr).
K=conversion factor, 1000 g/kg (1.0 lb/lb).

(2) Method 8 shall be used to determine the acid mist and SO2/ concentrations (C's) and the volumetric flow rate (Qsd/) of the effluent gas. The moisture content may be considered to be zero. The sampling time and sample volume for each run shall be at least 60 minutes and 1.15 dscm (40.6 dscf).

(3) Suitable methods shall be used to determine the production rate (P) of 100 percent H2/SO4/ for each run. Material balance over the production system shall be used to confirm the production rate.

(4) Method 9 and the procedures in Sec.60.11 shall be used to determine opacity.

(c) The owner or operator may use the following as alternatives to

the reference methods and procedures specified in this section:

(1) If a source processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen, the following procedure may be used instead of determining the volumetric flow rate and production rate:

(i) The integrated technique of Method 3 is used to determine the O2/ concentration and, if required, CO2/ concentration.

(ii) The SO2/ or acid mist emission rate is calculated as described in Sec.60.84(d), substituting the acid mist concentration for Cs/ as appropriate.

***ACME Chemicals, Inc. acknowledges that performance tests shall be conducted as specified above.***

*Appendix D*
*Modeling Report*

**Prepared for:**
Nu-West Industries, Inc.

# Appendix D: Modeling Report

#3 Super Phosphoric Acid Evaporator System
Agrium Conda Phosphate Operations
Soda Springs, Idaho

December 2012

www.erm.com

*Delivering sustainable solutions in a more competitive world.*

ERM

# TABLE OF CONTENTS


| | | |
|---|---|---|
| *LIST OF FIGURES* | | *i* |
| *LIST OF TABLES* | | *i* |
| *1.0* | *INTRODUCTION* | *1* |
| *2.0* | *PROJECT DESCRIPTION* | *2* |
| *2.1* | *Project Location* | *2* |
| *2.2* | *Process Description* | *2* |
| *3.0* | *EMISSIONS* | *3* |
| *3.1* | *Emission Sources* | *3* |
| *3.2* | *Criteria Pollutant Emissions* | *3* |
| *3.3* | *Toxic Air Pollutant Emissions* | *4* |
| *4.0* | *AIR QUALITY MODELING METHODOLOGY* | *7* |
| *4.1* | *Receptor Grid* | *7* |
| *4.2* | *Ambient Air Boundary* | *8* |
| *4.3* | *Meteorological Data* | *8* |
| *4.4* | *Stack Parameters* | *8* |
| *4.5* | *Building Downwash* | *9* |
| *5.0* | *AIR QUALITY MODELING RESULTS* | *11* |

*ATTACHMENT 1 – MODELING PROTOCOL (TRANSMITTED NOVEMBER 5, 2012) AND DEQ APRROVAL NOTICES*

*ATTACHMENT 2 – MODELING FILES (ON CD)*

*ATTACHMENT 3 – IDAHO DEQ MODELING FORMS*


## LIST OF FIGURES


*Figure 3-1* *Property Boundary, Building/Structures and Source Locations*

*Figure 3-2* *Building/Structures and Source Locations*

*Figure 4-1* *Receptor Grid*


## LIST OF TABLES


*Table 3-1* *Emission Points*

*Table 3-2* *Criteria Pollutant Emissions Compared to Modeling Thresholds*

*Table 3-3* *Maximum Hourly Noncarcinogenic Toxic Air Pollutant Emissions – Potential to Emit*

*Table 3-4* *Annual Carcinogenic Toxic Air Pollutant Emissions – Potential to Emit*

*Table 4-1* *Stack Modeling Parameters*

*Table 5-1* *Maximum Modeled TAP Concentrations*

*Table 5-2* *Comparison of Maximum Modeled TAP Concentrations to Acceptable Ambient Air Concentrations for Carcinogens*

# 1.0 INTRODUCTION

This Modeling Report supplements the December 2012 Permit to Construct (PTC) application submitted by Nu-West Industries, Inc., for the proposed #3 Super Phosphoric Acid (SPA) Evaporator System at the Agrium Conda Phosphate Operations facility in Soda Springs, Idaho. An application for a PTC must demonstrate compliance with ambient air quality standards for criteria pollutant emissions (IDAPA 58.01.01.203.02). Additionally, the application must demonstrate that emissions of toxic air pollutants (TAPs) would meet toxic standards and not injure or unreasonably affect human or animal life or vegetation (IDAPA 58.01.01.203.03).

The new emission units associated with the new #3 SPA Evaporation System Project include the #3 SPA train (evaporator, seal tanks, oxidation tanks) and the new Therminol Heater. Emissions from the #3 SPA train will be controlled by the existing SPA Scrubber. In addition to the new emission units, the project will increase emissions associated with the following existing emission units: B-5 Nebraska Boiler, SPA Oxidation Reactor, and PPA Cooling Tower. In total, there is one new emission point (Therminol Heater) and four existing points (B-5 Nebraska boiler, SPA Scrubber, SPA Oxidation Reactor, and PPA Cooling Tower) affected by the proposed project. Stack parameters and emissions estimates for all five emission points associated with the proposed project are provided in the PTC application. For those emission points modeled for the SPA#3 project, emissions and stack parameters are also provided in subsequent sections of this report.

A modeling protocol with proposed source locations, stack parameters, and estimated emissions was submitted to the Idaho DEQ on November 5, 2012 (included in Attachment 1). Upon evaluation of the protocol and supplemental information provided as requested, DEQ conditionally approved the modeling protocol on December 5, 2012 (Attachment 1). DEQ determined that criteria pollutant modeling would not be required to demonstrate compliance with ambient air quality standards given the emissions levels and facility configuration provided in the modeling protocol. However, for TAPs with project emissions exceeding their screening emission levels (ELs) listed in IDAPA 58.01.01.585-586, DEQ required modeling per IDAPA 58.01.01.203.03 to demonstrate compliance with acceptable ambient concentrations listed in IDAPA 58.01.01.585-586.

Four TAPs were identified that exceeded their ELs: formaldehyde, arsenic, cadmium, and nickel, which are all carcinogenic TAPs. These TAPs are emitted by the new Therminol heater and increased load on the existing B-5 Nebraska boiler. The modeling for these four TAPs from these two emission sources demonstrates compliance with acceptable ambient concentrations for carcinogens (AACCs) listed in IDAPA 58.01.01.586.

The remainder of this report is organized as follows:

- Section 2.0 presents a brief project description;
- Section 3.0 describes project emissions;
- Section 4.0 describes the analytical methods for predicting ground level pollutant concentrations;
- Section 5.0 presents the results of the modeling;
- Attachment 1 contains the Modeling Protocol and DEQ Approval Notices;
- Attachment 2 presents electronic dispersion modeling files on CD-ROM; and
- Attachment 3 contains Idaho DEQ-required Modeling Forms MI1 – MI4

# 2.0 PROJECT DESCRIPTION

## 2.1 Project Location

The Nu-West Conda Phosphate Operation is located 7 miles north of Soda Springs, 1.2 miles east of Highway 34. The mailing address is 3010 Conda Road, Soda Springs, ID, 83276. The Facility ID No. is 029-00003.

## 2.2 Process Description

The new SPA evaporation system (#3 SPA) will utilize similar process technology to the existing #1 and #2 SPA evaporation systems. The SPA evaporator trains take a feed of approximately 50-60 wt% phosphoric acid ($P_2O_5$) and evaporate additional water to concentrate the $P_2O_5$ to 68-70 wt%. The feed to each SPA train is evaporated through a shell/tube exchanger and vapor head system. The SPA feed is heated through the exchanger via external Therminol 55 systems (one for each train). The Therminol system is a stand-alone system that provides the heat source to elevate the feed to high enough temperatures to evaporate the water necessary for concentration of the SPA product.

A two-stage jet system coupled with barometric condensing induces a vacuum on the SPA trains. Steam for the vacuum jets is supplied by the B-5 boiler. The vacuum is achieved through a closed loop water circulation system. The circulating water is collected in seal tanks from each evaporator, and then pumped through three parallel closed loop exchangers cooled by the PPA cooling tower. The cooled process water is then circulated back to the evaporator condensers.

The concentrated SPA product is then fed to the oxidation system where it is reacted with nitric acid and mixed to help control the total oxidizable carbon (TOC) content in the SPA. The oxidized SPA is pumped to tanks and cooled. The aged and cooled SPA process stream is pumped through a filter press and then the product acid is routed to railcars and/or trucks.

Emissions from the SPA evaporation system processes are controlled by a scrubber that complies with 40 CFR 63 Subpart AA, National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants. Emissions from the Therminol Heater are controlled by low-NOx burners.

The December 2012 #3 SPA PTC Application can be consulted for more details on the process description.

# 3.0 EMISSIONS

## 3.1 Emission Sources

The one new emission point and four existing emission points affected by the proposed #3 SPA project are listed in Table 3-1.

*Table 3-1 Emission Points*

| Emission Point | Source Type | Criteria Pollutant Source | Toxic Air Pollutant Source |
|---|---|---|---|
| Therminol Heater | New | X | X[1] |
| B-5 Nebraska Boiler | Existing | X | X[1] |
| SPA Scrubber | Existing | X | X[2] |
| SPA Oxidation | Existing | X | |
| PPA Cooling Tower | Existing | X | |

*Note 1: TAPs associated with natural gas combustion.*

*Note 2: The SPA Scrubber is a source of fluorides. Potential increased emissions of fluorides as a result of the proposed #3 SPA project are under the IDAPA 58.01.01.585 screening emission level (EL) for fluorides.*

Figure 3-1 illustrates the facility property boundary, building, and modeled emission point locations. Figure 3-2 zooms in on the modeled emission points showing more detail on the buildings and structures in their vicinity.

## 3.2 Criteria Pollutant Emissions

Table 3-2 provides the total project emissions and DEQ's Level I and II modeling thresholds for criteria pollutants and fluorides. If project emissions are below Level I thresholds, a dispersion modeling analysis is not required, except in unique situations. Project source emissions at Level II thresholds and above require a dispersion modeling analysis. Project source emissions greater than Level I but below Level II thresholds are evaluated on a case-by-case basis, considering characteristics of the sources and the site. Project emissions for the criteria pollutants and fluorides are all below the Level II thresholds with CO, Pb, $SO_2$ and fluorides emissions below the Level I thresholds.

*Table 3-2 Criteria Pollutant Emissions Compared to Modeling Thresholds*

| Pollutant | Project Emissions (TPY) | Level I Modeling Thresholds | Level II Modeling Thresholds | Comparison to Thresholds |
|---|---|---|---|---|
| $NO_x$ | 6.3 | 1.2 TPY<br>0.20 lb/hr | 14 TPY<br>2.4 lb/hr | < Level II |
| CO | 16.9<br>(3.9 lb/hr) | 15 lb/hr | 175 lb/hr | < Level I |
| $PM_{10}$ | 2.3<br>(0.53 lb/hr) | 0.22 lb/hr | 2.6 lb/hr | < Level II |
| $PM_{2.5}$ | 1.3 | 0.35 TPY<br>0.054 lb/hr | 4.1 TPY<br>0.63 lb/hr | < Level II |
| Lead (Pb) | 5.7E-5<br>(9.5E-3 lb/month) | 14 lb/month | Same as Level I | < Level I |
| $SO_2$ | 6.8E-2 | 1.2 TPY<br>0.21 lb/hr | 14 TPY<br>2.5 lb/hr | < Level I |
| VOC | 0.6 | -- | -- | -- |
| Fluoride, as F | 0.5<br>(0.12 lb/hr) | -- | 0.167 lb/hr | < Level I |

As described in Section 1.0, DEQ conditionally approved the modeling protocol on December 5, 2012, indicating that criteria pollutant modeling would not be required to demonstrate compliance with ambient air quality standards. DEQ's decision was based on the emissions levels and facility configuration provided in the modeling protocol. Therefore, modeling was not conducted for the criteria pollutants or fluorides.

## 3.3 Toxic Air Pollutant Emissions

Project TAP emissions, other than fluorides, result from natural gas combustion in the Therminol Heater and incremental load on the B-5 Nebraska boiler. Tables 3-3 and 3-4 compare the project emissions to the non-carcinogenic and carcinogenic screening emission levels (ELs) listed in IDAPA 58.01.01.585 and 586. If those ELs are exceeded, a modeling demonstration would be required per IDAPA 58.01.01.203.03 to demonstrate compliance with acceptable ambient concentrations. As shown in Tables 3-3 and 3-4, only four TAPs—formaldehyde, arsenic, cadmium and nickel—exceeded the ELs and required dispersion modeling, all carcinogens (see Table 3-4). The modeling demonstration in this report is for these four TAPs and demonstrates compliance with acceptable ambient concentrations for carcinogens (AACCs) in IDAPA 58.01.01.586.

*Table 3-3* *Maximum Hourly Noncarcinogenic Toxic Air Pollutant Emissions – Potential to Emit*

| Non-Carcinogenic Toxic Air Pollutants (sum of all emissions) | Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr) | Non-Carcinogenic Screening Emission Level (lb/hr) | Exceeds Screening Level? (Y/N) |
|---|---|---|---|
| Dichlorobenzene[1] | 3.12E-05 | 20 | No |
| n-Hexane | 4.69E-02 | 12 | No |
| Naphthalene | 1.59E-05 | 3.33 | No |
| Toluene | 8.85E-05 | 25 | No |
| Barium | 1.15E-04 | 0.033 | No |
| Chromium | 3.65E-05 | 0.033 | No |
| Cobalt | 2.19E-06 | 0.0033 | No |
| Copper | 2.21E-05 | 0.013 | No |
| Manganese | 9.89E-06 | 0.067 | No |
| Mercury[2] | 5.93E-02 | 25 | No |
| Molybdenum | 2.86E-05 | 0.333 | No |
| Selenium | 6.25E-07 | 0.013 | No |
| Vanadium | 5.99E-05 | 0.003 | No |
| Zinc | 7.55E-04 | 0.667 | No |
| Fluoride | 1.22E-01 | 0.167 | No |

*1. Conservative Screening Level for o-Dichlorobenzene used.*
*2. Mercury standard = 25 lb/year based on IDEQ Rule 58.01.01-215. Annual standard*

*Table 3-4* *Annual Carcinogenic Toxic Air Pollutant Emissions – Potential to Emit*

| Carcinogenic Toxic Air Pollutants (sum of all emissions) | Change in Annual Average Emissions Rates for Units at the Facility (lb/hr) | Carcinogenic Screening Emission Level (lb/hr) | Exceeds Screening Level? (Y/N) |
|---|---|---|---|
| 2-Methylnaphthalene | 6.25E-07 | 9.10E-05 | No |
| 3-Methylchloranthrene | 4.69E-08 | 2.50E-06 | No |
| 7,12-Dimethylbenz(a)anthracene | 4.17E-07 | 9.10E-05 | No |
| Acenaphthene | 4.69E-08 | 9.10E-05 | No |
| Acenaphthylene | 4.69E-08 | 9.10E-05 | No |
| Anthracene | 6.25E-08 | 9.10E-05 | No |
| Benz(a)anthracene[1] | 4.69E-08 | 2.00E-06 | No |
| Benzene | 5.47E-05 | 8.00E-04 | No |
| Benzo(a)pyrene[1] | 3.12E-08 | 2.00E-06 | No |
| Benzo(b)fluoranthene[1] | 4.69E-08 | 2.00E-06 | No |
| Benzo(g,h,i)perylene | 3.12E-08 | 9.10E-05 | No |
| Benzo(k)fluoranthene[1] | 4.69E-08 | 2.00E-06 | No |
| Chrysene[1] | 4.69E-08 | 2.00E-06 | No |
| Dibenzo(a,h)anthracene[1] | 3.12E-08 | 2.00E-06 | No |
| Fluoranthene | 7.81E-08 | 9.10E-05 | No |
| Fluorene | 7.29E-08 | 9.10E-05 | No |
| Formaldehyde | 1.95E-03 | 5.10E-04 | Yes |
| Indeno(1,2,3-cd)pyrene[1] | 4.69E-08 | 2.00E-06 | No |
| Phenanathrene | 4.43E-07 | 9.10E-05 | No |
| Pyrene | 1.30E-07 | 9.10E-05 | No |
| Arsenic | 5.21E-06 | 1.50E-06 | Yes |
| Beryllium | 3.12E-07 | 2.80E-05 | No |
| Cadmium | 2.86E-05 | 3.70E-06 | Yes |
| Nickel | 5.47E-05 | 2.70E-05 | Yes |
| PAH - B(a)P Equivalent | 2.97E-07 | 2.00E-06 | No |

*1. 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.*

Detailed information for TAP emissions and calculations per emission source can be found in Appendix B of the permit application.

# 4.0 AIR QUALITY MODELING METHODOLOGY

An air quality impact assessment was performed to estimate maximum off-site concentrations of toxic air pollutants (TAPs) for the four TAPs that exceeded their respective ELs listed in IDAPA 58.01.01.586: formaldehyde, arsenic, cadmium, and nickel. The modeled concentrations were then compared to Acceptable Ambient Concentrations for Carcinogens (AACCs) listed in IDAPA 58.01.01.586. The modeling was conducted as described in the modeling protocol unless otherwise indicated in this report.

The dispersion modeling was performed using the AERMOD modeling system developed by the American Meteorological Society/Environmental Protections Agency Regulatory Model Improvement Committee (AERMIC). Regulatory default technical options were selected for the AERMOD modeling. These include stack tip downwash and a routine for processing concentration averages during calm winds and when there are missing meteorological data. These regulatory default options are found in the AERMOD User's Manual[1].

AERMOD incorporates air dispersion for both surface and elevated sources and for areas with either simple and/or complex terrain. The AERMOD modeling system includes three regulatory components: a meteorological data preprocessor, AERMET; a terrain data preprocessor, AERMAP; and the AERMOD dispersion model.

Electronic dispersion modeling files on CD-ROM are attached as Attachment **2** and Idaho DEQ-required Modeling Forms MI1 – MI4 can be found in Attachment 3.

**Please note that the emission rates modeled by AERMOD were those described in Section 3.3 multiplied by a factor of one million (1,000,000) in order to obtain non-zero concentration predictions, thus the AERMOD concentration output must be divided by 1,000,000 to express ambient concentration predictions in units of micrograms per cubic meter (μg/m³).**

## 4.1 Receptor Grid

A receptor grid was placed in locations surrounding the proposed facility. Receptors were placed at 25-meter increments out to a minimum distance of approximately 500 meters, at 50-meter increments to a minimum distance of approximately 2,000 meters (2 kilometers), at 100-meter increments to a minimum distance of approximately 3,500 meters (3.5 kilometers), and at 250-meter increments out to a minimum distance of approximately 5,000 meters (5 kilometers). Figure 4-1 illustrates the receptor grid used. The datum is NAD 83. Note that Figure 4-1 is consistent with the receptor grid figure presented in the modeling protocol; the text description of the receptor grid in the modeling protocol was incorrect.

It was not necessary to create additional refined grids to refine maximum locations as all maximum concentrations occurred along the property boundary. Receptor elevations were obtained from USGS National Elevation Data (NEDs). As part of the AERMOD

---

[1] USEPA, *User's Guide for the AMS/EPA Regulatory Model AERMOD, EPA-454/B-03-001, September 2004.*

modeling system, AERMAP (version 11103) was run to calculate elevations and hill heights each modeled receptor.

## 4.2 Ambient Air Boundary

The ambient air boundary, beyond which receptors were placed, is based on the property boundary shown in Figure 3-1. The area inside this property boundary is owned and controlled by Agrium. The operation is a large industrial facility remotely located a considerable distance from the public and public activities. The boundary is controlled by a combination of physical barriers such as gates, fences, dirt berms, rail road tracks, and ponds; a buffer zone to the east; a guard-attended main entrance; and "No Trespassing" signs. While Agrium owns other parcels outside of the property line shown in Figure 3-1, public access is not restricted so they are not considered part of the ambient air boundary.

## 4.3 Meteorological Data

The dispersion modeling was performed using 5 years (2004 – 2008) of meteorological surface data collected at the Monsanto Facility located approximately 3.5 miles southwest of the facility. Missing data were filled in using data from the Pocatello surface monitoring station. Upper air data were obtained from the Boise Airport.

