Air Quality Permitting
Statement of Basis

July 14, 2006

Permit to Construct No. P-050311

Tronox, LLC

Soda Springs, ID
Lithium Vanadium Oxide Process
Facility ID No. 029-00002

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FINAL PERMIT

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Acronyms, Units, and Chemical Nomenclatures

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
Btu	British thermal unit
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
gr	grain (1 lb = 7,000 grains)
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
LCO	lithium cobalt oxide
LMO	lithium manganese oxide
LVO	lithium vanadium oxide
m	meter(s)
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operations and maintenance
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	Synthetic Minor
SO_2	sulfur dioxide
T/yr	tons per year
UTM	Universal Transverse Mercator
V_2O_5	vanadium pentoxide
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

2. FACILITY DESCRIPTION

The Tronox, LLC (Tronox) facility in Soda Springs produces cathode materials for rechargeable batteries. The facility currently includes two manufacturing processes housed separately at the same location: a lithium vanadium oxide (LiV_3O_8 or "LVO") process and a lithium manganese oxide ($LiMn_2O_4$ or "LMO") process that can also be used to produce lithium cobalt oxide ($LiCoO_2$ or "LCO"). The LMO/LCO process is currently permitted under a separate permit to construct (PTC) No. P-060306, issued May 23, 2006. The use of cobalt in the LMO process to produce LCO is permitted under PTC No. 029-00002, issued April 30, 1997.

The use of these hybrid materials is an emerging technology, and therefore requires some flexibility in the specific arrangement and use of individual units. In the current configuration for LVO production, the facility uses either of two different feedstock pre-mix methods.

In the existing pre-mix process, vanadium oxide and lithium salt are blended in an enclosed blender. The mixture is then ground in an enclosed grinder. Vanadium compounds emitted from the existing process may include emissions of vanadium pentoxide (V_2O_5), a noncarcinogenic toxic air pollutant (TAP) regulated under IDAPA 58.01.01.585.

In the new alternate pre-mix process, vanadium oxide and lithium salt are blended in a water mix which converts any V_2O_5 in the feedstock to a lithium vanadium oxyhydrate. Once dried, the LVO pre-mix is transferred to a milling process (#2, #3, and #4 Milling). Each of the spray dryers and milling units is provided with a dedicated baghouse or collector as well as a secondary filter. Fugitive dust emissions from the alternate spray dryer pre-mix process are collected in the new Baghouse #3.

The ground mixture from either of the pre-mix processes is then placed in containers and carried through an electrically-heated kiln/reactor to complete the reaction to form LVO. Reactor operations may also include calcining carbon black in an electrically-heated calciner. The process air from the existing pre-mix mixing and grinding processes and the reactor operations passes through the reactor operations baghouse and HEPA filter.

After the reaction is complete, the material passes through a de-lumper into the enclosed #1 milling system. The primary purpose of the #1 milling system is to mill the LVO to the proper particle size before the material is transferred to the classification system, where the LVO is sorted by size. Emissions from the #1 milling system are collected and controlled with a dedicated cartridge collector and a secondary filter. The classification system is currently configured as two parallel circuits, each served by a cartridge collector, with 80% of the exhaust from the collectors recirculated back through the classification system. The emissions from the collectors are further controlled by a secondary filter.

After milling and classification, the material is blended and mixed with two proprietary non-regulated substances. The final blend is sent through final processing and packaged. Emissions from final processing are routed through the packaging baghouse and HEPA filter. Fugitive dust emissions from the LVO production process (reactor operations, #1 milling, classification, and final operations) are collected in the new Baghouse #4.

Carbon black, a TAP regulated under IDAPA 58.01.01.585, may be added in the #1 milling, classification, and/or final operations processes. The total amount of carbon black added during these steps may constitute as much as 10 percent (estimated at 51 pounds per hour) of the material throughput. Fugitive emissions from the reactor operations process may also contain carbon black. Carbon black emissions are collected and controlled by the reactor operations baghouse and HEPA filter, the #1

milling and classification system collectors and filters, the final operations baghouse and filter, and Baghouse #4.

Emissions from each step in either of the pre-mix batch processes are controlled by dedicated baghouses and filter/collectors. Material collected from the baghouses and filter/collectors is recycled into the process or is sold as product. This approach minimizes waste generation, illustrates the level of focus on limiting the loss of production material, and provides support for the determination that the baghouses and filter/collectors should be treated as process equipment rather than as air pollution control devices.

3. FACILITY / AREA CLASSIFICATION

Table 3.1 shows the potential to emit (PTE) for criteria pollutants and hazardous air pollutants (HAPs) from the LVO and LMO/LCO process facility for Aerometric Information Retrieval System (AIRS) facility classification purposes.

This PTE estimate is based on a determination by DEQ that, in accordance with EPA guidance[1] the baghouses and filters are inherent components of the LVO and LMO/LCO production process. Each emissions unit has a dedicated baghouse or collector, which allows recovery of product at each processing step. The primary purpose of this equipment is to recover product and it would be installed if no air quality regulations were in place.

The facility is not a designated facility as defined by IDAPA 58.01.01.006. The Standard Industrial Classification code for the facility is 2899 (chemicals and chemical processes not classified elsewhere). The Tronox Soda Springs facility is classified as a natural minor facility because, as shown in the table, without requiring limits on its PTE, the PTE is less than major source thresholds. The AIRS classification is therefore "B."

Table 3.1 POTENTIAL TO EMIT ESTIMATES – CRITERIA AND HAZARDOUS AIR POLLUTANTS

Lithium Vanadium Oxide Process Throughput: 460 lb/hr, 2,015 T/yr[a]					**Lithium Manganese Oxide/ Lithium Cobalt Oxide Process Throughput: 300 lb/hr, 1,314 T/yr[a]**	
Pollutant / Emission Source	**PM/PM_{10} Emissions[b] (T/yr)**				**Emission Source**	**PM/PM_{10} (Mn Cmpds)[c] (T/yr)**
Dryers #1, #2, #3 + Filter/HEPA	9.05E-05				LiOH Bake Calciner + Baghouse	0.50
#2, #3, #4 Milling +Collectors/Filters	6.03E-05				Mn_2O_3 Calciner + Baghouse	0.50
Baghouse #3 + HEPA Filter	6.76E-04				$LiMn_2O_4$ Calciner + Baghouse	0.50
#1 Milling + Filter	2.23E-05				Annealing Calciner + Baghouse	0.50
Classification + Filter	2.23E-05				150 Mill + Baghouse	0.027
Kiln (Reactor) Baghouse + HEPA Filter	1.46E-04				250 Classifier + Filter/Collector	0.015
Final Operations: Packaging Baghouse + HEPA Filter	4.06E-04				500 Classifier + Filter/Collector	0.33
LVO Reactor Operations Nuisance Dust - Baghouse #4 + HEPA Filter	2.02E-04					
Total LVO Process PM/PM_{10} Emissions	1.63E-03				**Total LMO/LCO Process PM/PM_{10}/HAP Emissions**	2.37
Pollutant / Emission Source	**NOx (T/yr)**	**SO2 (T/yr)**	**CO (T/yr)**	**VOC (T/yr)**		
Dryers #1, #2, #3 (uncontrolled)	0.740	0.633	1.09	0.06		

