February 20, 2019

Rick Tabish
FX Solutions, Inc.
955 Beech Street
Missoula, MT 59802

Dear Mr Tabish:

Montana Air Quality Permit #5206-00 is deemed final as of February 20, 2019, by the Department of Environmental Quality (Department). This permit is for the FX Solutions, Inc Anaconda Slag Processing Plant. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Julie A. Merkel
Permitting Services Section Supervisor
Air Quality Bureau
(406) 444-3626

Shawn Juers
Environmental Engineer
Air Quality Bureau
(406) 444-2049

JM:SJ
Enclosure

Montana Department of Environmental Quality
Air, Energy & Mining Division

Montana Air Quality Permit #5206-00

FX Solutions, Inc
955 Beech Street
Missoula, MT 59802

2/20/2019

MONTANA AIR QUALITY PERMIT

Issued To: FX Solutions, Inc.
955 Beech Street
Missoula, MT 59802

MAQP: #5206-00
Application Complete: 11/21/2018
Preliminary Determination Issued: 12/21/2018
Department's Decision Issued: 2/4/2019
Permit Final: 2/20/2019

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to FX Solutions, Inc. (FX), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

Section I: Permitted Facilities

A. Permitted Equipment

FX proposes to construct and operate a slag processing facility which would separate the elemental iron from the Anaconda slag pile for re-use in the steel mill and foundry industries, separating the silica material to produce proppant for use in the natural resource extraction industry (silica proppant is a rounded, hard material used for oil fracking and natural gas extraction to keep fissures open). The slag would be sized through a screen and loaded into trucks to be transported from the slag pile to the main processing plant. At the main processing plant, the material would be dried, further sized and crushed if necessary, and then smelted in an induction or electric arc furnace. In the furnace, temperatures of approximately 3,000 degrees Fahrenheit (° F) are reached to support a carbothermic reaction, where the iron oxide in the slag is reduced using added carbon as the reducing agent, removing oxygen from the iron oxide and recovering the iron. FX estimates the slag contains approximately 45% iron oxide with primarily silica glass left over after the iron is removed. FX proposes to include additives in the furnace which would impart specific properties into the glass to make it suitable for use as a proppant.

The Anaconda slag is known to contain hazardous air pollutant (HAP) metals such as arsenic, lead, manganese, and cadmium. These metals are fixed in the glassy iron silicate slag which greatly reduces the potential mobility and leachability of metals from the slag. The slag is not considered a hazardous waste and is not a part of the current Superfund-related remediation work occurring near the slag pile. Particulate matter emissions associated with material handling and sizing would be expected to have HAP emissions in direct proportion to the concentration of the pollutants in particulate matter and the amount of particulate emissions. The emissions inventory demonstrates estimated potential emissions. Because the proposed exhaust temperature is such that gaseous metal HAP emissions would not be expected, metal HAP emissions would be emitted in the form of filterable particulate emissions, which would be controlled via fabric filter baghouses, enclosures, and other methods. A detailed description of equipment associated with the facility is included in the permit analysis.

B. Plant Location

The Slag Pile Feed Stock and Truck Loading area is located at the Anaconda Slag Pile in the South ½ of Section 01 and North ¼ of Section 12, Township 4 North, Range 11 West, in Deer Lodge County, at approximately Latitude 46° 7'35.23" North, Longitude 112°54'20.22" West.

The physical address of the Main Processing Plant is 1300 Mill Creek Road, Anaconda, Montana 59711, in the NE ¼ of Section 18, Township 4 North, Range 10 West, in Deer Lodge County, at approximately Latitude 46°6'13.36" North, Longitude 112°53'17.22" West.

Section II: Conditions and Limitations

A. Emission Limitations

1. FX shall not cause or authorize the production, handling, transportation, or storage of any material unless reasonable precautions to control emissions of airborne particulate matter are taken (ARM 17.8.308). FX shall treat all unpaved portions of haul roads, access roads, and the general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precaution requirement (ARM 17.8.749).

2. The screen, conveyor, and surge bin in the slag pile feed stock and truck loading area shall be enclosed and drop distance at all transfer points minimized. The conveyor in this area shall be fully enclosed and transfer points to and from the conveyor shall be enclosed. Where transfer from front loader to grizzly feeder occurs, such transfer shall be accomplished with reasonably minimized drop distance to minimize emissions. (ARM 17.8.752).

3. All roads within the Main Processing Plant as depicted in Attachment 1 of this MAQP shall be paved (ARM 17.8.749).

4. FX shall limit operation of all material handling and processing to no more than 8,400 hours per year. Dryer operations shall be further limited as required by Section II.A.14 (ARM 17.8.749).

5. Truck unloading of slag at the Main Processing Plant shall occur under negative pressure such that emissions associated with unloading are captured and sent to a baghouse control device (to be known as the Material Transfer Baghouse). Emissions of PM_{10} from the Material Transfer Baghouse shall not exceed 0.02 grains per dry standard cubic feet (gr/dscf) (ARM 17.8.752 and ARM 17.8.749).

6. Particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$) emissions from the Material Transfer Baghouse shall not exceed 0.006 gr/dscf (ARM 17.8.749).

7. The maximum rated air throughput of the Material Transfer Baghouse shall not exceed 1,100 dry standard cubic feet per minute (dscfm). (ARM 17.8.749).

8. The dryer shall be equipped with a baghouse designed and operated to meet the emissions limitations of Section II.A.9, II.A.10, and II.A.11. The dryer baghouse shall be equipped to continuously measure inlet temperature and pressure drop across the bags. Inlet temperature shall not exceed 300 degrees Celsius. (ARM 17.8.752 and ARM 17.8.749).

9. Emissions of PM_{10}, including condensable particulate matter, emitted to atmosphere from the dryer shall not exceed 0.02 gr/dscf (ARM 17.8.752).

10. Emissions of PM_{10}, including condensable particulate matter, emitted to the atmosphere from the dryer shall not exceed 0.025 lb/ton of dry material processed (ARM 17.8.749).

11. Emissions of $PM_{2.5}$, including condensable particulate matter, emitted to the atmosphere from the dryer shall not exceed 0.006 gr/dscf and 0.007 lb/ton of dry material processed (ARM 17.8.749).

12. Emissions of oxides of nitrogen (NO_X) to the atmosphere from the dryer shall not exceed 0.049 pounds per million British thermal units (lb/MMBtu) (ARM 17.8.749).

13. Emissions of carbon monoxide (CO) to the atmosphere from the dryer shall not exceed 0.082 lb/MMBtu (ARM 17.8.749).

14. FX shall not operate the dryer more than 5,000 hours per rolling 12-months and shall not dry more than 1,200,000 tons of slag per rolling 12-months (ARM 17.8.749 and ARM 17.8.1204).

15. FX shall not process more than 30,420 tons of slag per rolling 12-months in the furnace modules (ARM 17.8.749 and ARM 17.8.1204).

16. Particulate emissions from all furnace modules shall be controlled by baghouse/dust collector, designed and operated such that emissions of PM_{10}, including condensable particulate matter, shall not exceed 0.684 lb per ton of slag processed (ARM 17.8.752).