Note that the use of another on-site meteorological data set was proposed in the modeling protocol. It was later determined that the on-site data set did not meet EPA quality standards. The AERMET-processed data described above were provided to the Idaho DEQ in a December 11, 2012 email to Darrin Mehr. The DEQ approved the use of this meteorological data set at the Nu-West Conda plant on December 12, 2012, in an email from Darrin Mehr of DEQ to John Koehler of ERM (see Attachment 1).

## 4.4 Stack Parameters

The AERMOD dispersion model can simulate the transport of emissions from multiple sources including point sources, area sources, and volume sources. The model requires specific inputs for each source type. Air emissions sources for this analysis have been characterized as point sources (stacks). For point sources, the model requires the input of the source location, stack base elevation, stack height, stack inner diameter, stack gas exit velocity, and stack-gas exit temperature. Source locations were identified using the Universal Transverse Mercator (UTM) coordinate system. Stack parameters for the emission points modeled are summarized below in Table 4-1.

Note that the stack temperature and flow rate for the new Therminol Heater are both higher than given in the modeling protocol. This is because it was later discovered that the stack temperature given in the modeling protocol was too low relative to measurements conducted on the existing #1 SPA Therminol Heater. The stack temperature for the proposed new #3 SPA Therminol Heater was changed to be consistent with the measured stack temperature of the equivalent existing heater and the flow rate was adjusted to reflect the corrected temperature.

The height above ground level of the new Therminol Heater stack given in Table 4-1 is the same as in the modeling protocol when considering the height of the building that the stack would be on. The B-5 Boiler stack height in Table 4-1 is higher than given in the modeling protocol upon correction of that information.

*Table 4-1 Stack Modeling Parameters*

| AERMOD Source ID | SPA #3 Therminol Heater[1] | B-5 Boiler[2] |
|---|---|---|
| UTM Coordinates X – East | 455627 | 4732087 |
| UTM Coordinates Y – North | 455756 | 4732071 |
| Stack Height (m) | 31.95 | 15.85 |
| Stack Base Elevation (m) | 1877 | 1878 |
| Stack Gas Exit Velocity (m/s) | 9.81 | 7.59 |
| Stack Gas Exit Temperature (K) | 566.48 | 427.04 |

*Note 1: New Therminol Heater stack flow rate and temperature are estimated actual operating conditions based on preliminary design work for the SPA #3 project and measurements taken on the #1 Therminol Heater.*

*Note 2: B-5 Boiler stack flow rate and temperature shown above are actual three-month averages of stack temperature and steam rates from July 1 through September 30, 2012, for the existing Nebraska boiler. The 213.8 MMBtu/hr boiler heat input capacity was multiplied by the ratio of the 3-month average steam rate to the rated steam capacity of the boiler to arrive at an estimate of 123 MMBtu/hr during the period. The additional SPA#3 steam requirements add about 1 MMBtu/hr to this, for an estimated firing rate after the SPA#3 project of 124 MMBtu/hr. The EPA F-Factor of 8710 dscf/MMBtu was applied and an adjustment made for atmospheric pressure at plant altitude to estimate the post-project stack flow rate. This does not incorporate any moisture or oxygen content adjustment, which would add to the estimated stack exhaust flow rate. Use of an uncorrected EPA F-Factor assumes a dry stack gas with 0% oxygen, thus would underestimate actual stack gas flow rate (conservative for modeling purposes). Correcting for actual stack gas moisture and oxygen content would add to the stack gas flow rate.*

## 4.5 Building Downwash

The USEPA provides specific guidance[2] to determine whether or not a structure (building) potentially affects pollutant dispersion from a nearby emission source. The guidance states that, if a structure is located within a certain distance from the emissions sources (stack), downwash effects on the dispersion of stack emissions must be considered. A Good Engineering Practice (GEP) stack height is defined as the height at which nearby building downwash effects are not expected to influence plume behavior.

A GEP analysis is performed for two reasons. First, GEP guidance states that, in the modeling analysis, credit cannot be taken for a height greater than the GEP stack height. Second, if a stack is shorter than the GEP formula height, building downwash must be considered when modeling emissions from that stack. The GEP stack height is defined as the greater of the GEP formula height (defined below) and 213 feet (65 meters.) It is the maximum height for which credit can be taken in the modeling analysis, although a higher stack could be built.

The GEP formula height is defined as:

$$Hs = Hb + 1.5\ Lb$$

Where:

[2] *40 CFT Part 51 Appendix W, November 2005.*

$H_s$ = GEP formula height

$H_b$ = building height

$L_b$ = the lesser building dimension of the height or projected width

The Building Profile Input Program Prime (BPIP Prime), a software program, calculates the GEP formula heights and direction-specific building dimensions for input into the AERMOD model. BPIP Prime requires the input of building/structure corner coordinates and point source coordinates and heights. The UTM coordinate system was used to identify source and building/structure locations. The AERMOD model uses BPIP Prime outputs as input for calculating the aerodynamic building downwash from multiple buildings.

The locations of the modeled point sources in relation to the property boundary are illustrated in Figure 3-1. Greater detail of the surrounding buildings and structures relative to the emission points is shown in Figure 3-2. A scaled facility plot plan is also shown in Appendix A of the December 2012 PTC application for the #3 SPA project. It is noted that the structure dimensions used in the current modeling exercise were supplied by the Idaho DEQ from a previous modeling analysis performed in 2006 for the Nu-West Conda facility.

# 5.0 AIR QUALITY MODELING RESULTS

The maximum modeled TAP concentrations are shown in Table 5-1. For all TAPs, maximum concentrations occurred along the eastern property boundary. No adverse health effects will occur from exposures to TAP concentrations due to maximum potential emissions from the proposed #3 SPA Therminol heater and emissions from increased load on the B-5 Nebraska boiler.

*Table 5-1 Maximum Modeled TAP Concentrations*

| TAP | CAS Number | 24-Hour Average | | | Annual Average Concentrations | | |
|---|---|---|---|---|---|---|---|
| | | µg/m³ | UTM E | UTM N | µg/m³ | UTM E | UTM N |
| Formaldehyde | 50-00-0 | 5.50E-03 | 455914.1 | 4732103 | 2.98E-04 | 455914.9 | 4732153 |
| Arsenic | 7440-38-2 | 1.46E-05 | 455914.1 | 4732103 | 7.93E-07 | 455914.9 | 4732153 |
| Cadmium | 7440-43-9 | 8.06E-05 | 455914.1 | 4732103 | 4.36E-06 | 455914.9 | 4732153 |
| Nickel | 7440-02-0 | 1.54E-04 | 455914.1 | 4732103 | 8.33E-06 | 455914.9 | 4732153 |

As shown in Table 5-2, all TAP concentrations are below the Acceptable Ambient Concentrations, demonstrating that emissions from the #3 SPA project will have insignificant TAP impacts.

*Table 5-2 Comparison of Maximum Modeled TAP Concentrations to Acceptable Ambient Air Concentrations for Carcinogens*

| TAP | CAS Number | Annual Average Concentrations µg/m³ | Acceptable Ambient Air Concentrations µg/m³ |
|---|---|---|---|
| Formaldehyde | 50-00-0 | 2.98E-04 | 7.7E-02 |
| Arsenic | 7440-38-2 | 7.93E-07 | 2.3E-04 |
| Cadmium | 7440-43-9 | 4.36E-06 | 5.6E-04 |
| Nickel | 7440-02-0 | 8.33E-06 | 4.2E-03 |

*Figures*

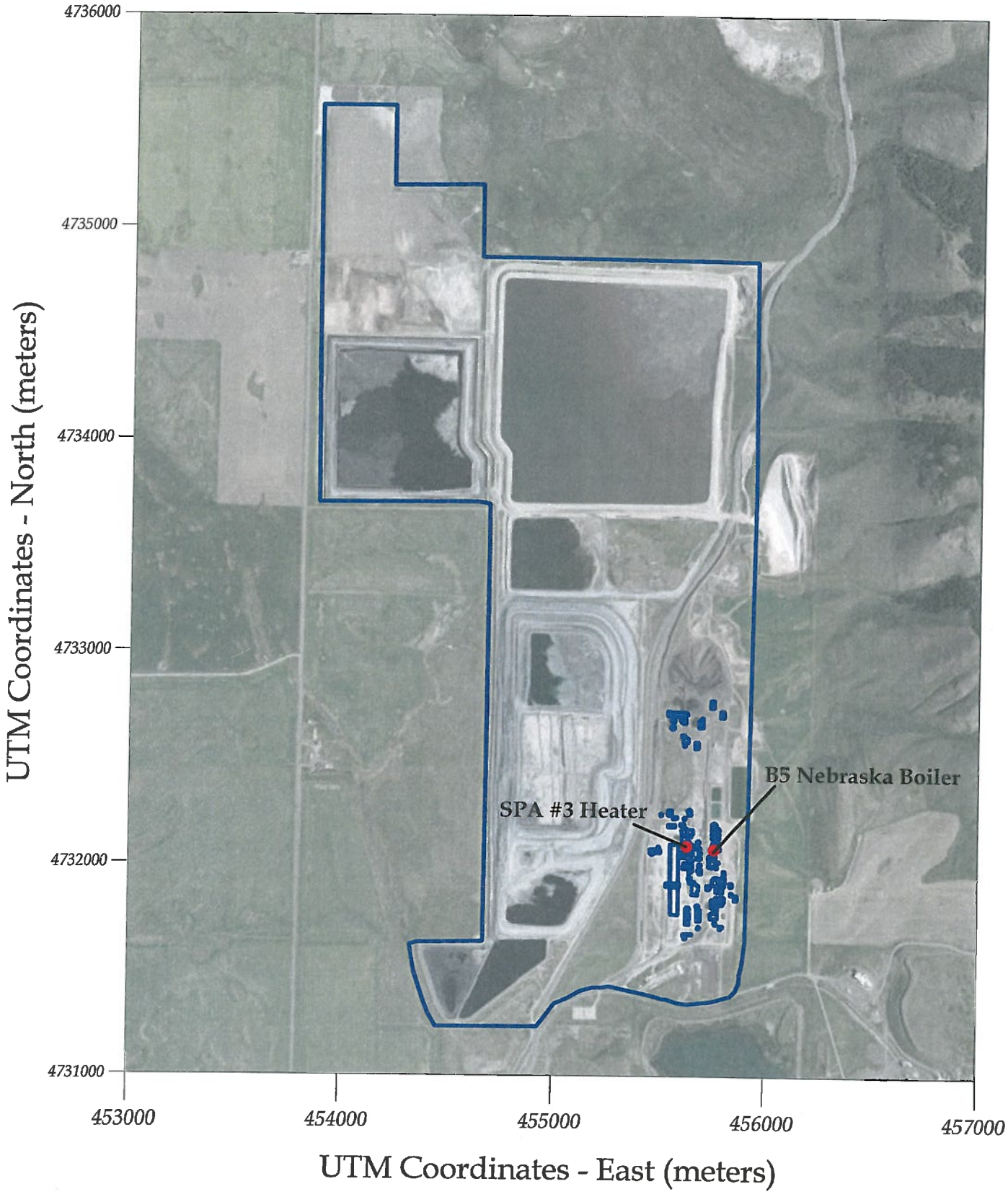



Figure 3-1

*Property Boundary Building/Structures and Source Locations*
*Agrium SPA #3 Permit Application*
*Soda Springs, Idaho*

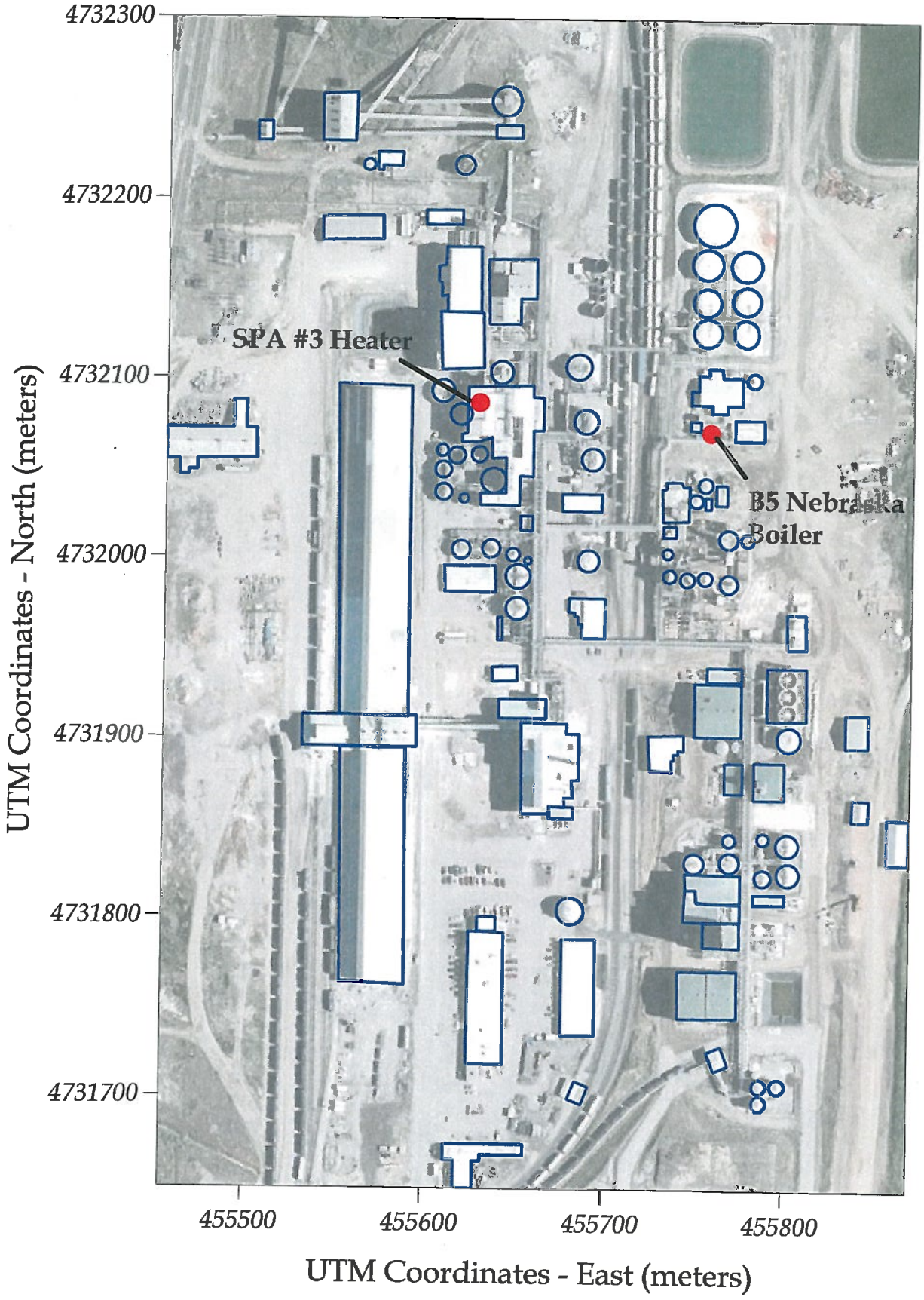



Figure 3-2

*Building/Structures and Source Locations*
*Agrium SPA #3 Permit Application*
*Soda Springs, Idaho*

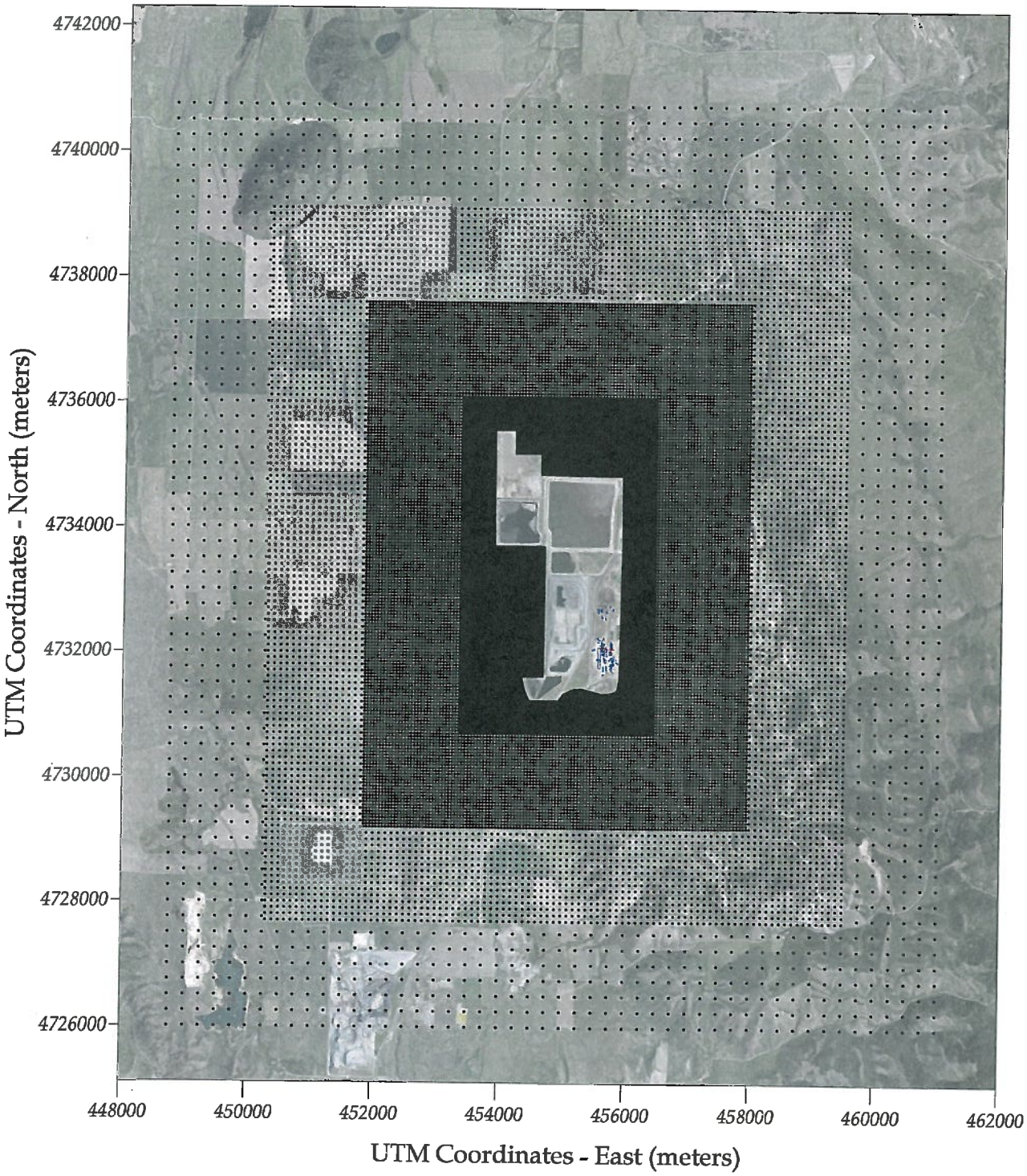



Figure 4-1

*Receptor Grid*
*Agrium SPA #3 Permit Application*
*Soda Springs, Idaho*

*Attachment 1*
*Modeling Protocol (Transmitted November 5, 2012) and DEQ Approval Notices*

**SPA #3 Modeling Protocol Submitted by Nu-West to Idaho DEP on November 5, 2012**

October 31, 2012

# Protocol for Dispersion Modeling Analysis for Nitrogen Oxides, Particulate Matter, and Toxic Air Pollutant Emissions for the Super Phosphoric Acid #3 Project at the Nu-West Inc. (Agrium) Conda Facility, Soda Springs, Idaho

## Introduction

This document presents a dispersion modeling protocol to the Idaho Department of Environmental Quality (IDEQ) subsequent to a pre-application meeting held at the IDEQ office in Boise, Idaho, on October 9, 2012. As discussed at the pre-application meeting, this protocol presents proposed procedures for performing an air quality impact analysis for criteria air pollutants, if needed, for oxides of nitrogen (NOx), particulate matter less than or equal to 10 μm aerodynamic diameter ($PM_{10}$), and particulate matter less than or equal to 2.5 μm aerodynamic diameter ($PM_{2.5}$) from new and modified emission units resulting from the proposed Super Phosphoric Acid #3 (SPA #3) project at the Nu-West Inc. (Agrium) Conda facility in Soda Springs, Idaho. It also presents proposed procedures for assessing toxic air pollutant (TAP) emissions from the proposed action, specifically formaldehyde, arsenic, cadmium, and nickel from the combustion of natural gas. The protocol has been prepared pursuant to IDEQ rule IDAPA 58.01.01.200, which requires a dispersion modeling analysis as part of a permit-to-construct (PTC) application.