[a] Annual throughput and emissions were very conservatively based on operating 8,760 hours per year. Reductions in total hours due to batch processing and scheduled downtime for routine maintenance were not estimated.

[b] Includes V_2O_5 and carbon black, which are emitted as particulates (these are Idaho TAPs, but not federal HAPs).

[c] These rates are applicable to estimated emissions of PM_{10} or hazardous air pollutants (HAPs from the LMO process are limited to manganese compounds).

[1] U.S. EPA Office of Air Quality Planning and Standards, "Criteria for Determining Whether Equipment is Air Pollution Control Equipment or Process Equipment," letter from Solomon (EPA) to Mohin (Intel), November 27, 1995.

The facility is located outside the city of Soda Springs, within AQCR 61, and UTM Zone 12. The facility is located in Caribou County, which is currently unclassified for all criteria air pollutants (PM_{10}, CO, NO_x, SO_2, lead, and ozone).

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant at the Tronox Soda Springs facility. This required information is entered into the EPA AIRS database.

4. APPLICATION SCOPE

Tronox has submitted an application requesting approval for installation of an alternative LVO pre-mixing process that includes the addition of three new spray dryers (#1, #2, and #3, which may be operated in parallel), three new pre-mix milling units (#2, #3, and #4), a new pre-mix nuisance dust baghouse (Baghouse #3), a new LVO reactor operations dust collection baghouse (Baghouse #4), and to change the facility owner name from Kerr-McGee Stored Power Corp. to Tronox, LLC. The new alternative and the existing LVO pre-mixing processes will not operate concurrently.

Tronox has also requested that DEQ include an emission limitation for carbon black emissions, a non-carcinogenic TAP.

4.1 Application Chronology

April 25, 2005	DEQ received a PTC modification application from Kerr-McGee to add the three new spray dryers, #2 milling, and dryer pre-mix nuisance dust baghouse #3.
April 26, 2005	DEQ received a facsimile submittal of corrected emission calculations.
May 3, 2005	DEQ received a revised PTC modification application without claims of confidential business information for portions of the submittal.
May 14, 2005	DEQ received payment of the $1000 PTC application fee.
May 16, 2005	DEQ returned the original PTC application materials to Kerr-McGee due to claims of confidential business information contained in the application.
May 25, 2005	DEQ declared the PTC modification application complete.
July 20, 2005	DEQ received a submittal of additional information from Kerr-McGee for carbon black emissions, and a request to review a facility draft of the PTC package.
August 9, 2005	DEQ received additional information from Kerr-McGee clarifying that the new equipment does not emit V_2O_5, and revising SO_2 emission estimates.
September 15, 2005	Draft permit issued to Pocatello Regional Office. No comments were received.
September 28, 2005	Facility Draft permit issued.
February 28, 2006	DEQ received a letter request to change the facility owner name from Kerr-McGee Stored Power Corp., to Tronox, LLC.
April 19, 2006	DEQ met with applicant. Received 1) no comments on the facility draft permit that would require changing the permit conditions, 2) submittal of supplemental application materials requesting that the project also include the #3 and #4 Milling processes and reactor operations nuisance dust Baghouse #4, and 3) the $2,500 PTC processing fee.

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

Table 5.1 lists the sources of regulated emissions for the LVO production facility that are being added with this PTC.

Table 5.1 PROJECT EQUIPMENT LISTING

Source Description	Process Equipment/Emissions Control(s)	
	Primary Control	**Secondary Control/ Emissions Point**
Alternate Pre-Mix Process		
Spray Dryer #1 (new) Mfr: Maxon Burner Model: APV Type 3 Series 2 Model 2 Fuel: Natural Gas Heat Input Capacity: 0.75 MMBtu/hr Nominal Product Throughput: 106 lb/hr	**Baghouse (new)** Manufacturer: Micropul Model No. 25S-8-30 with 16 oz. Aramid Fabric Control Efficiency: 99.985%	**HEPA Filter / Vent (new)** Manufacturer: Airguard Model: MC2000 Control Efficiency: 99.97
Spray Dryer #2 (new) Manufacturer/Model No.: SDS Dryer Fuel: Natural Gas Heat Input Capacity: 0.965 MMBtu/hr Nominal Product Throughput: 177 lb/hr	**Baghouse (new)** Manufacturer: Micropul Model No. 64S-10-20 TRH with 16 oz. Aramid Fabric Control Efficiency: 99.985%	**HEPA Filter / Vent (new)** Manufacturer: Airguard Model: MC2000 Control Efficiency: 99.97%
Spray Dryer #3 (new) Manufacturer/Model No.: SDS Dryer Fuel: Natural Gas Heat Input Capacity: 0.965 MMBtu/hr Nominal Product Throughput: 177 lb/hr	**Baghouse (new)** Manufacturer: Micropul Model No. 64S-10-20 TRH with 16 oz. Aramid Fabric Control Efficiency: 99.985%	**HEPA Filter / Vent (new)** Manufacturer: Airguard Model: MC2000 Control Efficiency: 99.97%
#2 Milling (new) Manufacturer: CCE Technologies Model: DPM II Feed Material: SD LVO Pre-Mix Maximum Throughput Rate: 460 lb/hr and 2014.8 T/yr	**Cartridge Collector (new)** Manufacturer: Torit Model No.: TD573 Control Efficiency: 99.999%	Safety Filter/ Safety Filter Vent Manufacturer: Donaldson Model: P129472 Control Efficiency: 99.9%
#3 Milling (new) Manufacturer: CCE Technologies Model: DPM 4 Feed Material: SD LVO Pre-Mix Maximum Throughput Rate: 460 lb/hr and 2014.8 T/yr	**Cartridge Collector (new)** Manufacturer: Torit Model No.: DFT 2-12 Control Efficiency: 99.999%	Safety Filter/Safety Filter Vent Manufacturer: Donaldson Model: P129472 Control Efficiency: 99.97%
#4 Milling (new) Manufacturer: CCE Technologies Model: DPM 4 Feed Material: SD LVO Pre-Mix Maximum Throughput Rate: 460 lb/hr and 2014.8 T/yr	**Cartridge Collector (new)** Manufacturer: Torit Model No.: DFT 2-12 Control Efficiency: 99.999%	Safety Filter/Safety Filter Vent Manufacturer: Donaldson Model: P129472 Control Efficiency: 99.97%
Dryer Pre-Mix Nuisance Dust Control—Baghouse #3 (new)	**Baghouse #3 (new)** Mfr: Micropul Model: 49S-10-20 Mfr Guarantee: 0.02 gr/dscf	**HEPA Filter / Vent (new)** Mfr: Airguard, MC2000 Control Efficiency: 99.97%
Reactor Operations/LVO Production Process Area		
LVO Reactor Operations Nuisance Dust Control—Baghouse #4 (new)	**Baghouse #4 (new)** Mfr: Micro Pul Model: 289S-0-2-TRH Mfr Guarantee: 0.001 gr/dscf	**HEPA Filter / Vent (new)** Mfr: Universal, FASH-30-16 Control Efficiency: 99.97%