17. Particulate emissions from all furnace modules shall be controlled by baghouse/dust collector, designed and operated such that emissions of $PM_{2.5}$, including condensable particulate matter, shall not exceed 0.545 lb per ton of slag processed (ARM 17.8.752).

18. The furnace modules baghouse/dust collector shall be equipped to continuously monitor inlet temperature and pressure drop across the bags. Baghouse inlet temperature shall not exceed 300 degrees Celsius. (ARM 17.8.749 and ARM 17.8.752).

19. Emissions of NO_X from the furnace modules shall not exceed 1.75 lb/ton of slag processed (ARM 17.8.752 and ARM 17.8.749).

20. Emissions of CO from the furnace modules shall not exceed 4.81 lb/ton of slag processed (ARM 17.8.752 and ARM 17.8.749).

21. Emissions of sulfur dioxide (SO_2) from the furnace modules shall not exceed 1.75 lb per ton of slag processed and 6.3 lb/hr (ARM 17.8.752 and ARM 17.8.749).

22. FX shall not cause or authorize emissions to be discharged into the outdoor atmosphere that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

23. The diesel generator engine shall have a maximum rated capacity of 175 horsepower. The generator shall meet the Tier III emissions standards of Table 1 of 40 CFR 89.112, as demonstrated via engine certification documentation. Diesel generator operation shall not exceed 1,470,000 horsepower-hours. Horsepower-hours shall be determined by multiplying the maximum rated horsepower of the engine by the hours of operation of the engine. (ARM 17.8.749).

24. FX shall comply with all applicable requirements of 40 CFR 60 Subpart IIII (ARM 17.8.340, ARM 17.8.302 and 40 CFR 60 Subpart IIII).

25. FX shall comply with all applicable requirements of 40 CFR 63 Subpart ZZZZ (ARM 17.8.342, ARM 17.8.302 and 40 CFR 63 Subpart ZZZZ).

B. Testing Requirements

1. Within 6 months of startup, FX Solutions shall test the dryer emissions utilizing Environmental Protection Agency (EPA) Method 201 and Method 202 to monitor compliance with the particulate emissions limitations of Section II.A.9, II.A.10, and II.A.11 (ARM 17.8.749 and ARM 17.8.105).

2. Within 6 months of startup, FX Solutions shall test the furnace module emissions utilizing EPA Methods 201 and Method 202 (ARM 17.8.749 and ARM 17.8.105).

3. Within 6 months of startup, FX shall test the furnace module emissions utilizing EPA Method 29 or Method 0060 Graphite Furnace or similar Methods as may be approved in writing by the Department to verify metal HAP emissions, including any metal HAP emissions emitted in gaseous form (ARM 17.8.749 and ARM 17.8.105).

4. Within 6 months of startup, FX shall test the furnace modules for NO_X and CO emissions, concurrently (ARM 17.8.749 and ARM 17.8.105).

5. Within 6 months of startup, FX shall test the furnace modules for SO_2 emissions (ARM 17.8.749 and ARM 17.8.105).

6. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

7. The Department may require further testing (ARM 17.8.105).

C. Recordkeeping and Reporting Requirements

1. FX shall maintain all required records for a minimum of 5 years from the date of record creation. Records shall be submitted to the Department upon request. (ARM 17.8.749).

2. FX shall maintain on-site a manufacturer/vendor supplied specification sheet for the generator engine specifying such information as necessary to demonstrate compliance with the maximum rated horsepower rating of the generator engine and the emissions ratings of the generator engine (ARM 17.8.749).

3. FX shall monitor and record the pressure drop of each baghouse at a minimum once per day. FX shall compare the pressure drop to the normal operating range. For any pressure drop reading falling outside of the normal operating range, FX shall shutdown the unit until a cause is identified, a solution implemented, and the unit returns to a normal operating range. The overall root cause and solution of the incident as well as the date of the shutdown, and date of commencement of operation shall be recorded in a log. (ARM 17.8.749).

4. FX shall submit to the Department final design parameters including stack height, stack diameter, and estimated exit gas flow rate and temperature, prior to construction, for any emitting units in which parameters are not provided in the application (ARM 17.8.749).

5. FX shall maintain on-site records of the tonnage of slag material dried. By the 25th day of each month, FX shall record the tonnage of slag material dried the previous month, and calculate and record the rolling 12-month sum. (ARM 17.8.749).

6. FX shall record in a log the precautions taken to control emissions from unpaved haul roads. FX shall record at a minimum the precautions taken, and the date of any actions taken (i.e. – note water or chemical dust suppressant and application date). (ARM 17.8.749).

7. FX shall record and maintain a daily log of the inlet temperature of the dryer and furnace module baghouses when operating. (ARM 17.8.749).

8. FX shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations. (ARM 17.8.505). FX shall submit the following information annually to the Department by March 1 of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).

a. Material throughput of each crusher
b. Material throughput of each screen
c. Material throughput of the dryer
d. Sum of material throughput of the furnaces
e. Hours of operation of material handling and processing
f. Hours of operation of the dryer
g. Million British Thermal Units of natural gas burned in the dryer
h. Combined material throughput of the furnaces
i. Horsepower-hours of the diesel generator engine
j. Estimated average weight and mileage of front loaders and haul trucks on unpaved roads/areas
k. Reference to dates of any source tests conducted during the calendar year and emissions factors determined as a result

9. FX shall notify the Department of any construction or improvement project conducted, pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit,*** change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to startup or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(l)(d) (ARM 17.8.745).

10. FX shall, by the 25th day of each month, determine and record the monthly and rolling 12-month sum of dryer operating hours and tons of slag throughput of the dryer for the previous month (ARM 17.8.749).

11. FX shall, by the 25th day of each month, determine and record the monthly and rolling 12-month sum of tons of slag throughput through the furnace modules (ARM 17.8.749).

12. All records compiled in accordance with this permit must be maintained by FX as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

13. FX shall annually certify that its actual emissions are less than those that would require the source to obtain an air quality operating permit as required by ARM 17.8.1204(3)(b). The annual certification shall comply with the certification requirements of ARM 17.8.1207. The annual certification shall be submitted along with the annual emission inventory information. (ARM 17.8.749 and ARM 17.8.1204).

D. Notification

1. FX shall notify the Department in writing of the date of commencement of operation within 15 days of commencement of operation, as determined by the earlier of postmark or email date, for each emitting unit identified in the emissions inventory (ARM 17.8.749).

2. FX shall notify the Department of source testing to be conducted in accordance with the Montana Source Test Protocol Manual (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – FX shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment such as Continuous Emission Monitoring Systems (CEMS) or Continuous Emission Rate Monitoring Systems (CERMS), or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if FX fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving FX of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq*., MCA.