The Agrium facility is located east of Highway 34 at 3010 Conda Road, Soda Springs, Idaho 83276. The UTM coordinates at the approximate center of the property are 455368 meters E, 4733175 meters N (NAD 83, zone 12). The plant processes locally mined phosphate ore to produce phosphoric acid and phosphate-based fertilizers. An aerial view of the facility is provided in Figure 1.

## Background

### *Criteria Air Pollutants*

Pursuant to *State of Idaho Guideline for Performing Air Quality Impact Analyses*, a criteria pollutant dispersion modeling analysis is usually not required if total increased emissions for a specific pollutant from new and/or modified sources, including fugitive and exempt sources, are below the Level I modeling thresholds established by IDEQ. A dispersion modeling analysis is required if the total emissions from new and/or modified sources exceed the respective Level II modeling thresholds.

According to the IDEQ modeling guidelines:

## Figure 1

## Aerial View of the Agrium Plant – Soda Springs, ID

> *"Level II – conditional thresholds that are applied on a case-by- case basis, considering characteristics of the sources and the site. In certain circumstances where emissions source configurations result in poor dispersion characteristics and/or there are potentially exposed public very near to emissions points, IDEQ may require modeling even if emissions are below Level II thresholds".*

Therefore, dispersion modeling may be required, at the discretion of IDEQ, if the emissions fall between the Level I and Level II thresholds.

It is anticipated that emissions of carbon monoxide (CO), sulfur dioxide ($SO_2$), and lead (Pb) from new and affected emissions units of the proposed project will not exceed the respective Level I thresholds, and therefore would not require dispersion modeling. It is also anticipated that emissions of NOx, $PM_{10}$, and/or $PM_{2.5}$ could fall between Level I and Level II thresholds. Information is presented in this protocol to assist IDEQ in determining whether modeling would be required for NOx, $PM_{10}$, and/or $PM_{2.5}$. In the event that Agrium is required to model NOx, $PM_{10}$, and/or $PM_{2.5}$ emission increases from the proposed project, the procedures outlined in the ***Dispersion Modeling*** section below will be followed.

*Toxic Air Pollutants*

According to the IDEQ modeling guidelines, increased potential TAP emissions associated with the proposed project must be compared to emission limits (ELs) in IDAPA 58.01.01 Sections 585 and 586. If the emissions of a specific TAP are below the respective EL, then that specific TAP need not be evaluated further. However, emissions of TAPs above ELs are required to be modeled and compared against the respective acceptable ambient concentrations (AACs).

Emissions of formaldehyde, arsenic, cadmium, and nickel as a result of the proposed action are projected to exceed their respective ELs. Therefore, emission increases for those TAPs will be modeled to demonstrate compliance with IDAPA 58.01.01 Sections 585 and 586 AACs. The procedures outlined in the ***Dispersion Modeling*** section will be followed.

## Dispersion Modeling

Estimates of allowable emissions for new source and incremental emissions for affected existing sources as a result of the SPA#3 project will be included in the permit-to-construct (PTC) application submitted to IDEQ. For the purposes of this modeling protocol, Table 1 presents *preliminary* criteria pollutant emission estimates that are somewhat higher but close to those discussed at the October 9, 2012 pre-application

meeting. The emission estimates that will be included in the PTC application may be different from these preliminary emission estimates, but such variations are expected to be small.

**Table 1**
**Preliminary Criteria Pollutant Emissions Increases from SPA #3 Project**

| Source | NOx | | CO | | $PM_{10}$ | | $PM_{2.5}$ | | $SO_2$ | | Pb |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/month |
| **Therminol Heater[1]** | 1.25 | 5.49 | 2.1 | 9.22 | 0.190 | 0.834 | 0.190 | 0.834 | 0.015 | 0.066 | 0.0274 |
| **#3 SPA Scrubber[2]** | -- | -- | -- | -- | 0.303 | 1.33 | 0.074 | 0.323 | -- | -- | |
| **SPA Oxidation[3]** | 0.109 | 0.48 | 1.73 | 7.56 | -- | -- | -- | -- | -- | -- | |
| **B-5 Boiler[4]** | 0.08 | 0.33 | 0.04 | 0.17 | 0.005 | 0.02 | 0.005 | 0.02 | 0.001 | 0.0025 | 0.0011 |
| **Cooling Tower[5]** | -- | -- | -- | -- | 0.037 | 0.164 | 0.022 | 0.098 | -- | -- | |
| **TOTALS** | 1.44 | 6.30 | 3.87 | 16.95 | 0.535 | 2.35 | 0.29 | 1.28 | 0.016 | 0.068 | 0.029 |
| **IDEQ Level I** | 0.2 | 1.2 | 15 | -- | 0.22 | -- | 0.054 | 0.35 | 0.21 | 2.5 | 14 |
| **IDEQ Level II** | 2.4 | 14 | 175 | -- | 2.6 | -- | 0.63 | 4.1 | 1.2 | 14 | 14 |

[1] *Low-NOx burner. For natural gas combustion, $PM_{2.5} = PM_{10}$ per AP-42.*
[2] *Increased $PM_{10}$ and $PM_{2.5}$ from SPA scrubber from the addition of SPA#3 calculated from higher result of past two source tests (2007 and 2009), scaling to maximum $P_2O_5$ capacity of SPA#3, and then multiplying by a safety factor of two.*
[3] *Increased NOx and CO from SPA scrubber due to the addition of SPA#3 calculated from NOx and CO emission measurements from 2008 source test, scaling to maximum $P_2O_5$ capacity of SPA#3 assuming average $P_2O_5$ feed rate from other 2007, 2009, 2010, 2011, and 2012 source tests, and then multiplying by a safety factor of two.*
[4] *Increased emissions (within current permit limits) from existing Nebraska boiler from a small load increase to provide steam for SPA #3 vacuum jets. The estimates provided in Table 1 were derived by prorating the Tier I emission limits for this boiler for the expected additional steam demand for SPA #3. $PM_{2.5}$ was assumed equal to $PM_{10}$ per AP-42.*
[5] *Increased $PM_{10}$ and $PM_{2.5}$ from the PPA cooling tower (above current actual emissions) due to an approximate 1200 gpm increase in circulating water to provide additional cooling for SPA #3. The estimates provided in Table 1 were derived from 2010 drift rate measurements from PPA cooling tower, and a TDS loading of 2,200 ppmw. AP-42 methods used to estimate $PM_{10}$, and $PM_{2.5}$ estimate assumed 60% $PM_{10} = PM_{2.5}$. This is expected to be overpredictive.*

Should IDEQ require criteria pollutant modeling, a dispersion modeling analysis will be performed using a U.S. EPA-approved model to simulate the downwind transport of NOx, $PM_{10}$, and $PM_{2.5}$. The modeling will predict maximum off-site pollutant concentrations and compare them against their respective Significant Impact Levels (SILs). Further details are described in the ***Air Quality Impact Analyses*** section.

Table 2 presents emission estimates for TAPs from the proposed Therminol heater that would exceed their respective ELs at the projected maximum heater capacity. These

TAP emissions will be modeled with a U.S. EPA-approved model. Predicted off-site concentrations will be compared to respective AACs to determine compliance with IDAPA 58.01.01.203.03. Estimated maximum emissions of fluorides from the SPA#3 process are also shown in Table 2, and are projected to be below its EL. For the purposes of this modeling protocol, Table 2 presents *preliminary* TAP emission estimates that are slightly higher than those discussed at the October 9, 2012 pre-application meeting. The emission estimates that will be included in the PTC application may vary from these preliminary emission estimates, but such variations are expected to be small.

**Table 2**
**Preliminary TAP Emissions Increases from SPA #3 Project**

| Pollutant | Classification | Emissions (lb/hr) | | Screening ELs (lb/hr) | Exceed EL? |
|---|---|---|---|---|---|
| | | Therminol Heater | SPA #3 Process | | |
| **Formaldehyde** | Carcinogen | 1.88E-03 | | 5.10E-04 | Yes |
| **Arsenic** | Carcinogen | 5.01E-06 | | 1.50E-06 | Yes |
| **Cadmium** | Carcinogen | 2.76E-05 | | 3.70E-06 | Yes |
| **Nickel** | Carcinogen | 5.26E-05 | | 2.70E-05 | Yes |
| **Fluorides[1]** | Non-Carcinogen | -- | 0.122 | 0.167 | No |

[1] *For purposes of modeling protocol, SPA#3 fluorides emissions calculated from Tier 1 limit of 0.0087 lb/ton equivalent $P_2O_5$ based on 40 CFR 63 Subpart AA and maximum capacity of SPA#3 process.*

## ***Model Selection***

The air quality dispersion modeling analyses will employ the American Meteorological Society/ Environmental Protection Agency Regional Modeling System (AERMOD) version 12060, developed by the American Meteorological Society/ Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC). AERMOD incorporates air dispersion for both surface and elevated sources and for areas with either simple and/or complex terrain. In addition to the dispersion portion, the AERMOD modeling system includes two additional regulatory components: a meteorological data preprocessor (AERMET) and a terrain data preprocessor (AERMAP). The following settings will be used in the AERMOD model:

- Complex terrain – receptor elevations and hill scales;
- Rural dispersion coefficients; and
- Regulatory default model parameters, including:
    - Use calm processing;
    - Account for elevated terrain;
    - Use missing data processing routines;

- Use stack-tip downwash; and
- No exponential decay.

The AERMOD dispersion model can simulate the transport of emissions from multiple sources (and source types) simultaneously, including point sources, area sources, and volume sources, while accounting for building downwash and building cavity effects. The model requires specific inputs for each source type as discussed below.

***Source Parameters***

Emissions sources for this analysis will be characterized as point sources and/or area sources. For point sources, the model requires the input of the release type (default, rain-cap, horizontal stack), emission rate, source location in terms of X-Y coordinates, stack base elevation, stack height, stack inner diameter, stack gas exit velocity, and stack gas exit temperature. Area sources require the input of source location in terms of X-Y coordinates, length of sides, orientation, and release heights. Manufacturer specifications and/or typical (not maximum) stack parameters will be used as inputs to the model. Source locations will be provided in terms of North American Datum 83 (NAD 83) Universal Transverse Mercator (UTM) coordinate system. Table 3 provides estimated parameters for potential point sources that may be included in the dispersion modeling analysis.

**Table 3**
**Typical Stack Parameters for New and Affected Sources for SPA #3 Project**

| Source | Stack Height (ft) | Stack Flow Rate (acfm) | Stack Temperature (°F) |
|---|---|---|---|
| New Therminol Heater[1] | 25 | 6,660 | 250 |
| SPA Scrubber | 42 | 8,700 | 85 |
| SPA Oxidation | 40 | 1,120 | 92 |
| B-5 Boiler[2] | 30 | 33,000 | 309 |

[1]*New Therminol Heater stack flow rate and temperature shown above are actual conditions estimated in preliminary design work for the SPA#3 project.*
[2] *B-5 Boiler stack flow rate and temperature shown above are actual three-month averages of stack temperature and steam rates from July 1 through September 30, 2012 for the existing Nebraska boiler. The 213.8 MMBtu/hr boiler heat input capacity was multiplied by the ratio of the 3-month average steam rate to the rated steam capacity of the boiler to arrive at an estimate of 123 MMBtu/hr during the period. The additional SPA#3 steam requirements add about 1 MMBtu/hr to this, for an estimated firing rate after the SPA#3 project of 124 MMBtu/hr. The EPA F-Factor of 8710 dscf/MMBtu was applied and an adjustment made for atmospheric pressure at plant altitude to estimate the stack flow rate for modeling. This does not incorporate any moisture or oxygen content adjustment, which would add to the estimated stack exhaust flow rate.*

***Building Downwash***

When point sources are located on or near buildings or structures, the dispersion of the plume can be influenced. Under certain wind speeds, the wake produced on the lee side of the building can cause the plume to be pulled toward the ground near the building, resulting in higher concentrations close to the building. These effects are called building downwash. The Building Profile Input Program -Prime (BPIP-Prime) program will be used create specific AERMOD inputs for representing nearby buildings. Each source location and height above ground will be input into the BPIP-Prime program along with locations and heights of nearby structures. The BPIP-Prime program will determine the wind-direction-specific building parameters used by the AERMOD model to account for downwash effects of nearby buildings, including cavity effects.

Figure 2 shows the location of the proposed new Therminol heater stack relative to nearby structures. The Therminol heater stack would be the stack with the majority of the SPA#3 project emission increases. As shown in Table 3, the Therminol heater stack is estimated to be 25 feet above the roof of the Phosphoric Acid Plant building. This building has a height of **79.5 feet** above ground level. The other potential stack sources would be in the same vicinity.

***Receptor Parameters***

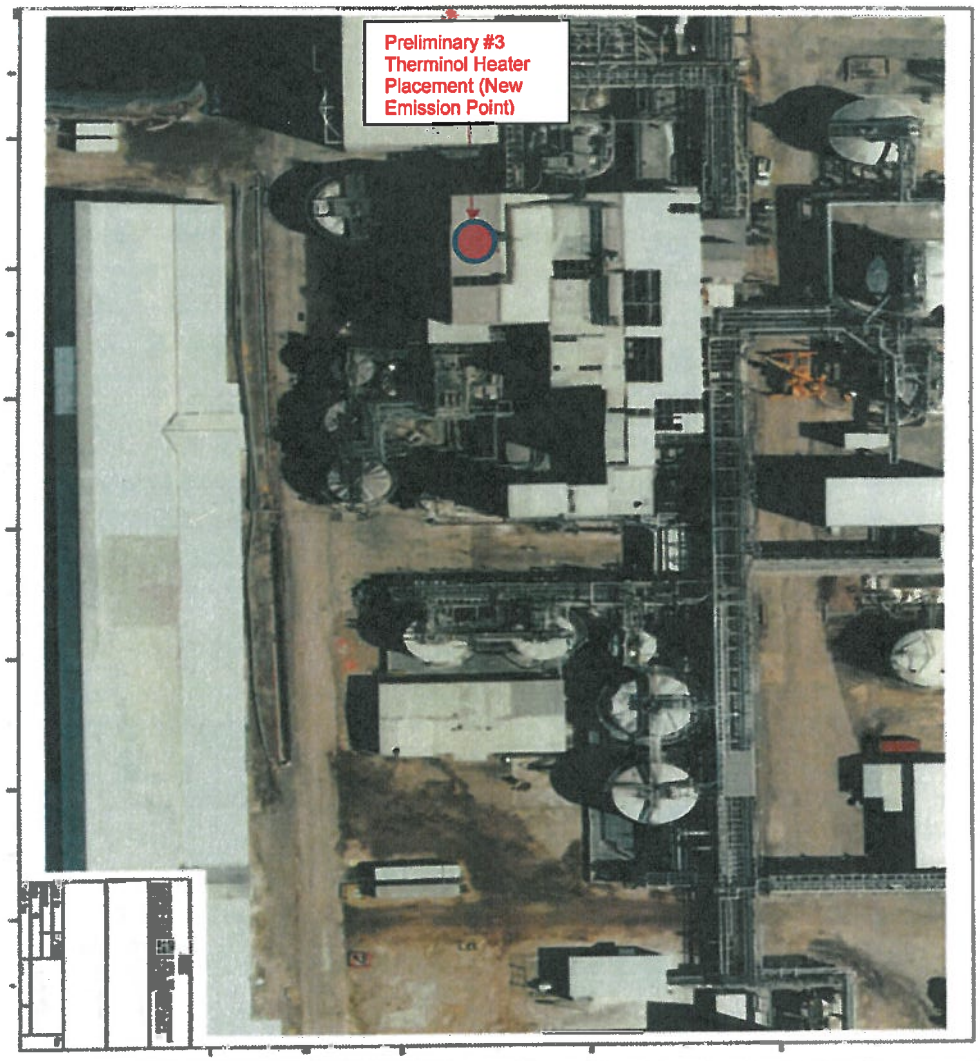
The dispersion modeling analyses will be performed using a receptor grid (refer to Figure 3) consisting of approximately 31,000 receptors, extending to approximately 14 kilometers from the plant. The maximum predicted concentrations are expected to be in the near-field, on or close to the facility fence-line, or in the elevated terrain to the east of the facility. The receptor spacing is proposed as follows (note – the grids are not of equal length in X and Y directions, i.e., the grids are rectangular rather than square):

1. 25-meter (m) spacing along the facility fence-line;
2. 25-meter (m) spacing fence-line to 500 m;
3. 50-meter (m) spacing from 500 m to approximately 5.6 km;
4. 100-m spacing from 5.6 km to approximately 8.7 km; and
5. 250-m spacing from 8.7 km to approximately 13.75 km.

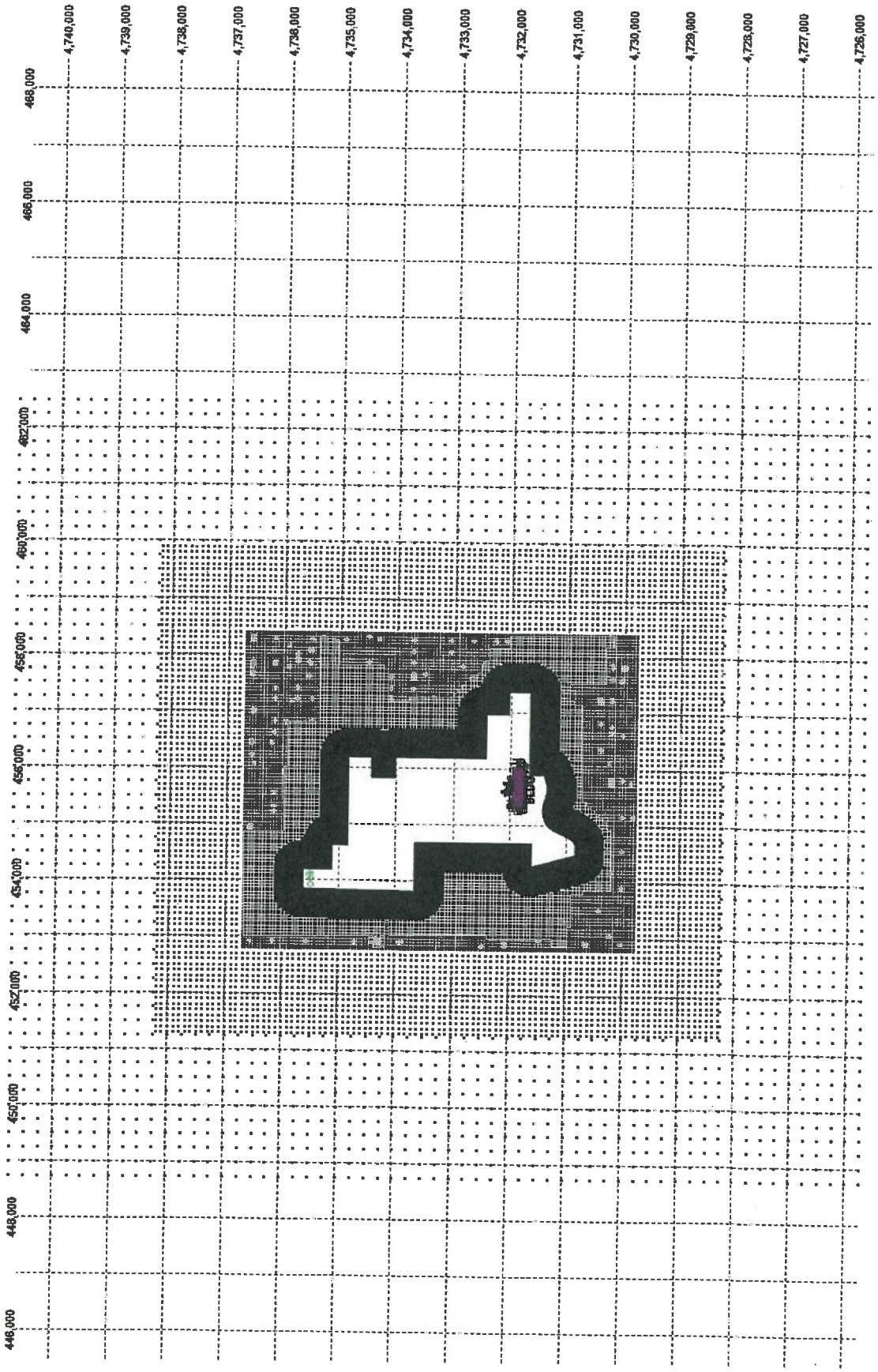
Once the maximum impact points have been identified in the above receptor grid, the maximum impacts will be refined within a grid with 10-meter spacing.