5.2 Emissions Inventory

The increases in emissions of criteria air pollutants associated with this PTC are shown in Table 5.2. The detailed emissions inventory is included in Appendix B.

Table 5.2. PROCESS EMISSION ESTIMATES OF CRITERIA POLLUTANTS FROM THIS PTC

Process Description	PM/PM_{10}[1]		NO_x[3]		SO_2[2]		CO[4]		VOCs[5]	
	lb/hr[5]	T/yr[6]	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Alternate Pre-Mix Process										
Spray Dryer #1[6]	4.76E-6	2.09E-6	0.09	0.39	0.041	0.177	0.11	0.48	0.0 (0.004)[8]	0.0 (0.02)[8]
Spray Dryer #2[6]	7.94E-6	3.48E-5	0.04	0.175	0.052	0.228	0.07	0.31	0.0 (0.005)[8]	0.0 (0.02)[8]
Spray Dryer #3[6]	7.94E-6	3.48E-5	0.04	0.175	0.052	0.228	0.07	0.31	0.0 (0.005)[8]	0.0 (0.02)[8]
#2 Milling[7]	4.59E-6	2.01E-5								
#3 Milling[7]	4.59E-6	2.01E-5								
#4 Milling[7]	4.59E-6	2.01E-5								
Dryer Pre-Mix (Baghouse #3)[6]	1.54E-4	6.76E-4								
LVO Reactor Operations Nuisance Dust Collection										
Baghouse #4	4.63E-5	2.02E-4								
Project Totals	**2.35E-4**	**1.03E-3**	**0.17**	**0.740**	**0.145**	**0.633**	**0.25**	**1.09**	**0.014**	**0.06**

[1] particulate matter with a mean aerodynamic diameter of 10 microns or less
[2] sulfur dioxide
[3] nitrogen oxides
[4] carbon monoxide
[5] volatile organic compounds
[6] process equipment emissions are controlled by a baghouse followed in series by a HEPA filter
[7] process equipment emissions are controlled by a baghouse followed in series by a safety filter
[8] values in parentheses were generated by DEQ using AP-42, Section 1.4, July 1998

Change in Criteria Air Pollutant Emissions from this PTC

Emission estimates of pollutants created by combustion of natural gas by each of the three spray dryers were provided in the application. Emission estimates for SO_2, NO_x, and CO cited spray dryer manufacturer data from Maxon Burner (for Spray Dryer #1) and SDS (for Spray Dryers #2 and #3). The gaseous combustion emissions (NO_x, SO_2, CO, and VOCs) are assumed to be uncontrolled. PM_{10} emissions are assumed to equal PM emissions. PM_{10} emissions from each dryer are controlled by a baghouse and a HEPA filter in series.

The permittee provided emissions estimates for PM/PM_{10} for the new milling units and nuisance dust baghouses. The emissions rates were based on the total process throughput of material being routed to the baghouse/collector and filter at each batch step. The throughputs were then multiplied by the value created by subtracting the decimal value of the particulate matter control efficiency for each emissions control device from a value of 1.0000. This was repeated for each emission control device that is installed in series.

Change in Toxic Air Pollutant Emissions from this PTC

The permittee provided information in a July 20, 2005, email and an August 9, 2005, submittal asserting that V_2O_5 undergoes a chemical decomposition to lithium vanadium oxyhydrate when it is added to the water mix during first step of the alternate pre-mix process. The increase in emissions of vanadium compounds from the new alternate pre-mix process was therefore treated as PM/PM_{10}.

The change in emissions of toxic air pollutants (TAPs) from this PTC is limited to new emissions of vanadium pentoxide (V_2O_5, a noncarcinogenic TAP) and carbon black (also a noncarcinogenic TAP) from the new Baghouse #4. These new emissions are shown in Table 5.3, and—because the baghouse/collectors and filters are considered process equipment rather than as air pollution control devices—represent uncontrolled emissions for these TAPs. In response to the facility request for an emission limit on carbon black, carbon black emissions estimates for the existing processes are also shown in that table.

Following the reactor process, the permittee estimated that carbon black might be present at each batch step at levels up to 10 weight percent of the hourly throughput. Emissions of carbon black were estimated by the permittee using a maximum batch process throughput of 51 lb/hr of carbon black, with the entire throughput being routed to the baghouse/collector and filter at each batch step.