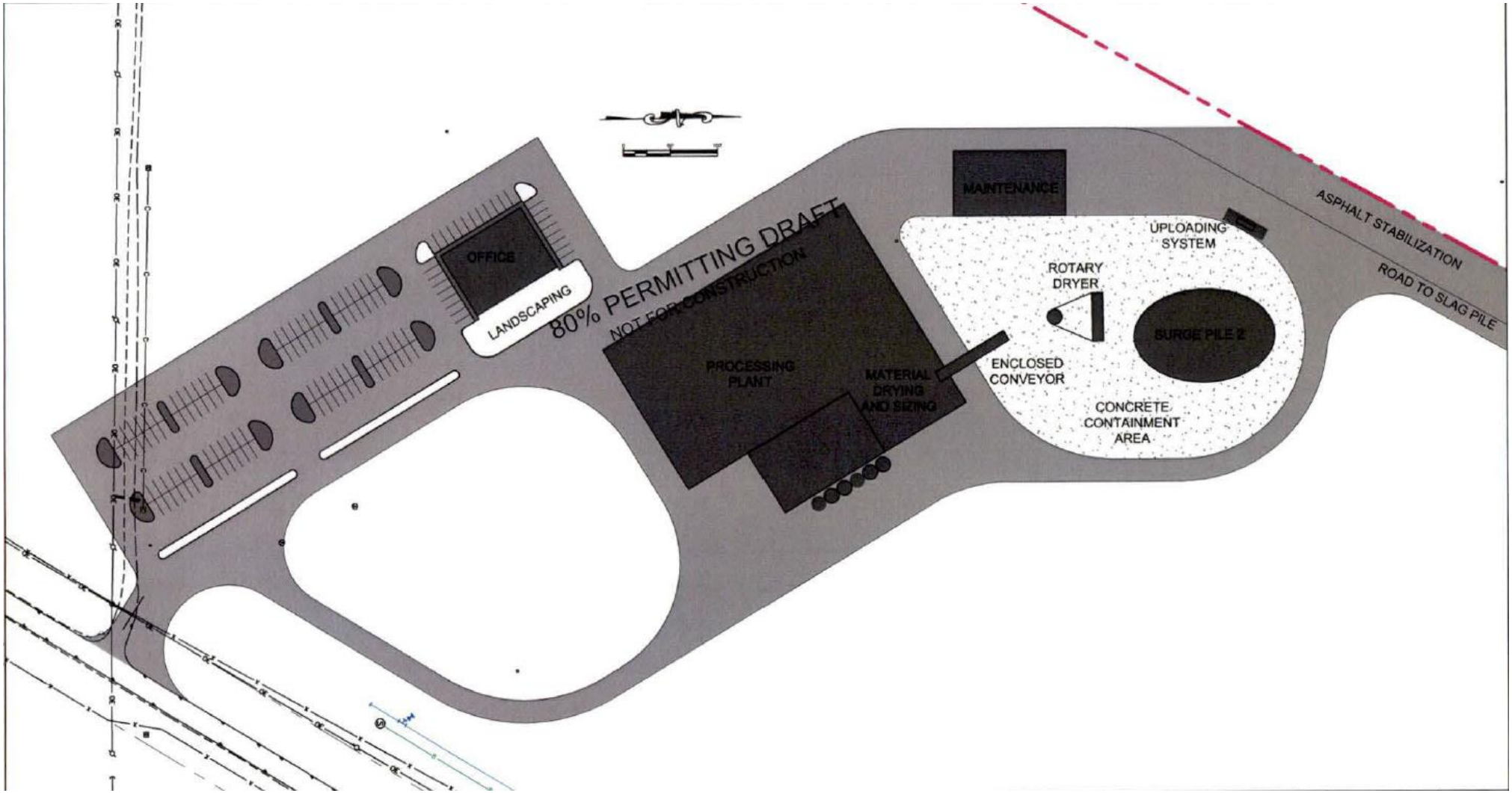
E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Permit Fee – Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by FX may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Attachment 1: Main Plant Pavement Area (Figure 2 of MAQP #5206-00 Application)



Montana Air Quality Permit (MAQP) Analysis
FX Solutions, Inc (FX)
MAQP #5206-00

I. Introduction/Process Description

FX proposes a slag processing facility which would separate the elemental iron from the Anaconda slag pile for re-use in the steel mill and foundry industries, as well as separating the silica material to produce proppant for use in the natural resource extraction industry (silica proppant is a rounded, hard material used for oil fracking and natural gas extraction).

A. Permitted Equipment

Anaconda Slag Pile Site:

- Diesel Generator Engine with maximum rated horsepower of 175, rated to meet Tier 3 emissions standards of 40 Code of Federal Regulations (CFR) 89.112 Table 1 or better
- One 12,000-gallon dyed diesel tank
- Screen 1 fed by Grizzly Feeder
- Conveyor 1 (moving material from initial screen to surge pile and/or Surge Bin)
- One truck loading hopper fed by Surge Bin
- Surge Pile

Main FX Site:

- Negative Pressure Truck Unloading System controlled by Baghouse
- Radial Stacker (Conveyor 2)
- Surge Pile
- Natural Gas fired Rotary Dryer with maximum capacity not to exceed 75 million British thermal units per hour (MMBtu/hr) with material feed limited to 200 tons per hour. Material is fed by hopper, and exhaust controlled via Dryer Baghouse achieving an estimated 99% control efficiency
- Conveyor 2 (moving material from dryer to dried slag surge pile)
- Dried Slag Surge Pile
- Conveyor 3 (moving material from dried surge pile to Screen 2 Load Bin)
- Screen 2 fed by Load Bin
- Conveyor 4 (moving material from Screen 2 to Post Dryer Screened Surge Pile)
- Vertical Shaft Impactor fed by oversized Screen 2 material
- Conveyor 5 (moving material from Post Dryer Screened Surge Pile to Furnaces)
- Furnace additives feed hopper
- 15 Induction Furnace Modules (ran parallel)
- Railcar Loadout
- Conveyor 5 moving material from Atomization unit to Conveyor 6 Hopper
- Conveyor 6 Hopper
- Conveyor 6 (moving material from Conveyor 6 hopper to Screen 3)
- Screen 3

- Conveyor 7 (moving material from Screen 3 to Proppant elevator)
- Proppant Bagger (fed via pneumatic transfer)
- Proppant Elevator (fed via pneumatic transfer)
- Proppant Storage
- Proppant Loadout Hopper
- Proppant Truck Loadout
- Proppant Railcar Loadout
- Additive Storage and Transfer

FX proposed both sites as one facility in one application. Because both sites are under common control, the sites are reasonably determined adjacent, and the operations at the slag pile are in support of the slag processing facility and therefore the operations have the same two-digit standard industrial classification code, the Department of Environmental Quality (Department) determined that assuming the operations as one facility, and therefore issuing one permit covering both locations, was appropriate in this case.

B. Source Description

The slag is sized through a screen and loaded into trucks to be transported from the slag pile to the main processing plant. At the main processing plant, the material is dried, further sized and crushed if necessary, and then smelted in an induction or electric arc furnace. In the furnace, temperatures of approximately 3,000 degrees Fahrenheit (° F) are reached to support a carbothermic reaction, where the iron oxide in the slag is reduced using carbon as the reducing agent, removing oxygen from the iron oxide and recovering the iron.

C. Response to Public Comments

The Department has summarized substantive comments and Department responses below. Comments were received by both the public and the applicant.