## Figure 2

## Location of Proposed #3 Therminol Heater Stack



# Figure 3
## SPA #3 Receptor Grid for Dispersion



The latest version of the AERMAP program will be used with National Elevation Data (NED) to develop terrain elevations and maximum terrain height. All coordinates will be based on the NAD83 datum. Rural dispersion will be assumed.

***Meteorological Data***

Four years of meteorological data have been processed for the facility. The surface meteorological data were collected on site from 1 January 2007 to 31 December 2010 and the upper air meteorological data were collected during the same years at the Salt Lake City International Airport. These data sets were used to create AERMOD-ready meteorological files using AERMET, the AERMOD meteorological data pre-processor, version 11059.

**Air Quality Impact Analyses**

The emissions increases from the PTC sources will be modeled with AERMOD to determine maximum predicted off-site concentrations at each receptor. The maximum concentrations for specific averaging periods predicted over four years of meteorology will be compared against the respective Significant Impact Levels (SILs) for NOx, $PM_{10}$, and/or $PM_{2.5}$. The important air quality SILs are provided in Table 4. Maximum TAP concentrations will be compared to pollutant specific AACs, as shown in Table 2.

**Table 4**
**Idaho DEQ SIL Thresholds**

| *POLLUTANT* | **AVERAGING PERIOD** | **SCL/SIL (µg/m³)** |
|---|---|---|
| NOx | Annual | 1 |
| | 1-Hour | 7.5 |
| $PM_{10}$ | Annual | 1 |
| | 24-Hour | 5 |
| $PM_{2.5}$ | Annual | 0.3 |
| | 24-Hour | 1.2 |

The modeling methodology will follow the guidance provided in *State of Idaho Guideline for Performing Air Quality Impact Analyses*. The steps defined as a "Preliminary Analysis" and the applicability to this project are:

1. If the modification is not "major", model the allowable emission increase of the proposed modification.

   **Applicability:** *This project is not a major modification, thus only the emissions increases associated with the PTC sources will be modeled for comparisons against thresholds described in item 2.*

2. Determine if the maximum impact(s) are greater than the significant impact levels (for criteria pollutants) or above AACs (for TAPs).

   **Applicability:** *Maximum hourly and annual emissions of NOx, $PM_{10}$, and/or $PM_{2.5}$ from the modification will be modeled using AERMOD and the maximum concentrations will be compared to IDEQ SILs. TAPs above respective ELs will also be modeled using AERMOD and the highest predicted 24-hour or annual concentration (depending on the TAP) will be compared against the applicable state AAC.*

3. If the criteria pollutant impacts are below all applicable SILs, then no further criteria pollutant analysis is required. If impacts are above applicable SILs, then a full impact analysis, including all emissions from the full facility for the applicable pollutant, must be modeled.

   **Applicability:** *The air quality impacts from this project are expected to be below all applicable SILs and AACs. Should the modeled impacts of criteria pollutant emission increases exceed the SILs, Agrium will submit a revised protocol for a cumulative NAAQS analysis for IDEQ's approval. For TAPs, it is expected that the impacts will be below applicable state AACs.*

4. If the predicted concentrations from a full impact analysis, when added with background (from a representative monitor) are below the applicable ambient standards (i.e., NAAQS), then the impact analysis is complete. If concentrations are predicted to exceed the NAAQS, then further design considerations may be required to result in values below the applicable standards.

   **Applicability:** *This is not anticipated to be necessary for criteria pollutants but would be addressed pursuant to the revised protocol if necessary.*

Preliminary calculations indicate that only NOx, $PM_{10}$, and $PM_{2.5}$ emission increases from the proposed project may exceed Level I thresholds, but are anticipated to be below Level II thresholds, and therefore, modeling for only NOx, $PM_{10}$, and $PM_{2.5}$ is discussed in this protocol should the IDEQ determine this modeling is required. Should emissions of other criteria pollutants also exceed their respective Level I thresholds, Agrium will follow the same criteria and methodology presented in this protocol.

The air quality impact analysis (including all model input and output files on a CD) will be summarized in a technical support document and submitted to IDEQ as an attachment to the PTC application.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
CURT FRANSEN, DIRECTOR

December 5, 2012

**VIA EMAIL**

Tom Miller
Environmental Specialist
Agrium U.S. Inc.
Soda Springs, ID 83276

RE: Conditional Modeling Protocol Approval for the Permit to Construct Modification at the Agrium Facility near Soda Springs, Idaho

Dear Mr. Miller:

DEQ received a dispersion modeling protocol from you, on behalf of Agrium U.S. Inc., (Agrium), on November 5, 2012. Additional information amending the modeling protocol was received via email on November 14, 2012 and November 28, 2012. A conference call with Agrium, ERM Consulting, and DEQ representatives was held on November 28, 2012 to discuss issues with the modeling protocol.

The modeling protocol proposes methods and data for use in Class II area ambient air impact analyses in support of a Permit to Construct application to modify Agrium's current operations for the #3 Super Phosphoric Acid plant (SPA #3). According to the protocol, a Therminol process heater will be installed as a new emissions unit. Increased utilization attributed to the SPA #3 project will cause an increase emissions from the SPA emission control scrubber, the B-5 Boiler, and the Cooling Tower, which are existing emission units and points of emissions. The Therminol heater will be the primary source of increased emissions for the project.

The modeling protocol has been reviewed and DEQ has the following comments:

- **Comment 1: Regulated Air Pollutant Modeling Demonstrations.** Modeling will not be required to demonstrate compliance with the following National Ambient Air Quality Standards (NAAQS) and Significant Impact Levels (SILs), based on the claimed changes in emissions rates and facility configuration:

  a) Carbon monoxide (CO), 1-hour average and 8-hour average,
  b) Lead, 3-month rolling average, and
  c) Sulfur dioxide ($SO_2$), 1-hour average and annual average.

  Increases in potential emissions of CO, lead, and $SO_2$ were estimated to be below DEQ's de minimis Level I modeling thresholds for this project.

d) Nitrogen dioxide ($NO_2$), 1-hour average and annual average.
e) Particulate matter with a mean diameter of 10 microns or less ($PM_{10}$), 24-hour average, and
f) Particulate matter with a mean aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), 24-hour average and annual average.

The emission increases for $PM_{10}$ and $PM_{2.5}$ and $NO_2$ for this project are greater than the Level I de minimis modeling thresholds but are below the Level II discretionary modeling thresholds. These pollutants are conditionally exempted for SIL and/or NAAQS compliance for this project. The modeling exemption is based on consideration that the increases in emission rate for these pollutants, as listed in the modeling protocol, are less than the Level II thresholds; the distance of the points of emissions are at least 100 meters from the nearest ambient air boundary; and, there are no nearby structures that are significantly taller than the Therminol Heater stack release height to cause plume downwash issues.

Ambient background concentrations have not been provided for this project because DEQ has conditionally exempted the project from modeling for all criteria air pollutants. Please contact DEQ modeling staff prior to submitting a permit to construct application if the criteria used to establish the exemptions are altered. DEQ will re-evaluate the requirements for the modeling demonstration and determine the appropriate ambient background concentrations and nearby sources to include in Agrium's analyses as needed.

Emissions of several Toxic Air Pollutants (TAPs) exceed the applicable screening emission rate limits and modeling is required for those pollutants.

- **Comment 2: Receptor Grid.** The proposed receptor grid appears to be adequate for resolving the maximum ambient impacts for this project.

- **Comment 3: Ambient Air Boundary.** Figure 3 in the November 5, 2012 modeling protocol and additional ambient air boundary diagrams emailed to DEQ on November 28, 2012, were used to illustrate Agrium's ambient air boundary for the protocol. Discussion during the November 28, 2012 conference call indicated that the ambient air boundary may include property along the external perimeter of the Agrium facility that is owned by Agrium but is leased to an outside entity. If Agrium does not control access to those parcel(s) of property by the party or parties leasing the land, then those parcels cannot be treated as exempt from ambient air and receptors must be included on that property for the modeling demonstration.

  A complete description of how the ambient air boundary was established and the methods used by Agrium to preclude public access must be included in the modeling report. The description of the methods that will be used to preclude public access to the area being claimed as exempt from ambient air must meet the requirements of DEQ's *State of Idaho Guideline for Performing Air Quality Impact Analyses (Modeling Guideline)*, dated July 2011.

- **Comment 4: DEQ Application Forms.** Please complete all modeling information application forms for this permit application package. Modeling forms include an emission inventory specifically for the modeling demonstration.

- **Comment 5: Emissions Inventory.** The permit writer will review and finalize approval of the permitting project's emissions inventory. Changes to the final emission inventory may affect modeling exemptions discussed in Comment 2 of this conditional modeling protocol approval.

- **Comment 6: Met Data Processing Report.** Provide a detailed report on the methods and assumptions used to generate the AERMOD-ready meteorological dataset from the on-site collected data. Met data collected at the Agrium site should follow Section 8.3.3 of the *Guideline on Air Quality Models*, EPA 2005, and *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, EPA 2000.

  Please submit the following: raw meteorological data files; AERMET output and intermediary files; AERSURFACE files and data used to establish land use characteristics surrounding the data collection site; and, the Quality Assurance/Quality Control plan for the meteorological data and collection equipment. Audit reports and follow-up actions to audit recommendations should be provided. Describe methods and justification for any data filling performed due to missing data.

- **Comment 7: Justification of Release Parameters.** Documentation and justification of release parameters must be provided in the application. Refer to Section 3.4.3 of the *Modeling Guideline*. In most instances, typical values should be used rather than extreme values, and should represent the conditions at the point of release to the atmosphere. Conservative assumed values may be used where supporting documentation is unavailable. Documentation can include manufacturer's specifications sheets or design documents. The application's modeling report must confirm that the plume release orientation of any point source is vertical and uninterrupted, rather than a horizontal release or impeded by a raincap or similar feature.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with resolution of the items noted above, to be approved. It should be noted, however, that the approval of the modeling protocol is not meant to imply approval of completed dispersion modeling analyses. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.idaho.gov/media/355037-modeling-guideline.pdf for further guidance.

To ensure a complete and timely review of any analyses submitted to the Idaho Department of Environmental Quality, our modeling staff requests that electronic copies of all modeling input and output files (including BPIP and AERMAP input and output files) be submitted with analyses reports. Also, please include a copy of the protocol and this approval notice with the submitted application. If you have any further questions or comments, please contact me at (208) 373-0536.

Sincerely,

*Darrin Mehr*

Darrin Mehr
Air Quality Analyst
Monitoring, Modeling, and Emission Inventories
Air Quality Stationary Source Program

## Vicki Hoffman

**From:** Darrin.Mehr@deq.idaho.gov
**Sent:** Wednesday, December 12, 2012 11:52 AM
**To:** John Koehler
**Subject:** RE: Met data for Monsanto, Soda Springs ID

Hi John,

The met dataset listed in your email appears to be fine for this project.

Thank you again for the discussion of where the SPA#3 project is headed and I look forward to working on it with you and Agrium.

Best regards,

Darrin

Darrin Mehr
Air Quality Analyst
Monitoring, Modeling & Emissions Inventory
Idaho Department of Environmental Quality
Phone: 208-373-0536
Fax: 208-373-0143
e-mail: Darrin.Mehr@deq.idaho.gov

---

**From:** John Koehler [mailto:John.Koehler@erm.com]
**Sent:** Tuesday, December 11, 2012 4:58 PM
**To:** Darrin Mehr
**Cc:** Vicki Hoffman; Snigdha Mehta; Dave Jordan; Rob Gronewold
**Subject:** FW: Met data for Monsanto, Soda Springs ID

Darrin,

I appreciate your time a few minutes ago. As we discussed, we request a change in the meteorological data to be used for the SPA#3 project at the Agrium (Nu-West) Conda plant. The data we would like to use is a five-year met data set provided to ERM for use in modeling at the Monsanto Soda Springs plant. The dataset was developed by DEQ from five years of data from Monsanto's met tower. A brief description of these data appear below the YouSendIt link containing the met dataset and DEQ's protocol approval for the Monsanto modeling (June 5, 2012).

Thanks. Let me know if you have any questions.

John

John Koehler, Sc.D.
ERM
1277 Treat Boulevard Suite 500
Walnut Creek CA 94597
925-482-3304 (direct)
925-946-0455 (main)
925-324-2805 (mobile)
www.erm.com

john.koehler@erm.com

*Please consider the environment before printing this email*

---

**From:** Daniel Guido
**Sent:** Tuesday, December 11, 2012 3:03 PM
**To:** John Koehler
**Cc:** Vicki Hoffman; Snigdha Mehta
**Subject:** RE: Met data for Monsanto, Soda Springs ID

---

Some files have been sent to you via the **YouSendIt** File Delivery Service.

Download the file - Monsanto P4 Modeling Protocol Approval 060512.pdf; Monsanto.P4.Soda.Springs.PTC.Modeling.Protocol.052212.FINAL.doc; BFB_NWS04.PFL; BFB_NWS04-08r2.PFL; BFB_NWS05.PFL; BFB_NWS06.PFL; BFB_NWS07.PFL; BFB_NWS08.PFL; BFB_NWS04.SFC; BFB_NWS04-08r2.SFC; BFB_NWS05.SFC; BFB_NWS06.SFC; BFB_NWS07.SFC; BFB_NWS08.SFC

Your files will expire after 7 days.

---

The meteorological database used in the dispersion model will consist of five years (2004 - 2008) of on-site surface observations (supplemented by nearby Pocatello, Idaho surface data) and coincident upper air observations from the Boise Air Terminal, Idaho National Weather Service site. This data has been provided by DEQ, processed with AERMET version 06341.

Dan Guido
Senior Project Manager
Manager, Wisconsin Operations
ERM
59 Park Place, Suite 200
Appleton, WI 54914
(Direct Dial) 920.749.8920
(Main Office Tel) 920.749.8935
(Main Office Fax) 920.749.8936
(Cell) 920.540.1254
(email) daniel.guido@erm.com

---

This message contains information which may be confidential, proprietary, privileged, or otherwise protected by law from disclosure or use by a third party. If you have received this message in error, please contact us immediately at (925) 946-0455 and take the steps necessary to delete the message completely from your computer system. Thank you.

Please visit ERM's web site: http://www.erm.com

*Attachment 2*
*Modeling Files (on CD)*

*Attachment 3*
*Idaho DEQ Modeling Forms*

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline - 1-877-5PERMIT**

# PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

*Please see instructions on page 2 before filling out the form.*

| | |
|---|---|
| Company Name: | Nu-West Industries, Inc. |
| Facility Name: | Nu-West Conda Phosphate Operations |
| Facility ID No.: | 029-00003 |
| Brief Project Description: | Install new #3 super phosphoric acid (SPA) evaporation system. |

## SUMMARY OF AIR IMPACT ANALYSIS RESULTS - CRITERIA POLLUTANTS

| | | 1. | | 2. | 3. | 4. | | 5. |
|---|---|---|---|---|---|---|---|---|
| **Criteria Pollutants** | **Averaging Period** | **Significant Impact Analysis Results (µg/m3)** | **Significant Contribution Level (µg/m3)** | **Full Impact Analysis Results (µg/m3)** | **Background Concentration (µg/m3)** | **Total Ambient Impact (µg/m3)** | **NAAQS (µg/m3)** | **Percent of NAAQS** |
| $PM_{10}$ | 24-hour | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 5 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 150 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| | Annual | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 1 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 50 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| $SO_2$ | 3-hr | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 25 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 1300 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| | 24-hr | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 5 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 365 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| | Annual | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 1 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 80 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| $NO_2$ | Annual | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 1 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 100 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| CO | 1-hr | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 2000 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 10000 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |
| | 8-hr | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 500 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 | 40000 | Exempt per DEQ email Letter to Tom Miller 12-05-2012 |

## Instructions for Form MI1

This form is designed to provide the air quality modeler with a summary of the air impact analysis results for the criteria pollutants. This information will be used by IDEQ to determine compliance demonstration with the national ambient air quality standards (NAAQS).

Please fill in the same company name, facility name, facility ID number, and brief project description as on Form CS in the boxes provided. This is useful in case any pages of the application get separated.

**Significant Impact Analysis** - Evaluates the emissions increase from the proposed project only. This analysis determines whether or not a proposed project has a significant impact on ambient air, and therefore, requires a full impact analysis.

**Full Impact Analysis** - Only required if the significant impact analysis exceeds the significant contribution level - evaluates the emissions from the facility, including the emissions increase from the proposed project. This analysis determines whether the facility, with the emissions increase, complies with the NAAQS.

1. Provide the results of the significant impact analysis in $\mu g/m^3$.
2. Provide the results of the full impact analysis in $\mu g/m^3$ (if required).
3. List the background concentration in mg/m3. Contact the Stationary Source Modeling Coordinator at (208) 373-0502 for the current background concentrations for the area of interest. (Not needed if full impact analysis is not required.)
4. Provide the total ambient impact in mg/m3. The total ambient impact is the sum of the background concentration and the full impact analysis result.
5. Calculate the percent of the NAAQS that the total ambient impact analysis represents.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline - 1-877-5PERMIT**

**PERMIT TO CONSTRUCT APPLICATION**
Revision 3
3/27/2007

*Please see instructions on page 2 before filling out the form.*

| | |
|---|---|
| Company Name: | Nu-West Industries, Inc. |
| Facility Name: | Nu-West Conda Phosphate Operations |
| Facility ID No.: | 029-00003 |
| Brief Project Description: | Install new #3 super phosphoric acid (SPA) evaporation system. |

**POINT SOURCE STACK PARAMETERS**

| 1. | 2. | 3a. | 3b. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| **Emissions units** | **Stack ID** | **UTM Easting (m)** | **UTM Northing (m)** | **Base Elevation (m)** | **Stack Height (m)** | **Modeled Diameter (m)** | **Stack Exit Temperature (K)** | **Stack Exit Flowrate (acfm)** | **Stack Exit Velocity (m/s)** | **Stack orientation (e.g., horizontal, rain cap)** |
| **Point Source(s)** | | | | | | | | | | |
| SPA #3 25.5 MMBtu/hr Heater | SPA3_HTR | 455,627.12 | 4,732,086.68 | 1,877.32 | 31.9522 | 0.7620 | 566.48 | 9,480.00 | 9.81 | Default (Vertical, unobstructed) |
| B-5 Nebraska Boiler | NEB_BLR | 455,755.95 | 4,732,070.90 | 1,878.11 | 15.8496 | 1.6154 | 427.04 | 33,000.00 | 7.60 | Default (Vertical, unobstructed) |

## Instructions for Form MI2

This form is designed to provide the air quality modeler with information on the stack characteristics of each point source located at the facility. This information may be used by the IDEQ to perform an air quality analysis or to review an air quality analysis submitted with the permit application or requested by the IDEQ.

Please fill in the same company name, facility name, facility ID number, and brief project description as on Form CS in the boxes provided. This is useful in case any pages of the application get separated.