Table 5.3. PROCESS EMISSIONS OF TOXIC AIR POLLUTANTS – UNCONTROLLED EMISSIONS

Process Description	V_2O_5		Carbon Black (CAS# 1333-86-4)	
	(lb/hr)[a]	(T/yr)[b]	(lb/hr)[a]	(T/yr)[b]
Increase from this PTC				
Baghouse #4	4.17E-05	1.82E-04	4.36E-06	2.03E-05
Subtotal, this PTC	**4.17E-05**	**1.82E-04**	**4.36E-06**	**2.03E-05**
IDAPA 58.01.01.585 Screening Emission Level	0.003		0.23	
Change in Emissions Exceed EL?	No		No	
Existing Process Emissions				
#1 Milling			5.10E-07	2.23E-06
Classification System			5.10E-07	2.23E-06
Final Operations (Blending and Packaging)			9.26E-06	4.05E-05
Subtotal, Existing Emissions			**1.03E-05**	**4.50E-05**
TOTAL (this PTC plus Existing Emissions)			**1.49E-05**	**6.53E-05**

[a] Based on operating 24 hours per day.
[b] Based on operating 8,760 hours per year. Reductions in total hours due to batch processing and scheduled downtime for routine maintenance were not estimated.

5.3 Modeling

Based on current DEQ modeling guidance,[2] modeling is required for an increase in PM_{10} or SO_2 emissions of 0.2 pounds per hour or 1 ton per year or greater. As shown in Table 5.2, the project's predicted increase in PM_{10} and SO_2 emissions are well below these levels. The predicted increase in NO_x emissions is significantly less than the 1 ton per year modeling threshold for that pollutant, and the increase in CO emissions for the proposed project are well below the 14 pounds per hour modeling threshold for that pollutant. Modeling of criteria pollutant emissions was therefore not required.

As shown in Table 5.3, the increase in emissions of V_2O_5 and carbon black from this PTC are well below the applicable screening emission levels listed in IDAPA 58.01.01.585. Modeling for these TAP emissions was therefore not required.

[2] December 31, 2002, "State of Idaho Air Quality Modeling Guideline," DEQ Document ID AQ-011, Revision 1.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201 ..... Permit to Construct Required

Tronox has requested a permit to add additional emission sources to the LVO process, and to add a permit condition to limit carbon black emissions. This is a modification to an existing permit to construct for this facility.

IDAPA 58.01.01.203 ..... National Ambient Air Quality Standards (NAAQS)

Estimated emissions of criteria pollutants (in this case, emissions of PM_{10}, NO_x, SO_2, and CO were well below currently published DEQ modeling guidance thresholds. Modeling was therefore not required to demonstrate compliance with NAAQS, and stack source testing requirements were not imposed. Therefore, specific emission limits on these criteria pollutants were not needed to ensure compliance with air quality standards.

The facility has demonstrated to compliance, to DEQ's satisfaction, that this project will not cause or significantly contribute to a violation of any ambient air quality standards.

IDAPA 58.01.01.203.3 ..... Toxic Air Pollutants
IDAPA 58.01.01.210 ..... Demonstration of Preconstruction Compliance with Toxic Standards

Increases in TAPs emissions from this modification are limited to emissions of vanadium pentoxide (V_2O_5) and carbon black from the new reactor operations nuisance dust collection Baghouse #4. Each of these TAPs is regulated as a noncarcinogen, subject to a 24-hour average standard under IDAPA 58.01.01.585. As shown in Table 5.3, the increase in the uncontrolled 24-hour potential to emit of these TAPs does not exceed the applicable screening emission level increment. In accordance with IDAPA 58.01.01.210.05, no further procedures were required to demonstrate preconstruction compliance for these emissions, and imposition of pollutant-specific emission limits was not required. In response to a specific request from the facility, however, an emissions limit for carbon black has been included in the permit.

Preconstruction compliance with TAPs increments for the change in emissions of V_2O_5 and carbon black has been demonstrated to DEQ's satisfaction.

5.5 Permit Conditions Review

This section describes only those permit conditions that have been revised, modified or deleted as a result of this permit action. Other than renumbering, all other permit conditions remain unchanged.

Permit Section Consolidation

The superseded October 7, 2002, permit included separate sections for reactor operations, the #1 milling system, classification system, and "final operations," but imposed essentially the same permit conditions on each of those processes. The current permit consolidates all of the existing and new batch processes into a single section. This avoids unnecessary duplication of permit conditions and clarifies that conditions requiring reasonable control of fugitive emissions apply to the entire LVO process, not just reactor operations.

Permit Condition Deletions

The superseded October 7, 2002, permit included requirements imposed only on reactor operations to comply with air pollution emergency rules and to monitor for visible emissions. Compliance with air

pollution emergency rules contained in IDAPA 58.01.01.550-562 is incumbent on all facilities in Idaho and is covered in the standard language on the first page of the permit. The condition regarding air pollution emergency rule compliance was therefore deleted.

The requirement to monitor for visible emissions was also deleted. The stringent measures employed by the facility to control and capture emissions and return those materials to the production line make it highly unlikely that visible emissions would be an issue for this facility.

Permit Conditions 1.1 through 1.3

Permit Conditions 1.1 through 1.3 contain the purpose of this permit and a current list of the regulated sources, processes, and emissions controls. Permit Condition 1.2 reflects the permittee's request during a February 28, 2006, meeting with DEQ to supersede existing permits for their facility where possible. This PTC replaces the following permits for the LVO production process:

- PTC No. 029-00002, issued October 7, 2002. Amended the permit issued May 17, 2002 to reconfigure the classification system into two parallel circuits, add a second Torit filter to the classification system, and to recirculate 80% of the exhaust from the Torit filters back through the classification system.
- PTC No. 029-00002, issued May 17, 2002. Amended the permit issued July 27, 2001 to add a milling system and a Torit filter, add a classification system and Torit filter, add a new baghouse and HEPA filter for final processing operations, and add a HEPA filter to the calciner baghouse.
- PTC No. 029-00002, issued July 27, 2001. Amended the permit issued June 29, 2000 to reflect reacting the mixed feedstocks by passing them in lidded pans through electrically-heated belt kilns, add drying carbon black in an electrically-heated calciner, include a step to blend calcined carbon black with the finished LVO, add additional process and control equipment, and increase the production rate to 460 pounds per hour.
- PTC No. 029-00002, issued June 29, 2000. Permit was for the initial construction of this LVO facility including grinding, screening, calcining, and packaging operations to manufacture LVO from an oxide of vanadium (assumed to be 100% vanadium pentoxide for air toxics evaluation) and lithium carbonate feedstocks. Maximum LVO production limit was 50 pounds per hour. Emissions from the entire process were collected in a single baghouse.

Permit Condition 2.1

A limit on carbon black emissions was included in response to a specific request from the permittee. The daily limit was set based on the permittee's estimated use of 51 pounds per hour of carbon black and a 24-hour operating day (equals 1,224 pounds per day). The daily limit is consistent with the 24-hour averaging period for noncarcinogenic TAPs standards. This is a new condition compared to earlier permits.