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
John Fitzpatrick	Section 5 of the Application and Social and Environmental Impact Section of the draft Environmental Assessment	The commenter states there is a discrepancy between the number of jobs that would be created as communicated to the Deer Lodge County Commissioners, and the number of employees noted in the application and in the Department's Environmental Assessment.	The Department has confirmed with the applicant that the number of anticipated employees needed to run what is addressed within this permit is 30 on-site employees.

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
John Fitzpatrick	Appendix B of the application, and the emissions inventory of the permit	The commenter states that the process flow diagram of the application indicates that 132 truck-loads per day would result in 40 miles traveled per day. Based on the location of the slag pile in relation to the main facility, there would be significantly more than 40 miles per day traveled.	The emissions from haul roads accounted for are emissions which occur from within the FX property line. Less than 800 feet of travel for each load will occur on-site. Travel on roads not within facility property, as a more common example on unpaved county roads, are not associated with a facility's potential to emit. The road between the slag pile and the main processing plant is property owned by Atlantic Richfield. The reasonable precautions requirements of ARM 17.8.308 will apply to that road as it does to any road, however, the emissions are not included in the emissions inventory.
John Fitzpatrick	Emissions Inventory Section of the Permit Analysis and corresponding emissions limitations and conditions	The commenter states the Department has erred in not requiring the applicant to calculate its emissions inventory using emissions factors based on production scale furnaces.	The Department has set emissions limitations, and has required testing to verify those emissions. Based on the research done and provided by the applicant, combined with the practically enforceable emissions limitations which are set and for which the applicant is depending on being correct, the Department is not requiring further information at this time. Testing will be required within 180 days of startup. Further, given the above, requiring the purchase of a production scale furnace prior to permitting would be an economically unreasonable request.
John Fitzpatrick	Emissions Inventory Section of the Permit Analysis and corresponding	The commenter notes that on a temperature basis alone, the arsenic should be expected to fume and report to the zinc oxide	In addition to the detailed mass balances required by the Department as part of the application, the Department has required emissions testing, including metal HAP testing, to

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
	emissions limitations and conditions		verify that emissions estimations are accurate. A mass balance, verified via lab analyses, has been provided in the application.
John Fitzpatrick	N/A	The commenter requests that the applicant fully fund an air quality monitoring contract with an independent, third party consultant to operate and maintain a monitoring system. That consultant should be hired and answerable to the Department.	This facility is proposed to be located in an area with no known or suspected air quality issues for conventional pollutants. Sources of permitted emissions in the area are well regulated. The permit conditions in MAQP #5206-00 are enforceable as a practical manner. Emissions are believed to be accurately characterized and emissions testing has been required to confirm those emissions levels. The Department has determined that requiring FX Solutions to provide ambient monitoring as a condition of the MAQP is not appropriate, given the level of emissions, enforceability of emissions limiting conditions, relatively low level of overall emissions in the area and associated with this action, and prescribed source testing required to ensure a high level of confidence in emissions.
John Fitzpatrick	Emissions Inventory Section of the Permit Analysis and corresponding emissions limitations and conditions	The commenter requests that the applicant submit for each clearly identified piece of equipment, emissions factors certified by the manufacturer or an independent lab.	The emissions factors are based on well-established methodologies such as utilizing EPA's AP-42 Compilation of Emissions Factors, emissions factors well established through existing operations, and via professional judgement. Further, the permit requires testing to verify the emissions factors assumed, to which the applicant has agreed.
John Fitzpatrick	Section III.A	The commenter suggests that the Department insert a provision into the permit which allows the Department to perform inspections without prior notice to the permittee.	Section III.A - General Conditions of the permit contains standard language as placed in all permits regarding providing access for inspection.

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
John Fitzpatrick	Emissions Inventory Section of the Permit Analysis and corresponding emissions limitations and conditions	The commenter requests that the Department require the applicant to provide a detailed explanation as to why the lead precipitates with zinc oxide and the arsenic remains molten with the iron.	The Department has previously requested detailed analyses demonstrating mass balances of HAP metals during the application process. Supplied with the application was representation of mass balances confirmed via laboratory testing. Further, the Department has required emissions testing. Given the details already submitted to the Department and the emissions testing which has been required by this permit, no further analyses are deemed warranted at this time.
Bison Engineering, on behalf of FX	Mass based limits throughout the permit.	Regarding II.A.6 and II.A.7, the commenter states the source (Material Transfer Baghouse) is very minimal from an emissions standpoint. The additional and also incorrect limits provide no environmental benefit. Regarding II.A.10, II.A.11, II.A.12, and II.A.16, the commenter states emissions limitations are inconsistent with what was submitted in the application. In regards to Section II.A.18, 19, 20, 21, and 22, the lb/hr limits are total limits for the 15 furnace modules. FX notes that furnace modules may not be constructed all at once.	The Department has considered these comments as a whole and provides the following in response: To ensure limitations which bear meaning to emissions control performance regardless of actual installed capacity at any one time, as well as to correct any errors while maintaining a clearly defined maximum allowable emissions as portrayed in the emissions inventory, the Department has changed mass based limits (i.e., lb/hr limitations) to a combination of rate based limitations (lb of emissions per ton of slag processed, or lb of emissions per volume of exhaust (i.e. – gr/dscf), or lb of emissions per energy consumed (i.e. - lb/MMBtu)), as well as throughput limits, maximum flowrate capacity limits, etc. The limits have been constructed such that no change to total allowable emissions as represented by the emissions

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
			inventory in Section IV. of the permit analysis is provided. These different forms of limits will ensure that emissions performance requirements are maintained regardless of actual installed capacity. The throughput or maximum rated design capacity limits serve to ensure maximum allowable emissions are clearly defined.
Bison Engineering, on behalf of FX	II.A.11	The commenter questions the need for a separate $PM_{2.5}$ BACT limit.	Note condition II.A.11 has a ARM 17.8.749 rule reference. The emissions limitation serves to not only enforce emissions control performance, but also to clearly define allowable emissions.
Bison Engineering, on behalf of FX	II.A.12, II.A.13, and II.B.6	The commenter questions the need for NO_X and CO BACT limits	The Department has maintained the limits to ensure well defined allowable emissions. However, based on the commonality of this emitting unit and the emissions factors assumed, the Department has agreed to forego the cost to the permittee of an initial testing requirement. In recognition of finding it appropriate to not require testing, the Department has removed the BACT regulatory authority of these limits.
Bison Engineering, on behalf of FX	II.A.15 through II.A.22 and II.B.2, 3, 4, and 5	The commenter requests that the language reflect "furnace modules" instead of furnaces.	The Department has updated the permit language as requested.
Bison Engineering, on behalf of FX	II.A.16 and II.A.17	The commenter requests that the term "baghouse" be replaced by "baghouse/dust collector"	The Department has incorporated the changes requested. This change does not alter the emissions control performance requirements.
Bison Engineering, on behalf of FX	II.B.1	The commenter requests deletion of the $PM_{2.5}$ testing requirement for the dryer. In addition, the condition contains an "Error! Reference source not found" statement	The 'Error! Reference Source Not Found' statement was the result of a document formatting error. The error statement replaced a reference to another permit condition in the document. No

Person/Group Commenting	Application or Draft Permit Reference	Summarized Comment	Department Response
		that may include additional information that cannot be reviewed.	information, however, was unavailable for review. The Department has determined that an initial test is appropriate. Note that no testing requirements beyond an initial test is prescribed at this time. However, the Department maintains the authority to require testing at any time.
Bison Engineering, on behalf of FX	II.C.4	The commenter requests that more specificity be provided, as the 'any emitting units' language could be taken to extremes with respect to insignificant emitting units.	The Department has updated this requirement to specify interest in the furnace module stack(s).
Bison Engineering, on behalf of FX	II.C.7	The commenter notes that the condition applies to each baghouse, but the material handling baghouse has no such underlying condition, and will be operating at ambient temperatures. Additionally, the condition should be clarified to include the recording of temperature daily "when operating".	The Department has incorporated the changes as requested.

D. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department. Upon request, the Department will

provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   FX shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility

9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}
11. ARM 17.8.230 Fluoride in Forage

FX must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, FX shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.

6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. The source shall comply with any applicable requirements of 40 CFR Part 60.

    a. 40 CFR 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:

b. 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006, and are not fire pump engines, and owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005, are subject to this subpart.

8. ARM 17.8.341 Emission Standards for Hazardous Air Pollutants. This source shall comply with any applicable standards and provisions of 40 CFR Part 61, as appropriate.

9. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with any applicable requirements of 40 CFR Part 63.

a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to a NESHAPs Subpart as listed below.

b. 40 CFR 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants (HAPs) for Stationary Reciprocating Internal Combustion Engines (RICE). An owner or operator of a stationary reciprocating internal combustion engine (RICE) at a major or area source of HAP emissions is subject to this rule except if the stationary RICE is being tested at a stationary RICE test cell/stand. An area source of HAP emissions is a source that is not a major source.

D. ARM 17.8, Subchapter 4 – Stack Height and Dispersion Techniques, including, but not limited to:

1. ARM 17.8.401 Definitions. This rule includes a list of definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.402 Requirements. FX must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP).

E. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. FX submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit

(excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

F. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. FX has a PTE greater than 25 tons per year of sulfur dioxide, nitrogen oxides, carbon monoxide, particulate matter, and particulate matter with an aerodynamic diameter of 10 microns or less; therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. FX submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. FX submitted an affidavit of publication of public notice for the May 9, 2018 issue of *The Anaconda Leader*, a newspaper of general circulation in the Town of Anaconda in Deer Lodge County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving FX of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.760 Additional Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those applications that require an environmental impact statement.

12. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

13. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

14. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

15. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

16. ARM 17.8.770 Additional Requirements for Incinerators. This rule specifies the additional information that must be submitted to the Department for incineration facilities subject to 75-2-215, Montana Code Annotated (MCA).

G. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source because this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

H. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

a. PTE > 100 tons/year of any pollutant;

b. PTE > 10 tons/year of any one hazardous air pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #5206-00 for FX, the following conclusions were made:

a. The facility's PTE is less than 100 tons/year for any pollutant.

b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.

c. This source is not located in a serious PM_{10} nonattainment area.

d. This facility is subject to current NSPS (40 CFR 60 Subpart IIII).

e. This facility is subject to current NESHAP standards (40 CFR 63 Subpart ZZZZ).

f. This source is not a Title IV affected source, or a solid waste combustion unit as the term is applicable for Title V applicability.

g. This source is not an EPA designated Title V source.

h. As allowed by ARM 17.8.1204(3), the Department may exempt a source from the requirement to obtain an air quality operating permit by establishing federally enforceable limitations which limit that source's potential to emit.

i. In applying for an exemption under this section, the owner or operator of the source shall certify to the Department that the source's potential to emit, does not require the source to obtain an air quality operating permit.

ii. Any source that obtains a federally enforceable limit on potential to emit shall annually certify that its actual emissions are less than those that would require the source to obtain an air quality operating permit.

FX has taken federally enforceable permit limits to keep potential emissions below major source permitting thresholds. Therefore, the facility is not a major source and thus a Title V operating permit is not required.

The Department determined that the annual reporting requirements contained in the permit are sufficient to satisfy this requirement.

3. ARM 17.8.1207 Certification of Truth, Accuracy, and Completeness.

FX shall annually certify that its actual emissions are less than those that would require the source to obtain an air quality operating permit as required by ARM 17.8.1204(3)(b). The annual certification shall comply with requirements of ARM 17.8.1207. The annual certification shall be submitted along with the annual emission inventory information.

Based on these facts, the Department determined that FX will be a minor source of emissions as defined under Title V based on a requested federally enforceable permit limit.

III. BACT Determination

A BACT determination is required for each new or modified source. FX shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible.

A detailed BACT analysis was submitted by FX in permit application #5206-00, addressing some available methods of controlling emissions throughout the process. The Department reviewed these methods, as well as previous BACT determinations. The following provides a summary of BACT findings. A robust analysis, with which the Department agrees, is available in the application.

Material Processing, Handling, and Transfer:

Filterable PM, PM_{10}, and $PM_{2.5}$ emissions would be expected as a result of crushing, screening, handling, and transfer of the slag material. The following controls were considered for these activities:

Technology	Description
No Add-on Control	This is the base case for proposed new sources.
Best Operational Practices (BOPs)	BOPs include a variety of techniques such as reducing transfer point drop heights.
Enclosure	Enclosure technology employs structures or underground placement to shelter material from wind entrainment. Enclosures can either fully or partially surround the source.
Wet Dust Suppression Including Retained or Inherent Moisture	Fogging water spray adds water, with or without surfactant, to material. Emissions are reduced through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. Moisture retained from water sprays upstream in the process or moisture inherent in the material provides a similar emission-reducing effect.
Electrostatic Precipitator (ESP)	An ESP uses electrical forces to move entrained particles onto a collection surface. To remove dust cake from the collection surface, the collection surface is periodically "rapped" by a variety of means to dislocate the particulate, which drops down into a hopper.
Wet Particulate Scrubber	Wet scrubbers typically use water to impact, intercept, or diffuse a particulate in a waste gas stream. Particulate matter is accelerated and impacted onto a solid surface or into a liquid droplet through devices such as a venturi and spray chamber. Wet slurry material is typically stored in an on-site waste impoundment.
Fabric Filter (Baghouse)	Baghouses direct particulate-laden exhaust through tightly woven or felted fabric that traps particulate by sieving and other mechanisms. Collection efficiency pressure drop simultaneously increases as a particulate layer collects on the filter. Filters are intermittently cleaned by shaking the bag, pulsing air through the bag, or temporarily reversing the airflow direction.

Slag Pile Site Feed Processing:

Because the material from the slag pile will require drying, dust suppression utilizing wet dust suppression techniques would not be feasible. The location of the slag pile site is not powered. FX submitted that use of a baghouse or other control techniques requiring power would require use of larger generator engine. Given the level of control achievable with

other methods, the Department agreed that an ESP, Wet Scrubber, or a Fabric Filter is not warranted in this case. The use of enclosures can provide a significant amount of control without requiring additional emissions from a diesel generator engine.