1. Provide the name of the emission unit. This name should match names on other submittals to IDEQ and within this application.
2. Provide the identification number for the stack which the emission unit exits.
3. Provide the UTM locations for each point source. The UTM Easting and UTM Northing are the coordinates for the center of the point source.
4. Provide the elevation of the base of the stack. This elevation must be calculated by the same method as the buildings and receptor elevation.
5. Provide the height of the stack, from the ground.
6. Provide the stack diameter that is included in the modeling analysis. Refer to the State of Idaho Modeling Guideline for guidance on developing the appropriate diameter.
7. Provide the stack exit temperature. Include documentation and justification for the exit temperature used.
8. Provide the stack exit flowrate. Include documentation and justification for the exit flowrate used.
9. Provide the stack exit velocity. Include documentation and justification for the exit velocity used.
10. Provide the orientation of the stack (horizontal or vertical). Indicate whether there is an obstruction on the stack, such as a raincap.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline - 1-877-5PERMIT**

**PERMIT TO CONSTRUCT APPLICATION**
Revision 3
4/5/2007

*Please see instructions on page 2 before filling out the form.*

| | |
|---|---|
| Company Name: | Nu-West Industries, Inc. |
| Facility Name: | Nu-West Conda Phosphate Operations |
| Facility ID No.: | 029-00003 |
| Brief Project Description: | Install new #3 super phosphoric acid (SPA) evaporation system. |

**FUGITIVE SOURCE PARAMETERS**

| 1. | 2. | 3a. | 3b. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| **Emissions units** | **Stack ID** | **UTM Easting (m)** | **UTM Northing (m)** | **Base Elevation (m)** | **Release Height (m)** | **Easterly Length (m)** | **Northerly Length (m)** | **Angle from North ( ° )** | **Initial Vertical Dimension (m)** | **Initial Horizontal Dimension (m)** |
| Area Source(s) | | | | | | | | | | |
| None | Not Applicable | | | | | | | | | |
| Volume Source(s) | | | | | | | | | | |
| None | Not Applicable | | | | | | | | | |

## Instructions for Form MI3

This form is designed to provide the air quality modeler with information on the characteristics of each fugitive source located at the facility. This information may be used by the IDEQ to perform an air quality analysis or to review an air quality analysis submitted with the permit application or requested by the IDEQ.

**Please fill in the same company name, facility name, facility ID number, and brief project description as on Form CS in the boxes provided. This is useful in case any pages of the application get separated.**

Fugitive sources are typically modeled as either area or volume sources. Area sources are used to model fugitives from sources such as roads or parking lots, while volume sources are typically used to model fugitives from piles. Refer to the State of Idaho Air Quality Modeling Guideline for additional guidance on modeling fugitive sources.

1. Provide the name of the fugitive source. This name should match names used on other submittals to IDEQ and within this application.
2. Provide the identification number for the fugitive source.
3. Provide the UTM locations of the fugitive source. The UTM Easting and UTM Northing are the coordinates for the center of the fugitive source.
4. Provide the elevation of the base of the fugitive source. This elevation must be calculated by the same method as the buildings and receptor elevation.
5. Provide the height of the fugitive source, from the ground. This is used for an elevated release. If the fugitive source is at ground level enter zero.
6. Provide the easterly length of the fugitive source.
7. Provide the northly length of the fugitive source.
8. Provide the angle from north, in degrees. This allows for accurate evaluation of the alignment of the fugitive source.
9. Provide the initial vertical dimension of the fugitive source. Refer to the State of Idaho Modeling Guideline for guidance on estimating this value.
10. Provide the initial horizontal dimension of the fugitive source. This parameter is only used for volume sources. Refer to the State of Idaho Modeling Guideline for guidance on estimating this value.

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
**Air Permit Hotline - 1-877-5PERMIT**

# PERMIT TO CONSTRUCT APPLICATION

Revision 3
4/5/2007

*Please see instructions on page 2 before filling out the form.*

| | |
|---|---|
| Company Name: | Nu-West Industries, Inc. |
| Facility Name: | Nu-West Conda Phosphate Operations |
| Facility ID No.: | 029-00003 |
| Brief Project Description: | Install new #3 super phosphoric acid (SPA) evaporation system. |

## BUILDING AND STRUCTURE INFORMATION

| 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|
| **Building ID Number** | **Length (ft)** | **Width (ft)** | **Base Elevation (m)** | **Building Height (m)** | **Number of Tiers** | **Description/Comments** |
| See attached table for buildings and structure details | | | | | | |

## Instructions for Form MI4

This form is designed to provide the air quality modeler with information on the buildings and structures located at the facility. This information may be used by the IDEQ to perform an air quality analysis or to review an air quality analysis submitted with the permit application or requested by the IDEQ.

Please fill in the same company name, facility name, facility ID number, and brief project description in the boxes provided. This is useful in case any pages of the application get separated.

1. Provide the building ID number.
2. Provide the length of the building.
3. Provide the width of the building.
4. Provide the base elevation of the building. This elevation must be calculated by the same method as the sources and receptor elevation.
5. Provide the height of the building, from the ground.
6. Provide the number of tiers on the building. Refer to the State of Idaho Modeling Guideline for guidance on this topic.
7. Provide a description of the building.

**ERM has over 140 offices across the following countries worldwide**

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Hong Kong
Hungary
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Korea
Malaysia
Mexico
The Netherlands
New Zealand
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Singapore
South Africa
Spain
Sweden
Taiwan
Thailand
UK
United Arab Emirates
USA
Venezuela
Vietnam

**ERM's Walnut Creek Office**

1277 Treat Boulevard
Suite 500
Walnut Creek, California 94597
T: 925.946.0455
F: 925.946.9968

www.erm.com



ERM

**IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY**

1410 North Hilton
Boise, Idaho 83706-1253

**RECEIPT**

01/08/13
DATE

RECEIVED FROM Agrium

SOURCE
Cash ☐ Check ☒ Money Order ☐ No. 10151

| DESCRIPTION | AMOUNT OF PAYMENT |
|---|---|
| PTC | 1000.00 |
| Facility 02900003 | |

RECEIVED BY

**TOTAL RECEIVED**

| PID | OBS | CA | SUB-OBJ | WP | BE |
|---|---|---|---|---|---|
| | | | | | |

№ 83428

**Nu-West Conda Phosphate Operations**
**Permit Section 6: Superphosphoric Acid Process**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 131.528 | 62 |
| | Specific Gravity | none | *none* | 1.8118 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 119,247 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,431 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 59.21 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 70,608 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 847 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 35.3 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 309,264 | 122,759 |
| 6.4 | SPA Oxidation $NO_x$ emissions | ppm | *none* | 23.0 | 9.130 |
| 6.4 | SPA Oxidation $NO_x$ emissions* | lb/hr | *none* | 0.137 | 0.054 |
| 6.4 | SPA Oxidation $NO_x$ emissions | tons/12 consecutive months | 5 | 0.60 | 0.24 |
| | SPA Oxidation CO emissions | ppm | *none* | 600.4 | 238.3 |
| | SPA Oxidation CO emissions* | lb/hr | *none* | 2.175 | 0.863 |

* Calculated with formula from Source Test Report (12-4-2008, NOx and CO Performance Tests Conducted on the $HNO_3$ Oxidizer Exhaust

Increased NOx and CO from SPA scrubber due to the addition of SPA#3 calculated from NOx and CO emission measurements from 2008 source test, prorating to maximum P2O5 capacity of SPA#3 assuming average P2O5 feed rate from other 2007, 2009, 2010, 2011, and 2012 source tests (as corresponding feed rate during the source test was not available).

**Burner TAC Emissions**

| | SPA #3 |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 1.01 |
| Steam Capacity (lb/hr) | 824 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |

| CAS Number | Pollutant | Emission Factor[1] | | SPA #3 Emissions | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|
| | | Emissin Factor (lb/MMscf) | Emissin Factor (lb/MMBtu) | Hourly (lb/hr) | Annual (lb/year) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 2.40E-05 | 2.35E-08 | 2.37E-08 | 2.07E-04 | — | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 1.60E-05 | 1.57E-08 | 1.58E-08 | 1.38E-04 | — | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 2.40E-06 | 2.35E-09 | 2.37E-09 | 2.07E-05 | — | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 71-43-2 | Benzene | 2.10E-03 | 2.06E-06 | 2.07E-06 | 1.82E-02 | — | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 1.20E-06 | 1.18E-09 | 1.18E-09 | 1.04E-05 | — | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 1.20E-03 | 1.18E-06 | 1.18E-06 | 1.04E-02 | — | — | No |
| 206-44-0 | Fluoranthene[2] | 3.00E-06 | 2.94E-09 | 2.96E-09 | 2.59E-05 | — | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 2.80E-06 | 2.75E-09 | 2.76E-09 | 2.42E-05 | — | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 7.50E-02 | 7.35E-05 | 7.40E-05 | 6.48E-01 | — | 5.10E-04 | No |
| 110-54-3 | n-Hexane | 1.80E+00 | 1.76E-03 | 1.78E-03 | 1.56E+01 | 12 | — | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 1.80E-06 | 1.76E-09 | 1.78E-09 | 1.56E-05 | — | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 6.10E-04 | 5.98E-07 | 6.02E-07 | 5.27E-03 | 3.33 | — | No |
| 85-01-8 | Phenanathrene[2] | 1.70E-05 | 1.67E-08 | 1.68E-08 | 1.47E-04 | — | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 5.00E-06 | 4.90E-09 | 4.93E-09 | 4.32E-05 | — | 9.10E-05 | No |
| 108-88-3 | Toluene | 3.40E-03 | 3.33E-06 | 3.36E-06 | 2.94E-02 | 25 | — | No |
| 7440-38-2 | Arsenic | 2.00E-04 | 1.96E-07 | 1.97E-07 | 1.73E-03 | — | 1.50E-06 | No |
| 7440-39-3 | Barium | 4.40E-03 | 4.31E-06 | 4.34E-06 | 3.80E-02 | 0.033 | — | No |
| 7440-41-7 | Beryllium | 1.20E-05 | 1.18E-08 | 1.18E-08 | 1.04E-04 | — | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 1.10E-03 | 1.08E-06 | 1.09E-06 | 9.51E-03 | — | 3.70E-06 | No |
| 7440-47-3 | Chromium | 1.40E-03 | 1.37E-06 | 1.38E-06 | 1.21E-02 | 0.033 | — | No |
| 7440-48-4 | Cobalt | 8.40E-05 | 8.24E-08 | 8.29E-08 | 7.26E-04 | 0.0033 | — | No |
| 7440-50-8 | Copper | 8.50E-04 | 8.33E-07 | 8.39E-07 | 7.35E-03 | 0.013 | — | No |
| 7439-96-5 | Manganese | 3.80E-04 | 3.73E-07 | 3.75E-07 | 3.29E-03 | 0.067 | — | No |
| 7439-97-6 | Mercury | 2.60E-04 | 2.55E-07 | 2.57E-07 | 2.25E-03 | — | — | No |
| 7439-98-7 | Molybdenum | 1.10E-03 | 1.08E-06 | 1.09E-06 | 9.51E-03 | 0.333 | — | No |
| 7440-02-0 | Nickel | 2.10E-03 | 2.06E-06 | 2.07E-06 | 1.82E-02 | — | 2.70E-05 | No |
| 7782-49-2 | Selenium | 2.40E-05 | 2.35E-08 | 2.37E-08 | 2.07E-04 | 0.013 | — | No |
| 7440-62-2 | Vanadium | 2.30E-03 | 2.25E-06 | 2.27E-06 | 1.99E-02 | 0.003 | — | No |
| 7440-66-6 | Zinc | 2.90E-02 | 2.84E-05 | 2.86E-05 | 2.51E-01 | 0.667 | — | No |
| | Lead | 5.00E-04 | 4.90E-07 | 4.93E-07 | 4.32E-03 | | | |
| NA | PAH - B(a)P Equivalent | — | | 1.13E-08 | 9.86E-05 | — | 2.00E-06 | No |

1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4
2. Polycyclic Organic Matter (POM)
3. POM as Polyaromatic Hydrocarbons (PAH)

New Therminol Heater Burner TAC Emissions

| | |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 25.55 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |

| CAS Number | Pollutant | Emission Factor[1] | | Emissions | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|
| | | Emissin Factor (lb/MMscf) | Emissin Factor (lb/MMBtu) | Hourly (lb/hr) | Annual (lb/year) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 2.40E-05 | 2.35E-08 | 6.01E-07 | 5.27E-03 | --- | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 1.60E-05 | 1.57E-08 | 4.01E-07 | 3.51E-03 | --- | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 2.40E-06 | 2.35E-09 | 6.01E-08 | 5.27E-04 | --- | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 71-43-2 | Benzene | 2.10E-03 | 2.06E-06 | 5.26E-05 | 4.61E-01 | --- | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 1.20E-06 | 1.18E-09 | 3.01E-08 | 2.63E-04 | --- | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 1.20E-03 | 1.18E-06 | 3.01E-05 | 2.63E-01 | --- | --- | No |
| 206-44-0 | Fluoranthene[2] | 3.00E-06 | 2.94E-09 | 7.51E-08 | 6.58E-04 | --- | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 2.80E-06 | 2.75E-09 | 7.01E-08 | 6.14E-04 | --- | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 7.50E-02 | 7.35E-05 | 1.88E-03 | 1.65E+01 | --- | 5.10E-04 | Yes |
| 110-54-3 | n-Hexane | 1.80E+00 | 1.76E-03 | 4.51E-02 | 3.95E+02 | 12 | --- | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 1.80E-06 | 1.76E-09 | 4.51E-08 | 3.95E-04 | --- | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 6.10E-04 | 5.98E-07 | 1.53E-05 | 1.34E-01 | 3.33 | --- | No |
| 85-01-8 | Phenanathrene[2] | 1.70E-05 | 1.67E-08 | 4.26E-07 | 3.73E-03 | --- | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 5.00E-06 | 4.90E-09 | 1.25E-07 | 1.10E-03 | --- | 9.10E-05 | No |
| 108-88-3 | Toluene | 3.40E-03 | 3.33E-06 | 8.52E-05 | 7.46E-01 | 25 | --- | No |
| 7440-38-2 | Arsenic | 2.00E-04 | 1.96E-07 | 5.01E-06 | 4.39E-02 | --- | 1.50E-06 | Yes |
| 7440-39-3 | Barium | 4.40E-03 | 4.31E-06 | 1.10E-04 | 9.65E-01 | 0.033 | --- | No |
| 7440-41-7 | Beryllium | 1.20E-05 | 1.18E-08 | 3.01E-07 | 2.63E-03 | --- | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 1.10E-03 | 1.08E-06 | 2.76E-05 | 2.41E-01 | --- | 3.70E-06 | Yes |
| 7440-47-3 | Chromium | 1.40E-03 | 1.37E-06 | 3.51E-05 | 3.07E-01 | 0.033 | --- | No |
| 7440-48-4 | Cobalt | 8.40E-05 | 8.24E-08 | 2.10E-06 | 1.84E-02 | 0.0033 | --- | No |
| 7440-50-8 | Copper | 8.50E-04 | 8.33E-07 | 2.13E-05 | 1.87E-01 | 0.013 | --- | No |
| 7439-96-5 | Manganese | 3.80E-04 | 3.73E-07 | 9.52E-06 | 8.34E-02 | 0.067 | --- | No |
| 7439-97-6 | Mercury | 2.60E-04 | 2.55E-07 | 6.51E-06 | 5.71E-02 | --- | --- | No |
| 7439-98-7 | Molybdenum | 1.10E-03 | 1.08E-06 | 2.76E-05 | 2.41E-01 | 0.333 | --- | No |
| 7440-02-0 | Nickel | 2.10E-03 | 2.06E-06 | 5.26E-05 | 4.61E-01 | --- | 2.70E-05 | Yes |
| 7782-49-2 | Selenium | 2.40E-05 | 2.35E-08 | 6.01E-07 | 5.27E-03 | 0.013 | --- | No |
| 7440-62-2 | Vanadium | 2.30E-03 | 2.25E-06 | 5.76E-05 | 5.05E-01 | 0.003 | --- | No |
| 7440-66-6 | Zinc | 2.90E-02 | 2.84E-05 | 7.26E-04 | 6.36E+00 | 0.667 | --- | No |
| NA | PAH - B(a)P Equivalent | --- | | 2.86E-07 | 2.50E-03 | --- | 2.00E-06 | No |

1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4
2. Polycyclic Organic Matter (POM)
3. POM as Polyaromatic Hydrocarbons (PAH)

**B-5 Nebraska Boiler Criteria Pollutant Emissions**

| | SPA #1 and 2 | SPA #3 | |
|---|---|---|---|
| Fuel | Natural Gas (NG) | Natural Gas (NG) | |
| High Heating Value of NG (btu/scf) | 1020 | 1020 | |
| Heat Input Rating (Mmbtu/hr) | 213.8 | 1.01 | <-incremental |
| Steam Capacity (lb/hr) | 175000 | 824 | |
| Burner Type | Controlled - Low NOx burners | | |

July 1-Sept 30, 2012 Plant Data:
Average Steam Rate: 100.8

124.2 <-- Avg + incremental

| Pollutants | Permitted SPA #1 and 2 Emissions (Permit Condition 5.2) | | Emissions Increase Due to SPA #3 | |
|---|---|---|---|---|
| | Hourly (lb/hr) | Annual (tons/yr) | Hourly (lb/hr) | Annual (tons/yr) |
| NOx | 16.84 | 70.71 | 0.079 | 0.333 |
| CO | 8.42 | 35.40 | 0.040 | 0.167 |
| $SO_2$ | 0.13 | 0.53 | 0.001 | 0.002 |
| PM10 | 1.05 | 4.42 | 0.005 | 0.021 |
| VOC | 0.36 | 1.50 | 0.002 | 0.007 |

Note:
Incremental emissions due to increased steam usage by SPA #3 were estimated by prorating the permitted B-5 boiler emissions in proportion to the steam requirements.