Compliance Assurance

Permit Condition 2.7 limits the processes where carbon black may be added, and limits the amount of carbon black that may be added, which inherently limits the potential emissions of this TAP. Permit Condition 2.11 requires monitoring and recording of the amount of carbon black calcined per day, and the amount of carbon black added to each batch step per day. That condition also requires that the records for the most recent two-year period be kept on site.

Permit Condition 2.2

This standardized language prohibiting exceedances of 20% opacity for period(s) greater than three minutes in any 60-minute period was included in the superseded permits, and has not been changed in the current permit.

Compliance Assurance

No monitoring and recordkeeping requirement is established in the permit to demonstrate compliance with the opacity limitation. All process equipment emission sources associated with this project are controlled by two filtration systems arranged in series to capture product and control emissions. Visible emissions are not anticipated to be an issue for these sources.

Permit Condition 2.4

Permit Condition 2.4 was added to clarify that the reactor operations units are electrically heated, and that the new spray dryers operate on natural gas. Operation of electrical heating for the spray dryers would not increase the facility emissions, and was included to provide additional flexibility for facility operations.

Compliance Assurance

Modification of the spray dryers to use a fuel other than natural gas may trigger requirements for the facility to submit a PTC application.

Permit Conditions 2.5 and 2.6

Permit Condition 2.5 was added to clarify the chemical form of the feedstocks, which provides the basis for identification of potentially toxic air pollutants that may be emitted from these processes. Permit condition 2.6 was added to require reacting the feedstocks with water during the first step of the alternate pre-mix process to convert any V_2O_5 into a non-regulated vanadium compound—this is the basis for treating vanadium compound emissions from that process as PM/PM_{10} rather than V_2O_5 (a regulated TAP).

Compliance Assurance

A change in feedstocks that would result in production of new emissions of regulated air pollutants, or a change in the method of operation that would prevent conversion of V_2O_5 in the first step of the alternate pre-mix process would trigger requirements for the facility to submit a PTC application.

Permit Condition 2.7

The LVO production limit was changed from 460 pounds per hour to 11,040 pounds per day (460 lb/hr over a 24-hour operating day). The estimated facility emissions are below DEQ modeling thresholds for criteria pollutants with short-term NAAQS limits (PM_{10}, SO_2, and CO), and no source testing requirements have been imposed, so an hourly production limit was not needed. The daily LVO production limit reflects the 24-hour averaging time for the Condition 2.1 limit on emissions of carbon black. The annual LVO production limit is unchanged compared to the previous permit.

A daily limit on the use of carbon black was also added, based on the permittee's estimate of adding a maximum of 51 pounds per hour of carbon black to the LVO production process, and reflects the 24-hour averaging time for the Condition 2.1 limit on carbon black emissions. At 24 hours per day of operation, the total quantity of carbon black that is permitted to be used in the LVO production process is 1,224 pounds on a daily basis.

Compliance Assurance

Condition 2.11 requires monitoring and recording of the amount of the daily and annual LVO production and the daily amount of carbon black that is calcined or added to the batch processes. That condition also requires that the records for the most recent two-year period be kept on site.

Permit Conditions 2.8 through 2.11

The superseded October 7, 2002, permit required an O&M manual, pressure drop capabilities on the baghouse/collectors and filters, and daily pressure drop monitoring and recording. Permit Conditions 2.8 through 2.11 of the current permit impose similar requirements, apply the requirements to all baghouse/collectors and filters, and provide more detail regarding the specific requirements for the O&M manual. The current permit also reduces pressure drop monitoring and recordkeeping from daily to weekly and specifies that inspections of the baghouse/collectors and filters must be conducted at least monthly. These terms and conditions are sufficient to ensure compliance, and—to make facility-wide compliance less cumbersome—mirror the conditions imposed by PTC No. P-060306, issued May 23, 2006, for the lithium manganese oxide (LMO) production process at this facility.

Compliance Assurance

Permit Conditions 2.9 and 2.11 require that records be maintained on site, and Permit Condition 2.11 requires monitoring and recordkeeping.

Permit Condition 2.12

In an effort to make facility-wide compliance less cumbersome by mirroring the conditions imposed by PTC No. P-060306, issued May 23, 2006, for the lithium manganese oxide (LMO) production process at this facility, Permit Condition 2.15 was added to require written reports of exceedances.

Compliance Assurance

Permit Conditions 2.9 and 2.11 require that records be maintained on site, and Permit Condition 2.11 requires monitoring and recordkeeping.

General Provision No. 5

General Provision No. 5 was revised to reflect the current standardized conditions applied to all PTCs.

6. PERMIT FEES

DEQ received a PTC application fee of $1,000 on May 4, 2005.

PTC processing fees apply for the increase in emissions associated with this project. The increase in emissions associated with this modification is 2.52 T/yr. IDAPA 58.01.01.225 requires the payment of a $2,500 processing fee for a new source or modification to an existing source with an increase of emissions of one to less than 10 tons per year (see Table 6.1). Tronox paid the $2,500 PTC processing fee on April 19, 2006.

Tronox is a non-major source for criteria and hazardous air pollutants. This PTC modification does not affect the facility's non-major status.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.74	0	0.74
SO_2	0.63	0	0.63
CO	1.09	0	1.09
PM_{10}	0.001	0	0.001
VOC	0.06	0	0.06
HAPS	0.0	0	0.0
Total:	2.52	0	2.52
Fee Due	$ 2,500.00		

7. PERMIT REVIEW

The final permit differs from the facility draft in the following ways:

- Permit sections for all processes associated with LVO production were consolidated into a single section.
- In Section 1, the list of regulated equipment was revised to include #3 and #4 Milling as part of the alternate pre-mix process, with Baghouse #4 added as a stand-alone process. The option to calcine carbon black was also included to reflect a process authorized in the July 27, 2001, superseded permit.
- In Section 2, the list of equipment and process and emissions control descriptions were revised to include #3 and #4 Milling processes and Baghouse #4, and where appropriate, permit conditions were revised to include this additional new equipment.
- The permitted emission limit for carbon black was increased from 1.03E-05 pounds per hour to 3.58E-04 pounds per day, and includes potential carbon black emissions from the new Baghouse #4.
- General Provision 5 was updated to reflect current PTC general conditions.