The following condition was determined BACT:

The screen, conveyor, and surge bin in the slag pile feed stock and truck loading area shall be enclosed and drop distance at all transfer points minimized. The conveyor in this area shall be fully enclosed and transfer points to and from the conveyor shall be enclosed. Where transfer from front loader to grizzly feeder occurs, such transfer shall be accomplished with reasonably minimized drop distance to minimize emissions.

Main Facility Site:

Once dried, the material must remain dry through handling, storage and transport. Therefore, wet suppression techniques would not be feasible. FX Solutions proposed to install a negative pressure unloading system and skirted radial stacker, with a baghouse controlling emissions collected. As FX has proposed the top-ranking control for those emissions points, the Department agrees with no further analyses necessary.
For the remaining material handling operations, FX submits that collection of the emissions from conveyor transfers, hopper loading, screening, and product off-loading would be prohibitively expensive. From a cost envelope perspective, enclosures, providing 90% control, provides a relatively high level of control with relatively little cost compared to baghouse control. With just over 10 tons per year of PM_{10} emissions which would be further controlled by a baghouse, the Department agrees with FX's proposed BACT determination that best management practices and enclosures meets BACT where baghouse control is not proposed, in this case. The addition of baghouse control to these sources would pose an additional cost per ton of particulate controlled disproportionate to available technically feasible alternatives.

Furnace Modules

This process uses a series of electric induction furnaces to heat slag material to 3,000 °F. Combustion products such as carbon monoxide (CO) and oxides of nitrogen (NO_X) as well as sulfur dioxide (SO_2) are created. Based on the level of emissions and the cost of controls for these pollutants, add-on controls were demonstrated as cost prohibitive for these pollutants. For example, catalytic oxidation for CO control would require exhaust gasses be re-heated, and annual costs were estimated at over $31,000 per ton. NO_X emissions controls via scrubbing was estimated at $29,337 per ton removed. Emissions of SO_2 would be inherently low. A limit of 1.75 lb of SO_2 emissions per ton of slag processed was proposed and accepted as demonstration of inherently low emissions.

Regarding particulate matter emissions, the following controls were considered:

Technology	Description	Control Effectiveness
Baghouse	Baghouses/dust collectors direct particulate-laden exhaust through tightly woven or felted fabric that traps particulate by sieving and other mechanisms. Collection efficiency pressure drop simultaneously increases as a particulate layer collects on the filter. Filters are intermittently cleaned by shaking the bag, pulsing air through the bag, or temporarily reversing the airflow direction.	99%
Electrostatic Precipitator (ESP)	An ESP uses electrical forces to move entrained particles onto a collection surface. To remove dust cake from the collection surface, the collection surface is periodically "rapped" by a variety of means to dislocate the particulate, which drops down into a hopper.	99%
Wet Particulate Scrubber	Wet scrubbers typically use water to impact, intercept, and/or diffuse particulate in an exhaust gas stream. Particulate matter is accelerated and impacted onto a solid surface or into a liquid droplet through devices such as a venturi and spray chamber. Wet slurry material is typically stored in an on-site waste impoundment.	98%
Cyclone	A cyclone acts as an inertial separator which is very effective at separating the coarse material from a gas stream. A cyclone has a lower collection efficiency for smaller diameter particles.	90%
No Add-on Control	Base Case	0%

FX proposed to install a top ranked control technology, dust collection with baghouse control, to control particulate matter from each furnace module. As such, no further analyses were required. Further, because outlet gas temperatures are anticipated to be below 200°F, most condensable particulate matter emissions are expected to be controlled. The following BACT condition was derived by the department:

Emissions of particulate matter with an aerodynamic diameter of 10 microns or less (including condensable particulate matter) emitted to atmosphere from the dryer shall not exceed 0.02 grains per dry standard cubic foot. Baghouse inlet gas temperatures shall not exceed 300 °F (ARM 17.8.752).

Rotary Dryer

The dryer, used to dry the slag prior to entry into the furnace, would have combustion related emissions associated with the natural gas fired drying, as well as particulate matter both as a result of natural gas combustion and as a result of entrainment of particulate from the incoming slag material. Combustion products such as CO and NO_X as well as SO_2 are created. These combustion products would result from combustion of natural gas only; the drying process would not result in combustion of the slag material. Based on the level of emissions and the cost of controls for these pollutants, add-on controls are not typically required for natural gas combustion for CO, NO_X or SO_2. No further analysis was required for these pollutants.

For particulate matter emissions, the following control technologies were reviewed:

Technology	Description	Control Effectiveness
Baghouse	Baghouses/dust collectors direct particulate-laden exhaust through tightly woven or felted fabric that traps particulate by sieving and other mechanisms. Collection efficiency pressure drop simultaneously increases as a particulate layer collects on the filter. Filters are intermittently cleaned by shaking the bag, pulsing air through the bag, or temporarily reversing the airflow direction.	99%
Electrostatic Precipitator (ESP)	An ESP uses electrical forces to move entrained particles onto a collection surface. To remove dust cake from the collection surface, the collection surface is periodically "rapped" by a variety of means to dislocate the particulate, which drops down into a hopper.	99%
Wet Particulate Scrubber	Wet scrubbers typically use water to impact, intercept, and/or diffuse particulate in an exhaust gas stream. Particulate matter is accelerated and impacted onto a solid surface or into a liquid droplet through devices such as a venturi and spray chamber. Wet slurry material is typically stored in an on-site waste impoundment.	98%
Cyclone	A cyclone acts as an inertial separator which is very effective at separating the coarse material from a gas stream. A cyclone has a lower collection efficiency for smaller diameter particles.	90%
No Add-on Control	Base Case	0%

FX proposed to install a baghouse, a top-ranking control technology, to control particulate emissions from the rotary dryer. The Department concurred with no further analyses required. A limit of 0.02 gr/dscf, including condensables, was assigned. This represents a high level of baghouse performance.

IV. Emission Inventory

Anaconda Slag Pile Site	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	SO_X (tpy)	CO2e (tpy)	HAPs (tpy)	Lead (tpy)
Point Sources										
Diesel-Fired Electric Generator	0.36	0.36	0.36	4.84	6.04	4.84	1.51	---	7.09E-03	---
Screen 1	1.85	0.62	0.04	---	---	---	---	---	1.02E-02	---
Material Transfers (enclosed)	4.74	2.16	0.40						2.62E-02	
Point Source Total	6.95	3.15	0.80	4.84	6.04	4.84	1.51	---	4.36E-02	---
Fugitives										
Material Transfers (not enclosed)	29.88	14.13	2.14	---	---	---	---	---	1.65E-01	---
Pile Fugitive Emissions	1.97E-04	9.30E-05	1.67E-10	---	---	---	---	---	1.09E-06	---
Fugitives Total	29.88	14.13	2.14	---	---	---	---	---	1.65E-01	---
TOTAL (Permitted PTE)	**36.84**	**17.28**	**2.94**	**4.84**	**6.04**	**4.84**	**1.51**	**---**	**2.09E-01**	**---**