Stack gas flow rate

| | | |
|---|---|---|
| F-Factor (dscf/MMBtu) | 8710 | |
| % Oxygen in stack exhaust | 0 | |
| Heat input rate (MMBtu/hr) | 124.16 | |
| Stack gas flow rate (dscfm) at STP (68 °F and 1 atm) | 18023.24 | |
| Actual temperature (°F) | 309.4 | (Measurement average between July 1-September 30, 2012) |
| Actual pressure (atm) | 0.797 | (standard atmospheric pressure at 6150 ft elevation) |
| Stack gas flow rate (acfm) at actual temperature and pressure | 32959 | |

**PPA Cooling Tower PM**

| Parameter | Units | Value | Data Source |
|---|---|---|---|
| **Water Circulation Rate** | gpm | 1,200 | Additional load due to SPA #3 |
| **Total Liquid Drift** | (%) | 0.00283% | Drift emissions test conducted on 10/15/2010 |
| **Maximum TDS of Circulated Water** | (ppmw) | 2,200 | Previous Tier I permit calculations |
| **Annual Operating hours** | hours/year | 8,760 | |
| **Mass Fraction of PM2.5 In PM10** | Unitless | 0.60 | SCAQMD, Appendix A - Updated CEIDARS Table with PM2.5 Fractions, Final Methodology to Calculate PM2.5 and PM2.5 Significance Thresholds (October 2006) |
| **Emission Rate** | | | |
| **PM** | lb/hr | 0.04 | |
| | ton/yr | 0.16 | |
| **PM10[1]** | lb/hr | 0.04 | |
| | ton/yr | 0.16 | |
| **PM2.5[2]** | lb/hr | 0.02 | |
| | ton/yr | 0.10 | |

**NOTES:**

1. PM10 Emission Rate = based on USEPA AP-42, Section 13.4 Wet Cooling Towers, Table 13.4-1, modified to design

   Rates calculated as follows:

   E lb/hr = Water Circulation Rate gpm * 60 min/hr * Drift % * 8.3453 lb/gal * TDS lb PM / 1,000,000 lb water

   E ton/yr = E lb/hr * 8,760 hr/yr * ton/2,000 lb

2 PM2.5 emission rate = PM2.5 mass fraction in PM10 x PM10 emission rate

**New Therminol Heater Burner Criteria Pollutant and GHG Emissions**

| | |
|---|---|
| Fuel | Natural Gas (NG) |
| High Heating Value of NG (btu/scf) | 1020 |
| Heat Input Rating (Mmbtu/hr) | 25.55 |
| Operating Time (hours/year) | 8760 |
| Operating Time (hours/day) | 24 |
| Load Factor | 1 |
| Burner Type | Controlled - Low NOx burners |

| Pollutants | Emission Factor | | Emissions | | |
|---|---|---|---|---|---|
| | lb/MMscf | lb/MMbtu | Hourly (lb/hr) | Daily (lb/day) | Annual (tons/yr) |
| NOx[1] | 50 | 0.0490 | 1.25 | 30.06 | 5.49 |
| CO[1] | 84 | 0.0824 | 2.10 | 50.50 | 9.22 |
| $SO_2$[2] | 0.6 | 0.0006 | 0.02 | 0.36 | 0.07 |
| PM10 | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| PM2.5 | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| Lead[2] | 0.0005 | 0.0000 | 0.00 | 0.00 | 0.00 |
| VOC | 5.5 | 0.0054 | 0.14 | 3.31 | 0.60 |
| TOC[2] | 11 | 0.0108 | 0.28 | 6.61 | 1.21 |
| $CO_2$[2] | 120,000 | 118 | 3005.88 | 72141.18 | 13165.76 |
| $CH_4$[2] | 2.3 | 0.0023 | 0.06 | 1.38 | 0.25 |
| $N_2O$[2] | 0.64 | 0.0006 | 0.02 | 0.38 | 0.07 |
| $CO_2e$[3] | | | 3012.06 | 72289.49 | 13192.83 |
| PM (total)[2] | 7.6 | 0.0075 | 0.19 | 4.57 | 0.83 |
| PM (condensable)[2] | 5.7 | 0.0056 | 0.14 | 3.43 | 0.63 |
| PM (filterable)[2] | 1.9 | 0.0019 | 0.05 | 1.14 | 0.21 |

Note:
1. NOx and CO emission factors from AP-42, Chapter 1.4, Table 1.4-1
2. Emission factors obtained from AP-42, Chapter 1.4, Table 1.4-2
3. $CO_2e$ Emissions = $CO_2$ Emissions + $CH_4$ Emission x GWP (21) + $N_2O$ Emissions x GWP (310)

| Small Burner Type (<100 MMBtu/hr) | NOx Emission Factor (lb/MMscf) | CO Emission Factor (lb/MMScf) | $N_2O$ Emission Factor (lb/MMscf) |
|---|---|---|---|
| Uncontrolled | 100 | 84 | 2.2 |
| Controlled - Low NOx burners | 50 | 84 | 0.64 |
| Controlled - Low NOx burners/Flue gas recirculation | 32 | 84 | 0.64 |

**Nu-West Conda Phosphate Operations**

**Superphosphoric Acid Process Line Fluoride Emissions Based on Stack Test Data Proration**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 126.4 | 62 |
| | Specific Gravity | none | *none* | 1.8 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 113,851 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,366 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 59.11 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 67,297 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 808 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 34 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 294,762 | 122,759 |
| | SPA Process Fluoride emissions* | lb F/hr | *none* | 0.181 | 0.075 |
| 6.2 | SPA Process Fluoride emissions | lb F/ton equivalent $P_2O_5$ feed | 0.00870 | 0.00538 | 0.00538 |
| | 68-70% $P_2O_5$ SPA Product | tons/day | *none* | --- | 487 |
| | 68-70% $P_2O_5$ SPA Product | lb/hr | *none* | --- | 40,619 |
| 6.6 | SPA Scrubber Flow | gpm | 559 maximum | 510.17 | |
| 6.6 | SPA Scrubber Pressure Drop | in. $H_2O$ | 6.38 maximum | 5.43 | |

* Increase proportional to feed Ems for SPA3 = Stack Ems for SPA1&2 x Eq. SPA3 Feed / Ini Eq. SPA 1&2 Feed

**Superphosphoric Acid Process Line Fluoride Emissions Based on Permit Limit**

| Permit Section | | Units | Value |
|---|---|---|---|
| 6.2 | SPA Process Fluoride Emissions Permit Limit | lb F/ton equivalent $P_2O_5$ feed | 0.00870 |
| | Post-Project SPA #1 & 2 Equivalent $P_2O_5$ Feed | tons/hr | 28 |
| | Post-Project SPA #3 Equivalent $P_2O_5$ Feed | tons/hr | 14 |
| | Post-Project Fluoride emissions from SPA #1 and 2 | lb F/hr | 0.24 |
| | Post-project Fluoride emissions from SPA #3 | lb F/hr | 0.12 |
| | Total Post-Project Fluoride Emissions from SPA process Line | tpy | 1.6 |

**Nu-West Conda Phosphate Operations**

**Permit Section 6: Superphosphoric Acid Process Stack Test Data**

| Permit Section | | Units | SPA Stack Actual 2012 | SPA Stack Actual 2011 | SPA Stack Actual 2010 | SPA Stack Actual 2009 | SPA Stack Actual 2008 | SPA Stack Actual 2007 |
|---|---|---|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | 126.4 | 133.4 | 130.4 | 138.14 | | 129.3 |
| | Specific Gravity | | 1.8 | 1.816 | 1.839 | 1.8 | | 1.804 |
| | Equivalent $P_2O_5$ Feed | wt% | 59.11 | 59.41 | 59.73 | 59.11 | | 58.70 |
| | Equivalent $P_2O_5$ Feed | tons/hr | 33.6 | 36.0 | 35.8 | 36.9 | | 34.3 |
| 6.6 | SPA Scrubber Flow | gpm | 510.17 | 506.00 | 452.00 | 465.77 | | |
| 6.6 | SPA Scrubber Pressure Drop | in. $H_2O$ | 5.43 | 5.09 | 4.97 | 5.32 | | |
| 6.2 | SPA Process Fluoride emissions | lb F/hr | 0.181 | 0.024 | 0.019 | 0.154 | | 0.113 |
| 6.2 | SPA Process Fluoride emissions | lb F/ton equivalent $P_2O_5$ feed | 5.38E-03 | 6.67E-04 | 5.20E-04 | 4.19E-03 | | 3.29E-03 |
| | SPA Process PM emissions | lb PM/hr | | | | 0.25 | | 0.28 |
| | SPA Process CPM ($PM_{2.5}$) emissions | lb CPM ($PM_{2.5}$)/hr | | | | 0.09 | | 0.09 |
| | SPA Process $PM_{10}$ emissions | lb PM10/hr | | | | 0.34 | | 0.37 |
| 6.4 | SPA Oxidation $NO_x$ emissions | lb/hr | | | | | 0.137 | |
| | SPA Oxidation CO emissions | lb/hr | | | | | 2.175 | |

**Nu-West Conda Phosphate Operations**

**Superphosphoric Acid Process Line PM10 and PM2.5 Emissions Based on Stack Test Data Proration**

| Permit Section | | Units | Permit Limit | Existing SPA (from stack tests resulting in maximum emissions) | Additional #3 SPA Estimated |
|---|---|---|---|---|---|
| | 50-58% $P_2O_5$ Acid Feed | gpm | *none* | 129.3 | 62 |
| | Specific Gravity | none | *none* | 1.804 | 1.71 |
| | 50-58% $P_2O_5$ Acid Feed | lb/hr | *none* | 116,722 | 52,881 |
| | 50-58% $P_2O_5$ Acid Feed | tons/day | *none* | 1,401 | 635 |
| | Equivalent $P_2O_5$ Feed | wt% | *none* | 58.70 | 53.00 |
| | Equivalent $P_2O_5$ Feed | lb/hr | *none* | 68,516 | 28,027 |
| | Equivalent $P_2O_5$ Feed | tons/day | *none* | 822 | 336 |
| | Equivalent $P_2O_5$ Feed | tons/hr | *none* | 34.3 | 14 |
| | Equivalent $P_2O_5$ Feed | tons/year | *560000* | 300,099 | 122,759 |
| | SPA Process PM10 emissions* | lb PM10/hr | *none* | 0.370 | 0.151 |
| | SPA Process CPM ($PM_{2.5}$) emissions | lb CPM ($PM_{2.5}$)/hr | *none* | 0.090 | 0.037 |
| | SPA Process CPM ($PM_{2.5}$) emissions | ton CPM ($PM_{2.5}$)/yr | *none* | 0.394 | 0.161 |

* Increased PM10 and PM2.5 from SPA scrubber from the addition of SPA#3 calculated from higher result of past two source tests (2007 and 2009), prorating to maximum P2O5 capacity of SPA#3.

Increase proportional to feed Ems for SPA3 = Stack Ems for SPA1&2 x Eq. SPA3 Feed / Ini Eq. SPA 1&2 Feed

P2O5 Feed

| | Units | Estimated SPA #3 Feed |
|---|---|---|
| SPA #3 $P_2O_5$ Acid Feed | gpm | 62 |
| Specific Gravity of SPA #3 $P_2O_5$ Acid Feed | none | 1.71 |
| SPA #3 $P_2O_5$ Acid Feed | lb/hr | 52,881 |
| SPA #3 $P_2O_5$ Acid Feed | tons/day | 635 |
| Equivalent $P_2O_5$ Feed | wt% | 53.00 |
| Equivalent $P_2O_5$ Feed | lb/hr | 28,027 |
| Equivalent $P_2O_5$ Feed | tons/day | 336 |
| Equivalent $P_2O_5$ Feed | tons/hr | 14 |
| Equivalent $P_2O_5$ Feed | tons/year | 122,759 |

Let:

Ini SPA 1&2 = Initial pre-project feed into SPA #1 and 2)

Red SPA 1&2 = Reduction in Feed to SPA #1 & 2 due to the project

SPA = overall feed post-project into all three SPA trains

SPA3 = Feed to SPA #3

| | | Equivalent $P_2O_5$ Daily Feed (tons/day) | Equivalent $P_2O_5$ Annual Feed (tons/year) | Equivalent $P_2O_5$ Hourly Feed (tons/hr) |
|---|---|---|---|---|
| Weight Percentage | wt% | 100% | 100% | 100% |
| Post-project SPA #1 & #2 Feed | (Ini SPA 1&2) - (Red SPA 1&2) | 664 | 242,360 | 28 |
| Feed to SPA #3 | SPA3 | 336 | 122,759 | 14 |
| Post-project SPA #1, 2, & 3 Feed | SPA = (Ini SPA 1&2) - (Red SPA 1&2) + (SPA3) | 1000 | 365,119 | 42 |
| Overall Change | Δ = (SPA) - (Ini SPA 1&2) | 196 | 71,540 | 8 |
| Initial pre-project feed into SPA #1 and 2 | Ini SPA 1&2 | 804 | 293,579 | 34 |
| Reduction in Feed to SPA #1 & 2 due to the project | Red SPA 1&2 | 140 | 51,219 | 6 |
| % Change in overall feed due to the project | %Δ = Δ*100/(Ini SPA 1&2) | 24.4% | 24.4% | 24.4% |
| | | | | |
| Feed distribution post-project | | SPA #1&2 | SPA #3 | Total |
| Annual Feed post-project | ton/year | 242,360 | 122,759 | 365119 |
| % Distribution | % | 66% | 34% | |

Note:

1. No contemporaneous emission decreases were included in the emission inventory for the decreased throughput through SPA #1 and #2 or other plant processes.

Criteria Emissions Summary - Modeling Protocol

| Source | NOx | | CO | | $PM_{10}$ | | $PM_{2.5}$ | | $SO_2$ | | Lead | Fluoride |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | lb/month | lb/hr |
| Therminol Heater[1] | 1.25 | 5.49 | 2.10 | 9.22 | 0.19 | 0.834 | 0.19 | 0.83 | 0.015 | 0.066 | 0.0274 | — |
| #3 SPA Scrubber[2] | — | — | — | — | 0.303 | 1.33 | 0.074 | 0.323 | — | — | — | 0.12 |
| SPA Oxidation[3] | 0.109 | 0.48 | 1.73 | 7.56 | | | | | | | | |
| B-5 Boiler[4] | 0.08 | 0.33 | 0.04 | 0.17 | 0.005 | 0.02 | 0.005 | 0.021 | 0.001 | 0.0025 | 0.0011 | — |
| Cooling Tower[5] | — | — | — | — | 0.037 | 0.164 | 0.022 | 0.098 | — | — | — | — |
| TOTALS | 1.44 | 6.29 | 3.87 | 16.95 | 0.535 | 2.34 | 0.29 | 1.28 | 0.016 | 0.068 | 0.029 | 0.12 |
| Level I Modeling Threshold | 0.2 | 1.2 | 15 | — | 0.22 | — | 0.054 | 0.35 | 0.21 | 1.2 | 14 | 0.167 |
| Level II Modeling Threshold | 2.4 | 14 | 175 | — | 2.6 | — | 0.63 | 4.1 | 2.5 | 14 | | |
| Modeling Required (Yes/No/Maybe) | No per DEQ email 12/5/2012 | No per DEQ email 12/5/2012 | No | No | No per DEQ email 12/5/2012 | No | No per DEQ email 12/5/2012 | No per DEQ email 12/5/2012 | No | No | No | No |

Note for Pb:
ERM followed a spreadsheet sent by IDEQ. Their spreadsheet was dividing annual emissions by 4, not 12, calling it a rolling 3-month number. Implies a quarterly total, even though modeling guidance states lb/month.

1. Low-NOx burner. For natural gas combustion, PM2.5 = PM10 per AP-42.
2. Increased PM10 and PM2.5 from SPA scrubber from the addition of SPA#3 calculated from higher result of past two source tests (2007 and 2009), prorating to maximum P2O5 capacity of SPA#3, and then multiplying by a safety factor of two.
3 Increased NOx and CO from SPA scrubber due to the addition of SPA#3 calculated from NOx and CO emission measurements from 2008 source test, prorating to maximum P2O5 capacity of SPA#3 assuming average P2O5 feed rate from other 2007, 2009, 2010, 2011, and 2012 source tests, and then multiplying by a safety factor of two.
4 Increased emissions (within current permit limits) from existing Nebraska boiler from a small load increase to provide steam for SPA #3 vacuum jets. The estimates provided were derived by prorating the Tier I emission limits for this boiler for the expected additional steam demand for SPA #3. PM2.5 was assumed equal to PM10 per AP-42.
5 Increased PM10 and PM2.5 from the PPA cooling tower (above current actual emissions) due to an approximate 1200 gpm increase in circulating water to provide additional cooling for SPA #3. The estimates provided in Table 1 were derived from 2010 drift rate measurements from PPA cooling tower, a TDS loading of 2,200 ppmw, and an assumption that all drift PM was PM10. PM2.5 estimate assumed 60% PM10 = PM2.5. This is expected to be overpredictive.

## #3 SPA Project Hazardous and Toxic Air Pollutants

### HAP & TAP Emissions

| CAS Number | Pollutant | Emissions from New Therminol Heater[4] | | | Incremental Emissions from Existing B-5 Boiler[5] | | | Total Emissions | | | Screening Emissions Levels (EL) | | Modeling Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Hourly (lb/hr) | Annual (lb/year) | Annual (ton/yr) | Non Carcinogenic (lb/hr) | Carcinogenic (lb/hr) | Yes/No |
| 91-57-6 | 2-Methylnaphthalene[2] | 6.01E-07 | 5.27E-03 | 2.63E-06 | 2.37E-08 | 2.07E-04 | 1.04E-07 | 6.25E-07 | 5.47E-03 | 2.74E-06 | --- | 9.10E-05 | No |
| 56-49-5 | 3-Methylchloranthrene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.50E-06 | No |
| 57-97-6 | 7,12-Dimethylbenz(a)anthracene[2] | 4.01E-07 | 3.51E-03 | 1.76E-06 | 1.58E-08 | 1.38E-04 | 6.92E-08 | 4.17E-07 | 3.65E-03 | 1.82E-06 | --- | 9.10E-05 | No |
| 83-32-9 | Acenaphthene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 9.10E-05 | No |
| 203-96-8 | Acenaphthylene[2] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 9.10E-05 | No |
| 120-12-7 | Anthracene[2] | 6.01E-08 | 5.27E-04 | 2.63E-07 | 2.37E-09 | 2.07E-05 | 1.04E-08 | 6.25E-08 | 5.47E-04 | 2.74E-07 | --- | 9.10E-05 | No |
| 56-55-3 | Benz(a)anthracene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 71-43-2 | Benzene | 5.26E-05 | 4.61E-01 | 2.30E-04 | 2.07E-06 | 1.82E-02 | 9.08E-06 | 5.47E-05 | 4.79E-01 | 2.39E-04 | --- | 8.00E-04 | No |
| 50-32-8 | Benzo(a)pyrene[2,3] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 2.00E-06 | No |
| 205-99-2 | Benzo(b)fluoranthene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 191-24-2 | Benzo(g,h,i)perylene[2] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 9.10E-05 | No |
| 205-82-3 | Benzo(k)fluoranthene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 218-01-9 | Chrysene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 53-70-3 | Dibenzo(a,h)anthracene[2,3] | 3.01E-08 | 2.63E-04 | 1.32E-07 | 1.18E-09 | 1.04E-05 | 5.19E-09 | 3.12E-08 | 2.74E-04 | 1.37E-07 | --- | 2.00E-06 | No |
| 25321-22-6 | Dichlorobenzene | 3.01E-05 | 2.63E-01 | 1.32E-04 | 1.18E-06 | 1.04E-02 | 5.19E-06 | 3.12E-05 | 2.74E-01 | 1.37E-04 | --- | --- | No |
| 206-44-0 | Fluoranthene[2] | 7.51E-08 | 6.58E-04 | 3.29E-07 | 2.96E-09 | 2.59E-05 | 1.30E-08 | 7.81E-08 | 6.84E-04 | 3.42E-07 | --- | 9.10E-05 | No |
| 86-73-7 | Fluorene[2] | 7.01E-08 | 6.14E-04 | 3.07E-07 | 2.76E-09 | 2.42E-05 | 1.21E-08 | 7.29E-08 | 6.39E-04 | 3.19E-07 | --- | 9.10E-05 | No |
| 50-00-0 | Formaldehyde | 1.88E-03 | 1.65E+01 | 8.23E-03 | 7.40E-05 | 6.48E-01 | 3.24E-04 | 1.95E-03 | 1.71E+01 | 8.55E-03 | --- | 5.10E-04 | Yes |
| 110-54-3 | n-Hexane | 4.51E-02 | 3.95E+02 | 1.97E-01 | 1.78E-03 | 1.56E+01 | 7.78E-03 | 4.69E-02 | 4.11E+02 | 2.05E-01 | 12 | --- | No |
| 193-39-5 | Indeno(1,2,3-cd)pyrene[2,3] | 4.51E-08 | 3.95E-04 | 1.97E-07 | 1.78E-09 | 1.56E-05 | 7.78E-09 | 4.69E-08 | 4.11E-04 | 2.05E-07 | --- | 2.00E-06 | No |
| 91-20-3 | Naphthalene | 1.53E-05 | 1.34E-01 | 6.69E-05 | 6.02E-07 | 5.27E-03 | 2.64E-06 | 1.59E-05 | 1.39E-01 | 6.96E-05 | 3.33 | --- | No |
| 85-01-8 | Phenanathrene[2] | 4.26E-07 | 3.73E-03 | 1.87E-06 | 1.68E-08 | 1.47E-04 | 7.35E-08 | 4.43E-07 | 3.88E-03 | 1.94E-06 | --- | 9.10E-05 | No |
| 129-00-0 | Pyrene[2] | 1.25E-07 | 1.10E-03 | 5.49E-07 | 4.93E-09 | 4.32E-05 | 2.16E-08 | 1.30E-07 | 1.14E-03 | 5.70E-07 | --- | 9.10E-05 | No |
| 108-88-3 | Toluene | 8.52E-05 | 7.46E-01 | 3.73E-04 | 3.36E-06 | 2.94E-02 | 1.47E-05 | 8.85E-05 | 7.75E-01 | 3.88E-04 | 25 | --- | No |
| 7440-38-2 | Arsenic | 5.01E-06 | 4.39E-02 | 2.19E-05 | 1.97E-07 | 1.73E-03 | 8.65E-07 | 5.21E-06 | 4.56E-02 | 2.28E-05 | --- | 1.50E-06 | Yes |
| 7440-39-3 | Barium | 1.10E-04 | 9.65E-01 | 4.83E-04 | 4.34E-06 | 3.80E-02 | 1.90E-05 | 1.15E-04 | 1.00E+00 | 5.02E-04 | 0.033 | --- | No |
| 7440-41-7 | Beryllium | 3.01E-07 | 2.63E-03 | 1.32E-06 | 1.18E-08 | 1.04E-04 | 5.19E-08 | 3.12E-07 | 2.74E-03 | 1.37E-06 | --- | 2.80E-05 | No |
| 7440-43-9 | Cadmium | 2.76E-05 | 2.41E-01 | 1.21E-04 | 1.09E-06 | 9.51E-03 | 4.76E-06 | 2.86E-05 | 2.51E-01 | 1.25E-04 | --- | 3.70E-06 | Yes |
| 7440-47-3 | Chromium | 3.51E-05 | 3.07E-01 | 1.54E-04 | 1.38E-06 | 1.21E-02 | 6.05E-06 | 3.65E-05 | 3.19E-01 | 1.60E-04 | 0.033 | --- | No |
| 7440-48-4 | Cobalt | 2.10E-06 | 1.84E-02 | 9.22E-06 | 8.29E-08 | 7.26E-04 | 3.63E-07 | 2.19E-06 | 1.92E-02 | 9.58E-06 | 0.0033 | --- | No |
| 7440-50-8 | Copper | 2.13E-05 | 1.87E-01 | 9.33E-05 | 8.39E-07 | 7.35E-03 | 3.67E-06 | 2.21E-05 | 1.94E-01 | 9.69E-05 | 0.013 | --- | No |
| 7439-96-5 | Manganese | 9.52E-06 | 8.34E-02 | 4.17E-05 | 3.75E-07 | 3.29E-03 | 1.64E-06 | 9.89E-06 | 8.67E-02 | 4.33E-05 | 0.067 | --- | No |
| 7439-97-6 | Mercury | 6.51E-06 | 5.71E-02 | 2.85E-05 | 2.57E-07 | 2.25E-03 | 1.12E-06 | 6.77E-06 | 5.93E-02 | 2.96E-05 | --- | --- | No |
| 7439-98-7 | Molybdenum | 2.76E-05 | 2.41E-01 | 1.21E-04 | 1.09E-06 | 9.51E-03 | 4.76E-06 | 2.86E-05 | 2.51E-01 | 1.25E-04 | 0.333 | --- | No |
| 7440-02-0 | Nickel | 5.26E-05 | 4.61E-01 | 2.30E-04 | 2.07E-06 | 1.82E-02 | 9.08E-06 | 5.47E-05 | 4.79E-01 | 2.39E-04 | --- | 2.70E-05 | Yes |
| 7782-49-2 | Selenium | 6.01E-07 | 5.27E-03 | 2.63E-06 | 2.37E-08 | 2.07E-04 | 1.04E-07 | 6.25E-07 | 5.47E-03 | 2.74E-06 | 0.013 | --- | No |
| 7440-62-2 | Vanadium | 5.76E-05 | 5.05E-01 | 2.52E-04 | 2.27E-06 | 1.99E-02 | 9.94E-06 | 5.99E-05 | 5.25E-01 | 2.62E-04 | 0.003 | --- | No |
| 7440-66-6 | Zinc | 7.26E-04 | 6.36E+00 | 3.18E-03 | 2.86E-05 | 2.51E-01 | 1.25E-04 | 7.55E-04 | 6.61E+00 | 3.31E-03 | 0.667 | --- | No |
| NA | PAH - B(a)P Equivalent | 2.86E-07 | 2.50E-03 | 1.25E-06 | 1.13E-08 | 9.86E-05 | 4.93E-08 | 2.97E-07 | 2.60E-03 | 1.30E-06 | --- | 2.00E-06 | No |