7.1 Regional Review of Draft Permit

The draft PTC package was provided to the Pocatello Regional Office on September 15, 2005. The Pocatello Regional Office did not provide any comments. Changes to the permit needed to incorporate the April 2006 supplemental information to add #3 and #4 Milling equipment to the alternate pre-mix process and to add Baghouse #4 did not substantially change the permit requirements compared to the facility draft permit. The final permit was not routed a second time for PRO review.

7.2 Facility Review of Draft Permit

On September 28, 2005, a draft of the permit and statement of basis was issued to Kerr-McGee (now Tronox, LLC). Due to project/process development issues, the facility requested a delay in responding to the draft. On April 19, 2006, a facility representative met with DEQ in Boise and submitted 1) no comments on the facility draft permit that would require changing those permit terms and conditions, and 2) supplemental application materials requesting that the project also include two additional milling steps (#3 and #4 Milling) and one additional nuisance dust baghouse (Baghouse #4).

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided from June 2 to July 5, 2005, in accordance with IDAPA 58.01.01.209.01.c. During this time, there were no comments on the application and no requests for a public comment period on DEQ's proposed action. The additional changes requested by the facility on April 19, 2006, to install two more milling steps and a nuisance dust baghouse were not substantively different from the original PTC scope. An additional opportunity for public comment was not recommended.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that Tronox, LLC be issued final PTC No. P-050311 for the construction of the alternate SD pre-mix process, a production area nuisance dust collection system, and the facility-requested carbon black TAP emission limits. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

Appendix A

AIRS Information

P-050311

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: Tronox, LLC
(Lithium Vanadium Oxide AND Lithium Manganese Oxide Production)
Facility Location: 1864 N. Highway 34, Soda Springs, Idaho
AIRS Number: 029-00002

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B							U
NO_x	B							U
CO	B							U
PM_{10}	B							U
PT (Particulate)	B							U
VOC	B							U
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, or each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Emissions Inventory

P-050311

Table B.1 TRONOX, LLC EMISSIONS INVENTORY, DEQ VERIFICATION ANALYSIS, P-050311

	PM/PM10		V2O5 particulates		Carbon Black particulates		NOx		SO2		CO	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
(New) Dryer #1 + Aramid Fabric Filter + HEPA	4.76E-06	2.09E-05					0.09	0.39	0.0405	0.177	0.11	0.48
(New) Dryer #2 + Aramid Fabric Filter + HEPA	7.94E-06	3.48E-05					0.04	0.175	0.0521	0.228	0.07	0.307
(New) Dryer #3 + Aramid Fabric Filter + HEPA	7.94E-06	3.48E-05					0.04	0.175	0.0521	0.228	0.07	0.307
Subtotal	**2.06E-05**	**9.05E-05**										
(New) #2 Milling + Torit Collector + Donaldson Filter	4.59E-06	2.01E-05										
(New) #3 Milling + Torit Collector + Donaldson Filter	4.59E-06	2.01E-05										
(New) #4 Milling + Torit Collector + Donaldson Filter	4.59E-06	2.01E-05										
Subtotal	**1.38E-05**	**6.03E-05**										
(New) Baghouse #3 (Pre-Mix Nuisance Dust)+ MicroPul 49S + HEPA	**1.54E-04**	**6.76E-04**										
(New) Baghouse #4 (Nuisance Dust)+ MicroPul 289S+ HEPA	4.17E-05	1.82E-04	4.17E-05	1.82E-04	4.63E-06	2.03E-05						
Subtotal	**4.63E-05**	**2.02E-04**										
Subtotal Emissions from this PTC	**2.35E-04**	**1.03E-03**			**4.63E-06**	**2.03E-05**	**0.170**	**0.740**	**0.145**	**0.633**	**0.250**	**1.09**
"Reactor Operations" (Kiln) Baghouse + HEPA Filter			3.34E-05	1.46E-04								
#1 Milling + High Efficiency Filter			4.59E-06	2.01E-05	5.10E-07	2.23E-06						
Classification System + High Efficiency Filter			4.59E-06	2.01E-05	5.10E-07	2.23E-06						
"Final Operations" Packaging + Baghouse + HEPA Filter			8.33E-05	3.65E-04	9.26E-06	4.05E-05						
Subtotal Existing Emissions	**1.36E-04**	**5.96E-04**	**1.26E-04**	**5.51E-04**	**1.03E-05**	**4.50E-05**						
TOTAL EMISSIONS	3.71E-04	1.63E-03	1.26E-04	5.51E-04	1.49E-05	6.53E-05	0.170	0.740	0.145	0.633	0.250	1.09
POTENTIAL TO EMIT – LVO PRODUCTION PROCESS												
Total PM/PM10 Emissions (PM/PM10 + V2O5 + Carbon Black)		**1.63E-03**						**0.740**		**0.633**		**1.09**

Baghouse #4, V_2O_5 Emissions: These were not calculated by the permittee. Consistent with the approach for V_2O_5 emissions from existing equipment, V_2O_5 emissions from this baghouse were estimated by DEQ as equal to the PM/PM_{10} emissions (excluding carbon black).

VOC Emissions, Spray Dryers, based on emission factor from AP-42, Section 1.4, Table 1.4-2 (07/98):

Dryer #1: 0.75 MMBtu/hr x (1 MMscf)/(1,020 MMBtu) x (5.5 lb VOC/MMscf) = 0.0040 lb/hr of VOC

Dryers #2, #3: 0.965 MMBtu/hr x (1 MMscf)/(1,020 MMBtu) x (5.5 lb VOC/MMscf) = 0.0052 lb/hr of VOC

Total Emissions From New Processes

V_2O_5 Particulate Emissions (Existing)

	lb/hr	ton/yr
#1 Milling [redacted]	4.59E-06	2.01E-05
Classification System [redacted]	4.59E-06	2.01E-05
"Reactor Operations" Bag House [redacted]	3.34E-05	1.46E-04
"Final Operations" Bag House [redacted]	8.33E-05	3.65E-04
Total V_2O_5 Particulate	1.26E-04	5.52E-04

Particulate Emissions (New)