Main Facility Site	PM	PM_{10}	$PM_{2.5}$	NOx	CO	VOC	SO_X	CO_2e	HAPs	Lead
	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
Point Source										
Natural Gas Rotary Dryer	12.33	12.33	3.64	9.19	15.44	1.01	0.11	22,193	2.56	9.19E-05
Material Transfer Baghouse	0.79	0.79	0.12	---	---	---	---	---	4.38E-03	---
Furnace Modules	12.87	10.40	8.29	26.46	72.77	0.37	26.46	5.03	1.62	
Screens	2.01	0.68	0.05	---	---	---	---	---	1.02E-02	---
Material Transfers (enclosed)	22.49	10.38	1.80						1.39E-02	
Vertical Shaft Impactor/Crusher	1.01	0.45	0.08						5.58E-03	
Point Source Total	51.49	35.04	13.97	35.65	88.21	1.38	26.57	22198.10	4.21	0.00
Fugitives										
Material Transfers (not enclosed)	23.62	10.78	1.98	---	---	---	---	---	1.24E-01	---
Fugitive Road Emissions	3.82	0.98	0.10	---	---	---	---	---	---	---
Pile Fugitive Emissions	0.43	0.00	0.00	---	---	---	---	---	2.29E-03	---
Fugitives Total	27.87	11.76	2.08	---	---	---	---	---	0.13	---
TOTAL (Permitted PTE)	**79.36**	**46.79**	**16.05**	**35.65**	**88.21**	**1.38**	**26.57**	**22,198**	**4.34**	**0.00**
TOTAL for both sites	**116.20**	**64.07**	**18.99**	**40.49**	**94.25**	**6.21**	**28.08**		**4.55**	

- All PM includes condensable emissions

** CO = carbon monoxide
HAPs = hazardous air pollutants
hp = horsepower
lb = pound
NO_X = oxides of nitrogen
PM = particulate matter
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
SO_2 = sulfur dioxide
TPH = tons per hour
TPY = tons per year
VOC = volatile organic compounds
yr = year

V. Existing Air Quality

The area in which the FX operation is proposed is noted as attainment/unclassifiable for all pollutants.

VI. Ambient Air Impact Analysis

The Department determined, based on the level of emissions authorized, that the impacts from this permitting action will be minor. The Department believes it will not cause or contribute to a violation of any ambient air quality standard.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
XX		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	XX	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	XX	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	XX	4. Does the action deprive the owner of all economically viable uses of the property?
	XX	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	XX	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	XX	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	XX	7a. Is the impact of government action direct, peculiar, and significant?
	XX	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	XX	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	XX	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
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Air Quality Bureau
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ENVIRONMENTAL ASSESSMENT (EA)

Issued To: FX Solutions, Inc.
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Montana Air Quality Permit (MAQP) number: 5206-00

EA Draft: December 21, 2018
EA Final: February 4, 2019
Permit Final: February 20, 2019

1. *Legal Description of Site:* The Slag Pile Feed Stock and Truck Loading area is located at the Anaconda Slag Pile in the South ½ of Section 01 and North ¼ of Section 12, Township 4 North, Range 11 West, in Deer Lodge County, at approximately Latitude 46° 7'35.23" North, Longitude 112°54'20.22" West.

   The physical address of the Main Processing Plant is 1300 Mill Creek Road, Anaconda, Montana 59711, in the NE ¼ of Section 18, Township 4 North, Range 10 West, in Deer Lodge County, at approximately Latitude 46°6'13.36" North, Longitude 112°53'17.22" West.

2. *Description of Project:* FX proposes a slag processing facility which would separate the elemental iron from the Anaconda slag pile for re-use in the steel mill and foundry industries, as well as separating the silica material to produce proppant for use in the natural resource extraction industry (silica proppant is a rounded, hard material used for oil fracking and natural gas extraction). The slag is sized through a screen and loaded into trucks to be transported from the slag pile to the main processing plant. At the main processing plant, the material is dried, further sized and crushed if necessary, and then smelted in an induction or electric arc furnace. In the furnace, temperatures of approximately 3,000 degrees Fahrenheit are reached to support a carbothermic reaction, where the iron oxide in the slag is reduced using added carbon as the reducing agent, removing oxygen from the iron oxide and recovering the iron.

3. *Objectives of Project:* To recover iron from the Anaconda Slag Pile and to produce valuable by-product as a result of the process.

4. *Alternatives Considered:* In addition to the proposed action, the Department also considered the "no-action" alternative. Because the applicant proposes operations via an application in compliance with all applicable air quality regulations, the "no-action" alternative was eliminated from further consideration. Air pollution control alternatives were considered in the BACT analysis the permit.

5. *A Listing of Mitigation, Stipulations, and Other Controls:* A list of enforceable conditions, including a BACT analysis, would be included in MAQP #5206-00.

6. *Regulatory Effects on Private Property:* The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. *SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS*: The following comments have been prepared by the Department.

   A. *Terrestrial and Aquatic Life and Habitats*

   The area of operations will be adjacent to the Anaconda slag pile, in areas previously disturbed. Significant impact to terrestrial and aquatic life and habitats would not be expected. The Department reviewed unique, endangered, or limited environmental resources in Section 7.G below.

   B. *Water Quality, Quantity and Distribution*

   Water usage may be required for various air pollution control requirements including on haul roads for dust suppression needs. FX would be required to comply with any applicable water quality regulations.

   C. *Geology and Soil Quality, Stability and Moisture*

   The areas of operations would be in areas which have already been previously disturbed. The FX operations would be removing material from the slag pile. Unpaved haul roads would be expected in the slag pile area.

   D. *Vegetation Cover, Quantity, and Quality*

   The area of operations will be adjacent to the Anaconda slag pile in areas already disturbed. MAQP #5206 would require control of particulate emissions limiting impacts associated with deposition.

   E. *Aesthetics*

   Construction, operation noise, new buildings, and increased traffic would be expected. The larger area has been subject to operations of other sources including remediation work nearby.

   F. *Air Quality*

   MAQP #5206-00 would be issued in accordance with all applicable clean air act requirements.

   G. *Unique Endangered, Fragile, or Limited Environmental Resources*

   The Department consulted the Montana Natural Heritage Program to obtain any information on record regarding the presence of any species of special concern in the area. While the greater area has the potential for numerous animal species, only three species of

special concern were noted as being observed in the area. The area has long been a site of contamination, with superfund reclamation activities nearby. The following outlines the species of concern noted:

Clark's Nutcracker

According to the field guide available from the Montana Natural Heritage Program, Nutcrackers in Montana typically occupy conifer forests dominated by whitebark pine at higher elevations and ponderosa pine and limber pine along with Douglas firs at lower elevations, relying largely on seeds of these species for food (Saunders 1921, Mewaldt 1956, Giuntoli and Mewaldt 1978). They often are seen above treeline in alpine meadows or flying among drainages (Johnson 1966, Pattie and Verbeek 1966). No management activities specific to Clark's Nutcracker are currently occuring in Montana. Clark's Nutcracker is dependent on conifer seeds, particularly pine seeds. Management activities promoting the health of pines generally benefit nutcrackers.

The direct loss of any trees is not expected as a result of issuance of MAQP #5206-00. The sites at which FX would have construction and activity are currently barren of any trees. The area has long been a site of contamination, with Superfund reclamation activities nearby.