*Note:*

*1. Emission factors obtained from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4*

*2. Polycyclic Organic Matter (POM)*

*3. POM as Polyaromatic Hydrocarbons (PAH)*

*4. Potential to emit.*

*5. Incremental emissions.*

*6. Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA or other plant processes.*

## *#3 SPA Project Greenhouse Gases*

***Project GHG Emissions***

| Equipment | Calculation Methodology | Methodology Citation | GHGs to Report | Heat Input (MMBtu/yr) | Electricity Use (MWhr/yr) | $CO_2$ | | $CH_4$ | | $N_2O$ | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ | $CO_2e$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | EF | EF Units | EF | EF Units | EF | EF Units | (kg/yr) | (kg/yr) | (kg/yr) | (kg/yr) | (metric ton/yr) | ton/yr |
| New Therminal Heater | AP-42, Chapter 1.4, Table 1.4-2 | Note 1,2,3 | CO2, CH4, N2O | 223,818 | - | 118 | lb/MMBtu | 0.0023 | lb/MMBtu | 0.00063 | lb/MMBtu | 11,943,903 | 229 | 64 | 11,968,458 | 11,968 | 13,193 |
| Existing Nebraska B-5 Boiler | AP-42, Chapter 1.4, Table 1.4-2 | Note 1,2,4 | CO2, CH4, N2O | 8,819 | - | 118 | lb/MMBtu | 0.0023 | lb/MMBtu | 0.00063 | lb/MMBtu | 470,600 | 9 | 3 | 471,568 | 472 | 520 |
| | | | | | | | | | | | | | | | Total | 12,440 | 13,713 |

*Note:*

*1) $CO_2e$ Emissions = $CO_2$ Emissions + $CH_4$ Emission x GWP (21) + $N_2O$ Emissions x GWP (310)*

*2) Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA.*

*3) Potential to emit.*

*4) Incremental emissions.*

**Agrium #3 SPA**
**Critieria Emissions Summary**
**12/11/2012**

## *#3 SPA Project: Criteria and Fluoride Emissions*

***#3 SPA Project Emissions***

| Equipment | $NO_X$ (TPY) | CO (TPY) | PM (TPY) | $PM_{10}$ (TPY) | $PM_{2.5}$ (TPY) | $SO_2$ (TPY) | $O_3$ (TPY) | Pb (TPY) | $H_2SO_4$ (TPY) | $H_2S$ (TPY) | VOC (TPY) | Flouride (TPY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Therminol Heater[1,2,3] Potential To Emit | 5.5 | 9.2 | - | 0.8 | 0.8 | 6.6E-02 | - | 5.5E-05 | - | - | 0.6 | - |
| Existing Nebraska Boiler (B-5)[1,4] | 0.3 | 0.2 | - | 2.1E-02 | 2.1E-02 | 2.5E-03 | - | 2.2E-06 | - | - | 7.1E-03 | - |
| Existing SPA Scrubber[1,5,6] | - | - | - | 1.3 | 0.3 | - | - | - | - | - | - | 0.5 |
| Existing SPA Oxidation Reactor[1,7] | 0.5 | 7.6 | - | - | - | - | - | - | - | - | - | - |
| Existing Cooling Tower[1,8] | - | - | - | 0.2 | 0.1 | - | - | - | - | - | - | - |
| **Totals:** | 6.3 | 16.9 | - | 2.3 | 1.3 | 6.8E-02 | - | 5.7E-05 | - | - | 0.6 | 0.5 |
| **PSD Significance Emission Rate** | 40 | 100 | - | 15 | 10 | 40 | - | 0.6 | 7 | - | 40 | 3 |
| **Does the Project Emission Increase Exceed the Significant Emission Rate Threshold?** | NO | NO | - | NO | NO | NO | - | NO | - | - | - | - |

*Note:*

*1) Assume 8,760 operating hours per year.*

*2) Low-$NO_X$ burners Emission Factors. For natural gas combustion, $PM_{2.5}$ = $PM_{10}$ per AP-42.*

*3) Potential to emit.*

*4) Calculated incremental emission increase (within current permit limits) using Tier 1 permit condition (5.2) emission factors and additional steam demand for #3 SPA. $PM_{2.5}$ was assumed equal to $PM_{10}$ per A*

*5) $PM_{10}$ and $PM_{2.5}$ incremental emissions found using source test data and prorated by ratio of throughput at maximum design of #3 SPA to throughput of source test. Calculated emissions then doubled.*

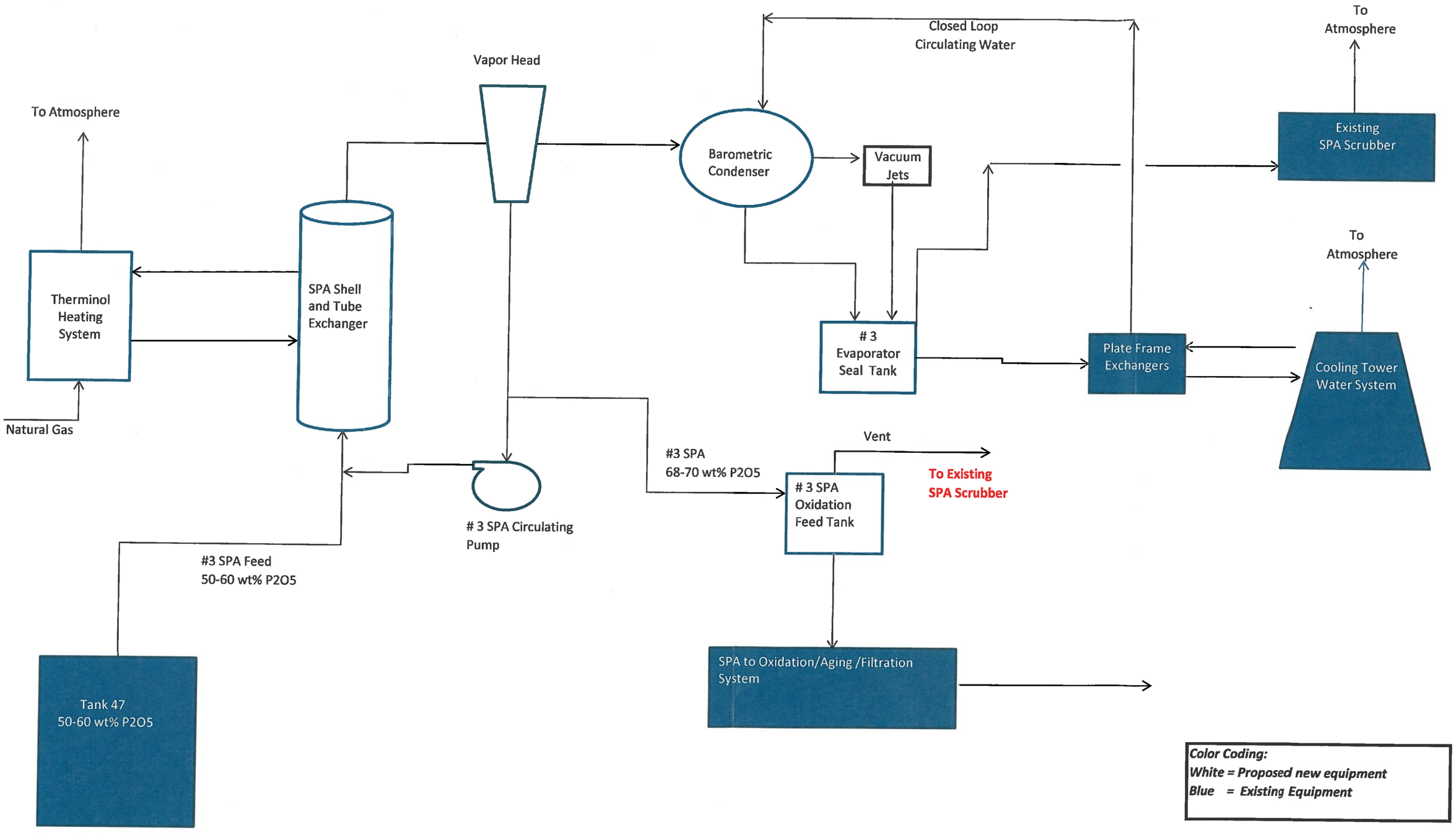
*6) Fluoride incremental emissions calculated using MACT Standard emission rate of 0.00870 lb F/ton equivalent $P_2O_5$ feed to #3 SPA at maximum design throughput.*

*7) $NO_X$ and CO incremental emissions calculated using source test data and prorated by ratio of throughput at maximum design of #3 SPA to throughput of source test. Calculated emissions then doubled.*

*8) Assume incremental increase of 1,200 gpm circulating water due to #3 SPA, 2010 drift rate measurements from PPA Cooling Tower, and TDS loading of 2,200 ppmw. Assume all drift PM as $PM_{10}$. Conservatively assume 60% $PM_{10}$ = $PM_{2.5}$.*

*9) All emissions are below significant threshold defined in 40 CFR 52.21(b)(40)*

*10) Above emission estimates do not include any contemporaneous emission decreases from reduced throughput from #1 SPA and #2 SPA or other plant processes.*




**Simplified Evaporator Block Flow - Agrium #3 Super Phosphoric Acid (SPA) Production**

## Baseline Actual Emissions (BAE)

### B-5 Nebraska Boiler

| | All Criteria Pollutant and GHG, except PM | PM/PM10/PM2.5 | |
|---|---|---|---|
| 2-Year Annual Average Natural Gas Usage | 1,104,895 | 1,100,918 | kscf/year |
| Heating Value of Natural Gas | 1,020 | 1,020 | Btu/scf |
| Permitted Capacity (Condition 5.6) | 1,768,000 | 1,768,000 | kscf/year |
| Baseline Period | 2006-2007 | 2007-2008 | |

| Pollutant | Emission Factor | | Emission Factor Reference | BAE | Permitted Emissions* | Adjusted BAE |
|---|---|---|---|---|---|---|
| | Value | Units | | tpy | tpy | tpy |
| CO | 6.14E-02 | lb/MMBtu | Source Tests, May 26-27, 2009 | 34.60 | 35.40 | 34.60 |
| NOx | 7.17E-02 | lb/MMBtu | 2-year Average NOx Emission Factor from Records maintained as required by Conditions 5.9 | 40.39 | 70.71 | 40.39 |
| SO2 | 0.00059 | lb/MMBtu | nual Emissions Report, June 2005 st | 0.33 | 0.53 | 0.33 |
| PM | 5.47E-03 | lb/MMBtu | Source Tests, May 26-27, 2009 | 3.07 | 4.42 | 3.07 |
| PM10 | 5.47E-03 | lb/MMBtu | Source Tests, May 26-27, 2009 | 3.07 | 4.42 | 3.07 |
| PM2.5 | 5.47E-03 | lb/MMBtu | Assumed equal to PM10 for natural gas combustion | 3.07 | --- | 3.07 |
| VOC | 0.0013 | lb/MMBtu | nual Emissions Report, June 2005 st | 0.73 | 1.50 | 0.73 |
| Lead | 4.90E-07 | lb/MMBtu | AP-42, Chapter 1.4, Table 1.4-2 | 2.76E-04 | 4.42E-04 | 2.76E-04 |
| Asbestos | --- | --- | --- | --- | --- | --- |
| Beryllium | 1.18E-08 | lb/MMBtu | AP-42, Chapter 1.4, Table 1.4-4 | 6.63E-06 | 1.06E-05 | 6.63E-06 |
| Mercury | 2.55E-07 | lb/MMBtu | AP-42, Chapter 1.4, Table 1.4-4 | 1.44E-04 | 2.30E-04 | 1.44E-04 |
| Vinyl Chloride | --- | --- | --- | --- | --- | --- |
| Flourides | --- | --- | --- | --- | --- | --- |
| Sulfuric Acid Mist | --- | --- | --- | --- | --- | --- |
| H2S | --- | --- | --- | --- | --- | --- |
| TRS (including H2S) | --- | --- | --- | --- | --- | --- |
| GHG | 1.22E+02 | lb/MMBtu | Source Tests, May 26-27, 2009 | 68,747 | 110,005 | 68,747 |

*Tier I permit condition 5.2

**SPA Scrubber**

| | PM/PM10/PM2.5 | Fluorides | |
|---|---|---|---|
| 2-Year Annual Average 100% Eq. P2O5 Feed Rate | 213,105 | 212,288 | tpy of Eq. P2O5 |
| 2-Year Annual Average Scrubber Operating Hours | 8,372 | 8,365 | hr/yr |
| Permitted Capacity (Condition 6.7) | 560,000 | 560,000 | tpy of Eq. P2O5 |
| Baseline Period | 2007-2008 | 2011-2012 | |

| Pollutant | Emission Factor | | Emission Factor Reference | BAE | Permitted Emissions* | Adjusted BAE |
|---|---|---|---|---|---|---|
| | Value | Units | | tpy | tpy | tpy |
| CO | --- | --- | --- | --- | --- | --- |
| NOx | --- | --- | --- | --- | --- | --- |
| SO2 | --- | --- | --- | --- | --- | --- |
| PM | 0.0100 | lb/ton of eq. P2O5 feed | Assumed equal to PM10 | 1.07 | 21 | 1.07 |
| PM10 | 0.0100 | lb/ton of eq. P2O5 feed | Calculated as average of past two source tests (2007 and 2009) | 1.07 | --- | 1.07 |
| PM2.5 | 0.0025 | lb/ton of eq. P2O5 feed | Calculated as average of past two source tests (2007 and 2009) | 0.27 | --- | 0.27 |
| VOC | --- | --- | --- | --- | --- | --- |
| Lead | --- | --- | --- | --- | --- | --- |
| Asbestos | --- | --- | --- | --- | --- | --- |
| Beryllium | --- | --- | --- | --- | --- | --- |
| Mercury | --- | --- | --- | --- | --- | --- |
| Vinyl Chloride | --- | --- | --- | --- | --- | --- |
| Fluorides | 3.02E-03 | lb/ton of eq. P2O5 feed | Calculated as average of source tests conducted in baseline period (2011-2012) | 0.32 | 2.44 | 0.32 |
| Sulfuric Acid Mist | --- | --- | --- | --- | --- | --- |
| H2S | --- | --- | --- | --- | --- | --- |
| TRS (including H2S) | --- | --- | --- | --- | --- | --- |
| GHG | --- | --- | --- | --- | --- | --- |

*Tier I permit condition 6.2 for fluorides and condition 6.5 for PM

**SPA Oxidation Reactor**

| | | |
|---|---|---|
| 2-Year Annual Average 100% Eq. P2O5 Feed Rate | 222,150 | tpy of Eq. P2O5 |
| 2-Year Annual Average Oxidation Reactpr Operating Hours | 8,370 | hr/yr |
| Permitted Capacity (Condition 6.7) | 560,000 | tpy of Eq. P2O5 |
| Baseline Period | 2006-2007 | |

| Pollutant | Emission Factor | | Emission Factor Reference | BAE | Permitted Emissions | Adjusted BAE |
|---|---|---|---|---|---|---|
| | Value | Units | | tpy | tpy | tpy |
| CO | 2.175 | lb/hr | Source Test, 2008 | 9.10 | --- | 9.10 |
| NOx | 0.137 | lb/hr | Source Test, 2008 | 0.57 | 5 | 0.57 |
| SO2 | --- | --- | --- | --- | --- | --- |
| PM | --- | --- | --- | --- | --- | --- |
| PM10 | --- | --- | --- | --- | --- | --- |
| PM2.5 | --- | --- | --- | --- | --- | --- |
| VOC | --- | --- | --- | --- | --- | --- |
| Lead | --- | --- | --- | --- | --- | --- |
| Asbestos | --- | --- | --- | --- | --- | --- |
| Beryllium | --- | --- | --- | --- | --- | --- |
| Mercury | --- | --- | --- | --- | --- | --- |
| Vinyl Chloride | --- | --- | --- | --- | --- | --- |
| Flourides | --- | --- | --- | --- | --- | --- |
| Sulfuric Acid Mist | --- | --- | --- | --- | --- | --- |
| H2S | --- | --- | --- | --- | --- | --- |
| TRS (including H2S) | --- | --- | --- | --- | --- | --- |
| GHG | --- | --- | --- | --- | --- | --- |

*Tier I permit condition 6.4

# PTC Fee Calculation

**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:** | **Nu-West Industries, Inc.** |
| **Address:** | **3010 Conda Road** |
| **City:** | **Soda Springs** |
| **State:** | **Idaho** |
| **Zip Code:** | **83276** |
| **Facility Contact:** | **Clint Humpherys** |
| **Title:** | **Environmental Specialist** |
| **AIRS No.:** | **029-00003** |

| | |
|---|---|
| **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) |
| $NO_X$ | 6.3 | 0 | 6.3 |
| $SO_2$ | 0.1 | 0 | 0.1 |
| CO | 16.9 | 0 | 16.9 |
| PM10 | 2.3 | 0 | 2.3 |
| VOC | 0.6 | 0 | 0.6 |
| TAPS/HAPS | 0.2 | 0 | 0.2 |
| Total: | 26.4 | 0 | **26.4** |
| | | | |
| Fee Due | **$ 5,000.00** | | |

Comments:

***M E M O R A N D U M***

**DATE:** February 28, 2013

**TO:** Kelli Wetzel, P.E., Permit Writer, Air Program

**FROM:** Darrin Mehr, Stationary Source Modeler, Air Program

**PROJECT:** P-2013.0001 PROJ 61142 PTC Application for the Nu-West Industries, Inc. PTC Application for the #3 Super Phosphoric Acid Evaporation System Project

**SUBJECT:** Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs)

---

## 1.0 Summary

Nu-West Industries, Inc., dba Agrium, (Agrium) submitted a Permit to Construct (PTC) application for a new super phosphoric acid evaporator system (SPA #3) and process changes associated the new SPA #3 system, at the existing Agrium fertilizer production facility located near Soda Springs, Idaho. Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the proposed project were submitted to DEQ to demonstrate that the facility would not cause violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and IDAPA 58.01.01.203.03 [Idaho Air Rules Sections 203.02 and 203.03]). Environmental Resources Management (ERM), Agrium's permitting consultant, submitted the analyses and applicable information and data enabling DEQ to evaluate potential impacts to ambient air.