Dryer #1 [redacted]	4.76E-06	2.09E-05
Dryer #2 [redacted]	7.94E-06	3.48E-05
Dryer #3 [redacted]	7.94E-06	3.48E-05
#2 Milling [redacted]	4.59E-06	2.01E-05
#3 Milling [redacted]	4.59E-06	2.01E-05
#4 Milling [redacted]	4.59E-06	2.01E-05
Bag House #3 [redacted]	1.54E-04	6.76E-04
Bag House #4 [redacted]	4.17E-05	1.82E-04
Total Particulate	2.30E-04	1.01E-03

Carbon Black Particulate Emissions

#1 Milling [redacted]	5.10E-07	2.23E-06
Classification System [redacted]	5.10E-07	2.23E-06
"Final Operations" Bag House [redacted]	9.26E-06	4.05E-05
"Reactor Operations" Bag House [redacted]	0.00E+00	0.00E+00
Bag House #4 [redacted]	4.63E-06	2.03E-05
Total Carbon Black Particulate	1.49E-05	6.53E-05

SO_2 Emissions

	lb SO_2/hr	ton SO_2/yr
Dryer #1 [redacted]	4.05E-02	1.77E-01
Dryer #2 [redacted]	5.21E-02	2.28E-01
Dryer #3 [redacted]	5.21E-02	2.28E-01
Total SO_2 Emissions	1.45E-01	6.33E-01

Dryer Emissions, Dryers #1, #2 and #3

Assumptions for Dryers #1, #2 and #3

1 [illegible] total granulated through put, (200 kg/hr)
2 [illegible]% of the product stream is LVO
3 All emissions are assumed to be PM/PM_{10}

Dryer #1

Nominal Product Rate 40 $\frac{kg}{hr}$

#1 Dryer Primary Filter Efficiency [illegible] % 16 oz Aramid Fabric, (efficiency determined by Mandarin Panel Test)

40 $\frac{kg}{hr}$ * (1-.99980) % * 2.2046 $\frac{lb}{kg}$ = [illegible] $\frac{lb}{hr}$

[illegible] $\frac{lb}{hr}$ * 8760 $\frac{hr}{yr}$ * $\frac{1}{2000}$ $\frac{ton}{lb}$ = [illegible] $\frac{ton}{yr}$

#1 Dryer HEPA Filter Efficiency 99.970 %

[illegible] $\frac{lb}{hr}$ * (1-.9997) % = [illegible] $\frac{lb}{hr}$ Final Emission

[illegible] $\frac{ton}{yr}$ * (1-.9997) % = [illegible] $\frac{ton}{yr}$ Final Emission

Dryer #2

Nominal Product Rate 80 $\frac{kg}{hr}$

#2 Dryer Primary Filter Efficiency [illegible] % 16 oz Aramid Fabric, (efficiency determined by Mandarin Panel Test)

80 $\frac{kg}{hr}$ * (1-.99980) % * 2.2046 $\frac{lb}{kg}$ = [illegible] $\frac{lb}{hr}$

[illegible] $\frac{lb}{hr}$ * 8760 $\frac{hr}{yr}$ * $\frac{1}{2000}$ $\frac{ton}{lb}$ = [illegible] $\frac{ton}{yr}$

#2 Dryer HEPA Filter Efficiency 99.970 %

[illegible] $\frac{lb}{hr}$ * (1-.9997) % = [illegible] $\frac{lb}{hr}$ Final Emission

[illegible] $\frac{ton}{yr}$ * (1-.9997) % = [illegible] $\frac{ton}{yr}$ Final Emission

Dryer #3

Nominal Product Rate 80 $\frac{kg}{hr}$

#3 Dryer Primary Filter Efficiency [illegible] % 16 oz Aramid Fabric, (efficiency determined by Mandarin Panel Test)

80 $\frac{kg}{hr}$ * (1-.99980) % * 2.2046 $\frac{lb}{kg}$ = [illegible] $\frac{lb}{hr}$

[illegible] $\frac{lb}{hr}$ * 8760 $\frac{hr}{yr}$ * $\frac{1}{2000}$ $\frac{ton}{lb}$ = [illegible] $\frac{ton}{yr}$

#3 Dryer HEPA Filter Efficiency 99.970 %

[illegible] $\frac{lb}{hr}$ * (1-.9997) % = [illegible] $\frac{lb}{hr}$ Final Emission

[illegible] $\frac{ton}{yr}$ * (1-.9997) % = [illegible] $\frac{ton}{yr}$ Final Emission

Milling & Fugitive Emissions, #2 Milling, #3 nuisance bag house

Assumptions for #2 milling and #3 nuisance bag house

1 460 lb/hr total pumisted through put, (368 kg/hr)
2 100% of the product stream is LVO
3 All emissions are assumed to be PM/PM_{10}

#2 Milling
Model TD 575, (Twin Collector)

Nominal Product Rate 368 kg/hr

#2 Milling Primary Filter Efficiency 99.999 % Tork, Ultra-Web II Catridges

368 kg/hr * (1-.99999) % * 2.2046 lb/kg = 4.59E-03 lb/hr

4.59E-03 lb/hr * 8760 hr/yr * 1 ton/2000 lb = 2.01E-02 ton/yr

#2 Milling Safety Filter Efficiency 99.90 %
Donaldson Filter, PM P129972

4.59E-03 lb/hr * (1-.999) % = 4.59E-06 lb/hr Final Emission

2.01E-02 ton/yr * (1-.999) % = 2.01E-05 ton/yr Final Emission

#3 Bag House (Pre-mix nuisance dust)
Mikro Pul, 498-30-20

Assumptions:

1 Airflow =	3000	scfm
2 No water in the airflow		
3 Inlet to bag house loading	1	gr/scf
4 Bag house outlet loading	0.02	gr/scf
5 HEPA Filter efficiency	99.97	%

Uncontrolled Emissions:

3000 scf/min * 1 gr/scf * 1/7000 lb/gr * 60 min/hr = 25.7 lb/hr

25.7 lb/hr * 1/2000 ton/lb * 8760 hr/yr = 112.6 ton/yr

Controlled Emissions:

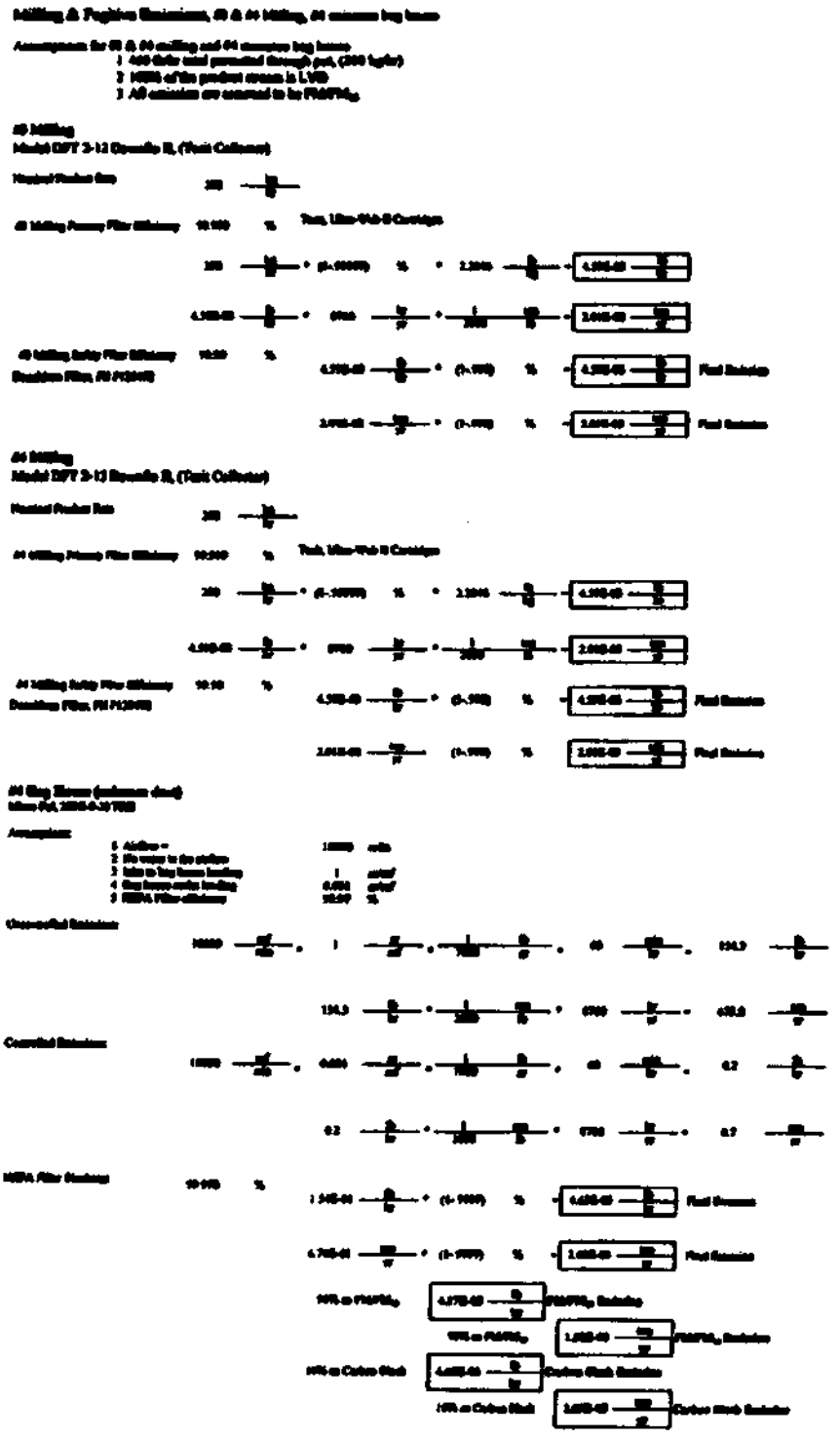
3000 scf/min * 0.02 gr/scf * 1/7000 lb/gr * 60 min/hr = 0.5 lb/hr

0.5 lb/hr * 1/2000 ton/lb * 8760 hr/yr = 2.3 ton/yr

HEPA Filter Discharge 99.970 %

5.14E-01 lb/hr * (1-.9997) % = 1.54E-04 lb/hr Final Emission

2.25E+00 ton/yr * (1-.9997) % = 6.76E-04 ton/yr Final Emission



Natural Gas Density, SO2 & MW

Fuel Data:

Max Sulfur =	20	gr/100 ft^3	(Per NWP Corp Data Sheet)
SG =	0.597		(Per NWP Corp Data Sheet)
MW_{air} =	29	lbs/lbmol	
MW_{NG} =	17.31	lbs/lbmol	
Grain Density =	7000	gr/lb	

$$\frac{P * MW}{R * T} = \text{Density } (\rho)$$

$$R = 0.7302 \quad \frac{atm * ft^3}{lbmol * {}^\circ R}$$

$$T = 520 \quad {}^\circ R$$

$$P = 1 \quad atm$$

$$\rho = 0.04559 \quad \frac{atm * \frac{lb}{mol}}{\frac{atm * ft^3}{mol * {}^\circ R} * {}^\circ R} = 0.04559 \frac{lb}{ft^3} \text{ @ STP}$$

$$\%S = 0.063 \quad \frac{gr * \frac{lb}{gr}}{ft^3 * \frac{lb}{ft^3}} = 0.063\% \frac{wt}{wt} \text{ Max Sulfur}$$

Natural Gas Components

Component	MW	(1) Mol %	Normalized Mol %	%H (wt/wt)	% C (wt/wt)	%H (lb/mol)	% C (lb/mol)
CH_4	16.043	92.622	92.568	23.131	74.869	3.733	11.121
C_2H_6	30.069	4.844	4.842	20.111	79.889	0.2928	1.1631
C_3H_8	44.096	0.960	0.96	18.285	81.715	0.0773	0.3458
iC_4H_{10}	58.123	0.035	0.035	17.341	82.659	0.0035	0.0168
nC_4H_{10}	58.123	0.051	0.051	17.341	82.659	0.0031	0.0245
iC_4H_{12}	72.150	0.015	0.015	16.763	83.237	0.0018	0.0090
nC_4H_{12}	72.150	0.015	0.015	16.763	83.237	0.0018	0.0090
C_6H_{14}	86.177	0.040	0.04	0	83.62	0.0056	0.0288
CO_2	44.010	0.403	0.423	0	27.292	0	0.0484
N_2	28.010	1.051	1.051	0	0	0	0
Tot		100.036	100.00			4.119	12.766

MW_{NG} = 17.31 lbs/lbmol

Total %C (wt/wt)	= (12.767/17.313) * 100	73.74%
Total %H (wt/wt)	= (4.119/17.313) * 100	23.79%
Total %N (wt/wt)	= (28.01 * 1.050/17.313)/100	1.70%

(1) - Data provided by Northwes Pipeline Corp