In reviewing potential impacts from emissions, coarse particulates would likely deposit relatively close to the operations, and fine particulates would likely be dispersed further from the source of emissions. A relatively high level of control of particulates would be required by MAQP #5206-00.

Great Blue Heron

According to the field guide available from the Montana Natural Heritage Program, Great Blue Herons are equally at home in urban wetlands and wilderness settings. Most Montana nesting colonies are in cottonwoods along major rivers and lakes; a smaller number occur in riparian ponderosa pines and on islands in prairie wetlands. Nesting trees are the largest available. Active colonies are farther from rivers than inactive colonies. The number of nests in the colony corresponds to the distance from roads (Parker 1980). Great Blue Herons build bulky stick nests high in the trees when nesting near the shores of rivers and lakes and on the ground or in low shrubs when nesting on treeless islands.

No management activities specific to Great Blue Heron are currently occurring in Montana, although annual colony counts have been conducted for the past several years as a follow-up assessment to Thompson (1981). Effects of human disturbance at 22 colonies in northwestern Montana was examined in 1978 and 1979 (Parker 1980). Larger colonies tended to be farther from roads, and some colonies close to rivers were abandoned when disturbed by recreational activity early in the nesting season. Larger colonies from the late 1960s had splintered into smaller colonies that were occupied for only 5-10 years; colony relocations may have resulted from deterioration of habitat quality and increased disturbance from humans. Most studies recommend a minimum 300 m buffer zone from the periphery of colonies in which no human activity should take place during courtship and the nesting seasons, with the exception of scientific studies (Butler 1992).

The direct loss of any trees is not expected as a result of issuance of MAQP #5206-00. The sites at which FX will have activity and construction are currently barren of any trees. The area in general has long been a site of human activity.

In reviewing potential impacts from emissions, coarse particulates would likely deposit relatively close to the operations, and fine particulates would likely be dispersed further from the source of emissions. A relatively high level of control of particulates would be required in MAQP #5206-00.

Mealy Primrose

According to the field guide available from the Montana Natural Heritage Program, Wetland habitats of mealy primrose can be adversely affected by water diversions that lower water tables, and via secondary effects from grazing.

The direct loss of any wetland habitat would not be expected as a result of issuance of MAQP #5206-00.

In reviewing potential impacts from emissions, coarse particulates would likely settle near the point of emissions generation, whereas fine particulates would generally be more dispersed and deposit further away. The largest potential for direct impact to vegetation would likely be deposition of coarse particulates near the point of generation. Limited vegetation is located nearby the proposed points of emissions. Given the long-standing presence of contaminated soils in the area and wind erosion related emissions from the site, significant impacts would not be expected as a result of issuance of MAQP #5206-00.

H. *Sage Grouse Executive Order*

The Department recognizes that the site location is not within a Greater Sage Grouse General Habitat Area as defined by Executive Order No. 12-2015.

I. *Demands on Environmental Resource of Water, Air and Energy*

The application for MAQP #5206-00 indicates that a new 100-megawatt substation would need to be installed. The furnaces are electric induction and therefore would require a relatively large amount of electricity to operate. The application diagrams indicate 2,750 kilowatts needed for the induction furnaces.

MAQP #5206-00 would contain enforceable conditions, which would limit impacts to air quality. All conventional pollutants would be limited to below Title V thresholds, making the facility a 'minor' source of emissions, as that term is used in the clean air act.

While some water usage may be utilized for dust suppression, a large demand for water is not expected based on the paved roads to be located at the processing facility and the use of chemical dust suppressant on unpaved roads, and the use of baghouse control technology for much of the process.

A relatively minor demand on water and air resources would be expected. A large demand for energy would be expected.

J. *Historical and Archaeological Sites*

In order to assess any potential impacts to historical or archaeological sites, the Department contacted the Montana Historical Society requesting any information available regarding any previously recorded cultural resources in the area. After conducting the cultural resource file search, the Historical Society found no previously recorded sites. No alteration to any existing structures is proposed, and as such, any impacts to any historical or archaeological sites is not expected.

K. *Cumulative and Secondary Impacts*

The Department does not find any significant impacts to the individual physical and biological considerations above. No significant cumulative and secondary impacts are known.

8. *SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS:* The following comments have been prepared by the Department.

A. *Social Structures and Mores*
B. *Cultural Uniqueness and Diversity*

The proposed facility would be located adjacent to the Anaconda Slag Pile. The application indicates that 30 employees would be expected. Significant impacts to social structures and mores, or cultural uniqueness and diversity, would not be expected.

C. *Local and State Tax Base and Tax Revenue*

The Department would expect an increase in local and state tax base and revenue.

D. *Agricultural or Industrial Production*

The project would locate in a currently unused area adjacent to the slag pile. Significant impacts would not be expected.

E. *Human Health*

The Anaconda slag pile is known to contain trace amounts of arsenic, lead, and other human health impacting contaminants.

FX has indicated that appropriate personal protective equipment would be required of workers, however, the underlying rules associated with development of MAQP #5206-00 does not include review of worker exposure risks. Assessment of worker exposure risks are outside the scope and authority of this permit.

From a conventional pollutants standpoint, MAQP #5206-00 would be based on rules designed to protect human health. From a conventional pollutants standpoint, the facility's allowable emissions would be considered a 'minor' source as that term is used in the clean air act.

From a hazardous air pollutants standpoint, the source would not be considered a major source, as that term is used in the clean air act, because the facility would not be expected to have the potential to emit of any single hazardous air pollutant in an amount greater than 10 tons per year or of any combination of hazardous air pollutants in an amount greater than 25 tons per year. The metal HAP emissions would be expected in the form of filterable particulate matter based on facility processes and enforceable conditions in MAQP #5206-00. The MAQP requires that the particulate matter emissions be controlled via baghouse and other control practices; therefore, the metal HAP emissions are minimized through the control of the particulate matter emissions.

F. *Access to and Quality of Recreational and Wilderness Activities*

The main site of this facility would be located adjacent to a highway utilized to access recreational and wilderness activities. Traffic associated with operations of the site would not impact this highway. Emissions, including the amount of visible emissions, would be limited. Significant impacts would not be expected.

G. *Quantity and Distribution of Employment*

The application indicates that 30 employees would be needed to run this facility. Significant impacts would not be expected.

H. *Distribution of Population*

The application indicates that 30 employees would be needed to run this facility. Significant impacts would not be expected.

I. *Demands for Government Services*

Various permits, and related compliance activities, would be required. Significant impacts would not be expected.

J. *Industrial and Commercial Activity*

The application indicates that 30 employees would be expected needed to run this facility. Traffic between the slag pile and the facility would occur on a road which is not public. Significant impacts would not be expected.

K. *Locally Adopted Environmental Plans and Goals*

The Department is not aware of any locally adopted environmental plans and goals in which this project would conflict.

L. *Cumulative and Secondary Impacts*

The Department found no significant impacts in the economic and social considerations made above. The Department is not aware of significant cumulative or secondary impacts.

Recommendation: No Environmental Impact Statement (EIS) is required. The current permitting action is for the construction and operation of the FX Slag Processing facility. MAQP #5206-00 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program – Montana Sage Grouse Conservation Program

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Quality Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program

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