The submitted modeling information and air quality impact analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was not within the scope of this DEQ modeling review); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that the criteria air pollutant emissions increases attributed to this project were below Idaho DEQ's Level I de minim is modeling thresholds or the Level II discretionary modeling thresholds specified in the *Idaho Air Quality Modeling Guideline* (State of Idaho Guideline for Performing Air Quality Impact Analyses. Doc. ID AQ-011 {rev. 2, July 2011}; 5) showed that Toxic Air Pollutant (TAP) emissions increases associated with the facility do 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.

Air impact analyses are required by Idaho Air Rules to be conducted according to 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. The submitted information and analyses demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

| Table 1. KEY CONDITIONS USED IN MODELING ANALYSES | |
|---|---|
| **Criteria/Assumption/Result** | **Explanation/Consideration** |
| Criteria air pollutant emission rates are below the State of Idaho Air Quality Modeling Guideline Level I and Level II modeling thresholds. | Compliance demonstrations for Significant Impact Level (SIL) and National Ambient Air Quality Standards (NAAQS) were not required for this project due to the low level of increase in potential emissions proposed by Agrium for all criteria air pollutants. |

The timeline and associated submittals for Agrium's project, primarily reflecting the modeling analyses, are listed below:

- October 9, 2012: A pre-application meeting was held at DEQ's state office with representatives of Agrium, Agrium's permitting consultant, Agrium's project engineering consultant, and DEQ staff.
- November 14, 2012: ERM, Agrium's permitting consultant, submitted wind roses for the 4-year meteorological data set they requested to use in the modeling demonstration via email. This data was obtained from a monitoring site on the Agrium facility property.
- November 28, 2012: ERM submitted additional information in support of the modeling protocol. Emission unit stack location and ambient air boundary diagrams were received by email.
- November 29, 2012: Representatives for Agrium, ERM, and DEQ participated in a conference call to discuss the project and modeling protocol.
- November 29, 2012: DEQ emailed Agrium and ERM EPA's June 22, 2007 memorandum on leased land and ambient air boundary determinations and a discussion on exemption criteria concerning stack distances to an ambient air boundary for the project.
- December 4, 2012: DEQ emailed ERM and Agrium distance information for applying the modeling applicability thresholds and Agrium's modeling setup for the facility and ambient air boundary as requested during a phone conversation earlier that day.
- December 5, 2012: DEQ issued a conditional modeling protocol approval letter to Agrium for the SPA #3 project.
- December 11, 2012: ERM requested that DEQ approve the use of an alternative meteorological dataset in place of the on-site dataset spanning 4 years that was approved in the modeling protocol. Use of a 2004-2008 AERMOD-ready dataset based on on-site meteorological data at the P4 Production facility was requested.
- December 12, 2012: DEQ approved the use of the alternative dataset.
- January 8, 2013: DEQ received the PTC application from Agrium.
- February 6, 2013: DEQ declared the PTC application complete.
- February 28, 2013: DEQ's modeling group provided a modeling memorandum to the air permitting group for the proposed PTC.

## 2.0 Background Information

### *2.1 Applicable Air Quality Impact Limits and Modeling Requirements*

This section identifies applicable ambient air quality standards and analyses used to demonstrate compliance with air quality standards.

### *2.1.1 Area Classification*

The Agrium facility is an existing stationary facility in Caribou County. The area is designated as attainment or unclassifiable for all pollutants.

### *2.1.2 Significant and Cumulative NAAQS Impact Analyses*

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the facility exceed the significant impact levels (SILs) of 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, 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 from facility-wide 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-time at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on receptor-by-receptor basis.

$NO_2$ and $SO_2$ short-term standards have recently been promulgated by EPA. The standards became applicable for permitting purposes in Idaho when they were incorporated by reference *sine die* into Idaho Air Rules (Spring 2011). The modeling analyses performed and submitted in the permit application accounted for the new standards.

The annual $PM_{2.5}$ standard was changed from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ on December 14, 2012. The revised standard will not become applicable for permitting purposes until it is incorporated *sine die* into Idaho's Air Rules.

The $PM_{2.5}$ 24-hour and annual SILs were vacated and remanded by the D.C. Circuit U.S. Court of Appeals, with a decision made on January 22, 2013. This decision most directly affects "major" projects subject to the Prevention of Significant Deterioration (PSD) program (applicable to designated facilities with emissions of a criteria pollutant over 100 tons per year). For minor source permitting, DEQ determined the vacated SILs will still be used as a screening tool to evaluate when a cumulative impact analysis must be performed, but the SIL will not be used exclusively as a level below which impacts of a new source or modification can be considered as not causing or significantly contributing to a $PM_{2.5}$ NAAQS violation. Additional considerations used to evaluate the need for a cumulative impact analysis will included the following: 1) other potentially co-contributing sources in the area; 2) background concentrations for the area impacted; 3) results of the SIL analysis in relation to other sources and background concentrations; 4) presence of sensitive receptors in the area such as residences, schools, hospitals, parks, etc.

Agrium was not required to perform significant impact analyses nor cumulative impact analyses for this project.

| Table 2. APPLICABLE REGULATORY LIMITS | | | | |
|---|---|---|---|---|
| **Pollutant** | **Averaging Period** | **Significant Impact Levels[a] ($\mu g/m^3$)[b]** | **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[i] | 35[j] | Mean of maximum 1st highest[k] |
| | Annual | 0.3[i] | 15[l] | Mean of maximum 1st highest[k] |
| 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] (7.9 $\mu g/m^3$) | 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[o] (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] |

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. $PM_{2.5}$ SILs were vacated and remanded as of January 22, 2013.
j. 3-year average of the upper 98th percentile of the annual distribution of 24-hour concentrations.
k. 5-year mean of the 1st highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. The monitoring design value is used for background concentrations for $PM_{2.5}$ analyses. This approach is also used for the significant impact analysis.
l. 3-year average of annual concentration. The NAAQS was revised to 12 $\mu g/m^3$ on December 14, 2012. However, this standard will not be applicable for permitting purposes in Idaho until it is incorporated by reference *sine die* into Idaho Air Rules in Spring of 2014.
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 average 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 average of maximum modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year average 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 average of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.

### *2.1.3 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.

Agrium estimated the TAPs emissions increases for each emissions unit affected by this project.

### *2.2 Background Concentrations*

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. No background concentrations were provided for this project.

## 3.0 Modeling Impact Assessment

### *3.1 Modeling Methodology*

This section describes the modeling methods used by the applicant's consultant, ERM, to demonstrate preconstruction compliance with applicable air quality standards.

#### *3.1.1 Overview of Analyses*

ERM performed site-specific air impact analyses that were determined by DEQ to be reasonably representative of the proposed Agrium facility. Results of the submitted analyses demonstrated 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 3 provides a brief description of parameters used in the modeling analyses.

| Table 3. MODELING PARAMETERS | | |
|---|---|---|
| **Parameter** | **Description/Values** | **Documentation/Addition Description** |
| Facility Location | Northeast of Soda Springs | The area is an attainment or unclassified area for all criteria pollutants. |
| Model | AERMOD | AERMOD with the PRIME downwash algorithm, version 12060. |
| Meteorological Data | P4 Production Facility On-Site Data | Five years of on-site data obtained by the P4 Production facility for 2004 through 2008. |
| Terrain | Considered | Receptor, building, and emissions source elevations were determined using USGS 1/3 arc second National Elevation Dataset (NED) files. The NAD83 datum was used for receptors, sources, and structures. |
| Building Downwash | Considered | Plume downwash was considered for the structures associated with the facility. Agrium and ERM used the BPIP input file from a prior 2006 modeling demonstration supplied by DEQ at ERM's request. |
| Receptor Grid | Grid 1 | 25-meter spacing along the boundary and out to at least 500 meters. |
| | Grid 2 | 50-meter spacing out to at least 1,500 meters set on Grid 1. |
| | Grid 3 | 100-meter spacing out to at least 1,500 meters set on Grid 2. |
| | Grid 4 | 250-meter spacing out to 1,500 meters set on Grid 3. |

### *3.1.2 Modeling protocol and Methodology*

A modeling protocol was submitted to DEQ prior to the application. The protocol was submitted by ERM, on behalf of Agrium, on November 5, 2012, via email. DEQ provided an electronic conditional protocol approval letter via email on December 5, 2012. Site-specific modeling was generally conducted using data and methods described in the protocol and in the *Idaho Air Quality Modeling Guideline* (State of Idaho Guideline for Performing Air Quality Impact Analyses. Doc. ID AQ-011 {rev. 2, July 2011} http://www.deq.idaho.gov/media/355037-modeling-guideline.pdf).

### *3.1.3 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 sources, Gaussian dispersion model AERMOD was promulgated as the replacement model for 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 was used for the modeling analyses to evaluate impacts of the facility.

### *3.1.4 Meteorological Data*

ERM's modeling protocol requested stated that met data collected from an on-site tower would be used for modeling demonstration. The data spanned 4 years but the dates of data collection were not specified. Following issuance of DEQ's conditional modeling protocol approval letter, ERM submitted a request via email on December 11, 2012 to use a different meteorological dataset than 4 year dataset based on data collected at the Agrium facility. Quality assurance and control requirements for the Agrium on-site data were not met and DEQ agreed with Agrium's request to use an existing P4 Production on-site met dataset. DEQ emailed approval to use the alternative dataset on December 12, 2012.

The alternative met data set was an existing dataset used for modeling demonstrations predating this project. ERM had the dataset in-house. The on-site data was collected for a 5-year period, spanning 2004 through 2008, at a met tower located on the P4 Production facility. The on-site data provides surface data.

Pocatello airport data was used to fill in missing data for the surface data file. Boise airport data for 2004 through 2008 was used for the upper air data.

### *3.1.7 Terrain Effects*

ERM used 1/3 arc second National Elevation Dataset (NED) files, in the NAD83 datum, to calculate elevations of receptors. The terrain preprocessor AERMAP was used to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. Elevations of buildings, stacks, and receptors immediately surrounding the site were determined from the Dynamis site grading plan, since the NED files would not have elevations accounting for site modifications. 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. The model 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.

NED files are typically in the NAD83 datum and the facility layout is in the same datum. Google Earth uses the WGS84 datum, which is nearly identical to the NAD83 datum, and a spot check of several buildings in the model setup versus Google Earth showed close agreement in location data.

### *3.1.8 Building Downwash*

Potential downwash effects on the emissions plume were accounted for in the model by using building parameters. The Building Profile Input Program for the PRIME downwash algorithm (BPIP-PRIME) was used to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and release parameters for input to AERMOD.

DEQ provided ERM with a copy of an Agrium modeling demonstration setup from an earlier 2006 project. The building base elevations for the current project were changed from those used in the 2006 modeling setup. Sources and building locations were included in the AERMAP run but only terrain height extraction was specified in the AERMAP input and output files by ERM. The base elevations for this project's emission sources—Boiler 5 and the Therminol heater stack—match the revised base elevations so building downwash effects are properly accounted for in the submitted analyses.

### *3.1.9 Ambient Air Boundary*

Agrium established the ambient air boundary at the perimeter of property owned and controlled by the facility. Physical restrictions recognized for precluding public access by the Idaho *Air Quality Modeling Guideline*, include a manned gated main entrance, fences, and no trespassing signage. Only the property that Agrium actively controls was treated as exempt from ambient air. Other property external to this project's ambient air boundary is owned by Agrium but some level of access to the property is allowed so the land was treated as ambient air for this project.

The methods proposed to prevent public access within the ambient air boundary satisfy the requirements specified in the *Idaho Air Quality Modeling Guideline*.

### *3.1.10 Receptor Network*

Table 3 describes the receptor network used in the submitted modeling analyses. DEQ contends that the receptor network was adequate to reasonably assure compliance with applicable air quality standards at all

ambient air locations.

## 3.2 Emissions Rates

Emissions rates of criteria pollutants and TAPs for this project were provided by the applicant for various applicable averaging periods. DEQ modeling review, described in this memorandum, did not include review of emissions rates for accuracy. DEQ modeling review included verification that the application's potential emissions rates were properly used in the model.

### 3.2.1 Criteria Pollutant Emissions Rates

No criteria air pollutants were modeled for this project. Emissions of CO, lead, and $SO_2$, were below the de minim is modeling thresholds and are listed in Table 4. Emissions of $NO_x$, $PM_{2.5}$, and $PM_{10}$ associated with the project were all below the Level II modeling thresholds and are listed in Table 5. DEQ did not require modeling for these pollutants for SIL or cumulative impact analyses.

**Table 4. LEVEL I MODELING EXEMPTIONS**

| Pollutant | Project Emission Rate Increase (lb/hr)[a] | Level I Modeling Threshold (lb/hr) | Project Emission Rate Increase (T/yr)[b] | Level I Modeling Threshold (T/yr)[c] |
|---|---|---|---|---|
| CO[d] | 3.87 | 15 | NA[c] | NA |
| $SO_2$[e] | 0.016 | 0.21 | 0.068 | 1.2 |
| Pb[f] | NA[g] | NA[g] | 0.029 | 14 pounds per month |

a. Pounds per hour.
b. Tons per year.
c. There is no long term averaging period (annual or multiple months) for CO.
d. Carbon monoxide.
e. Sulfur dioxide.
f. Lead.
g. The lead National Ambient Air Quality Standard is based on a rolling 3 month average. Thus, the modeling applicability threshold is based on a monthly period. There is only a Level I modeling threshold for lead.

**Table 5. LEVEL II MODELING EXEMPTIONS**

| Pollutant | Project Emission Rate Increase (lb/hr)[a] | Level I Modeling Threshold (lb/hr) | Level II Modeling Threshold (lb/hr) | Project Emission Rate Increase (T/yr)[b] | Level I Modeling Threshold (T/yr) | Level II Modeling Threshold (T/yr) |
|---|---|---|---|---|---|---|
| $NO_x$[c] | 1.44 | 0.2 | 2.4 | 6.29 | 1.2 | 14 |
| $PM_{2.5}$[d] | 0.29 | 0.054 | 0.63 | 1.28 | 0.35 | 4.1 |
| $PM_{10}$[e] | 0.54 | 0.22 | 2.6 | NA[f] | NA[f] | NA[f] |

a. Pounds per hour.
b. Tons per year.
c. Nitrogen oxides.
d. Particulate matter with a mean aerodynamic diameter of 2.5 microns or less, including condensables.
e. Particulate matter with a mean aerodynamic diameter of 10 microns or less, including condensables.

### 3.2.2 TAP Emissions Rates

Agrium modeled those TAPs where TAP emissions attributed to this project exceeded the emissions screening levels (ELs) of Idaho Air Rules Section 585 and 586. Only carcinogenic TAPs regulated under Section 586 of the Rules exceeded the applicable ELs. Table 6 provides modeled emissions rates for TAPs. The Therminol Heater will be a new emissions unit. Boiler 5 is an existing boiler and the TAPs emissions modeled for this emissions unit were based on the level of increased utilization of the boiler for

the #3 Superphosphoric Acid project.

Emission rates in the electronic modeling files were based on the emission rates listed in Table 6 multiplied by a factor of 1 million. Modeling output file impact values were divided by the factor of 1 million to obtain the final design concentrations listed in Table 8. The hourly emission rates were modeled continuously for 8,760 hours per year.

**Table 6. TAP EMISSIONS MODELED IN ANALYSES**

| Pollutant | Emission Unit / Modeling ID | |
|---|---|---|
| | Therminol Heater / SPA3_HTR (lb/hr)[a] | Boiler 5 / NEB_BLR (lb/hr)[a] |
| Formaldehyde | 1.88E-03 | 7.41E-05 |
| Arsenic | 5.01E-06 | 1.98E-07 |
| Cadmium | 2.75E-05 | 1.09E-06 |
| Nickel | 5.26E-05 | 2.07E-06 |

a. Pounds per hour.

## 3.3 Emission Release Parameters and Plant Criteria

Table 7 lists emissions release parameters for sources modeled. Coordinates are specified in the Universal Transverse Mercator NAD83 system and all sources are located in Zone 12.

**Table 7. EMISSIONS RELEASE PARAMETERS**

| Release Point | Source Type | UTM[a] Easting (m)[b] | UTM Northing (m) | Base Elevation (m) | Stack Height (m) | Modeled Diameter (m) | Stack Gas Temperature (K)[c] | Stack Gas Flow Velocity (m/sec)[d] |
|---|---|---|---|---|---|---|---|---|
| **Therminol Heater / SPA3_HTR** | Point | 455,627.12 | 4,732,086.68 | 1877.32 | 31.95 | 0.76 | 566.5 | 9.81 |
| **Boiler 5 / NEB_BLR** | Point | 455,755.95 | 4,732,070.9 | 1878.11 | 15.85 | 1.62 | 427.0 | 7.60 |

a. Universal Transverse Mercator
b. Meters.
c. Kelvin.
d. Meters per second.

## 3.4 Results for Significant Impact Level and National Ambient Air Quality Standards Analyses

Significant Impact Level (SIL) analyses to evaluate whether the emissions from the proposed project would significantly contribute to concentrations of criteria pollutants in ambient air were not performed. NAAQS analyses were not performed. The potential emissions increases of all criteria air pollutants were below the Level I or Level II modeling thresholds.

## 3.5 Results for Toxic Air Pollutant Analysis

Table 8 presents results for TAP modeling. All TAP impacts were well below the applicable increments.

| Table 8. RESULTS FOR TOXIC AIR POLLUTANT ANALYSES | | | | | |
|---|---|---|---|---|---|
| **Pollutant** | **CAS Number** | **Averaging Period** | **Maximum Modeled Concentration ($\mu g/m^3$)[a]** | **AACC[b] TAP Increment[c] ($\mu g/m^3$)** | **Percent of Increment** |
| Formaldehyde | 50-00-0 | Annual | 2.98E-04 | 7.7E-02 | 0.4% |
| Arsenic | 7440-38-2 | Annual | 7.93E-07 | 2.3E-04 | 0.3% |
| Cadmium | 7440-43-9 | Annual | 4.36E-06 | 5.6E-04 | 0.8% |
| Nickel | 7440-02-0 | Annual | 8.33E-06 | 4.2E-03 | 0.2% |

a. Micrograms per cubic meter.
b. Acceptable Ambient Concentration for Carcinogens.
c. Toxic Air Pollutant allowable increment impact listed in Idaho Air Rules Section 586.

## 4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any ambient air quality standard.