TECHNICAL REVIEW DOCUMENT
for
OPERATING PERMIT 95OPJE084

to be issued to:

TXI Operations, LP
dba Western Aggregates, Inc.
Jefferson County
Source ID 0590409

Matthew S. Burgett
December 2, 2003

I. PURPOSE

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA and during Public Comment. This narrative is intended only as an adjunct for the reviewer and has no legal standing. Conclusions in this document are based on information provided in the original application submittal of December 7, 1995, and supplemental Title V technical information submittals of November 14, 1997, previous inspection reports, the technical documents submitted for the construction permits, as well as telephone contacts with the applicant.

On April 16, 1998, the Colorado Air Quality Control Commission directed the Division to implement new procedures regarding the use of short term emission and production/throughput limits on Construction Permits. These procedures are being directly implemented in all Operating Permits that had not started their Public Comment period as of April 16, 1998. All short term emission and production/throughput limits that appeared in the Construction Permits associated with this facility that are not required by a specific State or Federal standard or by the above referenced Division procedures have been deleted and all annual emission and production/throughput limits converted to a rolling twelve (12) month total. Note that, if applicable, appropriate modeling to demonstrate compliance with the National Ambient Air Quality Standards was conducted as part of the Construction Permit processing procedures.

The following table lists the short term limits that were included in the Construction Permits but not included in the Operating Permit.

Construction Permit	Emission Point	NOx, lb/hr	PM lb/hr	PM_{10} lb/hr	SO_2, lb/hr	VOC lb/hr	CO lb/hr	Process Rate
88JE373-1	Rotary Kiln	55.48	4.62	2.91	68.94	0.31	32.4	40 tons per hour 1150 tons per day NG- 0.095 MMscf/hr Shale-63 tons per hour
88JE373-2	Product Cooler		6.56	3.54				40 tons per hour
88JE373-3	Shale crushing/screening		4.22	2.03				250 tons per hour 2000 tons per day
88JE373-4	Shale storage silo conveyor discharges		0.62	0.33				250 tons per hour 2000 tons per day

Construction Permit	Emission Point	NOx, lb/hr	PM lb/hr	PM_{10} lb/hr	SO_2, lb/hr	VOC lb/hr	CO lb/hr	Process Rate
88JE373-6	Product silos load-in and screen		0.72	0.39				50 tons per hour
88JE372-7	Product crushing & screening		2.87	1.55				50 tons per hour
88JE372-8	Scrubber lime feeder		0.10	0.06				400 pounds per hour
88JE372-9	Shale silo transfer points & screens		0.31	0.17				250 tons per hour 2000 tons per day
88JE372-10	Fugitive dust sources							250 tons per hour

This Operating Permit incorporated the following existing Construction Permits:

88JE372-1	88JE372-2	88JE372-3	88JE372-4
88JE372-6	88JE372-7	88JE372-8	88JE372-10
99JE730	00JE0504	00JE0505	00JE0803

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this Operating Permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This Operating Permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this Operating Permit without applying for a revision to this permit or for an additional or revised Construction Permit.

A number of the construction permits had initial approval status at the time this Operating Permit was issued. Since the equipment covered by the construction permits will have been operating for more than 180 days by the due date of the first semi-annual monitoring required by this Operating Permit, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for that construction permit.

II. SOURCE DESCRIPTION

This plant manufactures light weight aggregate. Lightweight aggregate is a hard-shelled aggregate material produced by heating shale in a rotary kiln. The resultant material, when used as a concrete aggregate, provides the structural strength of sand and gravel aggregate, but with one-third less weight. A portion of the lightweight aggregate produced is also treated with calcium chloride and coherex, then sold as a low-dust road sanding material.

Shale is mined in a quarry, crushed by a breaker and secondary roll crusher, and stored in shale silos. Dust emissions from shale mining and processing are low because of the high moisture content of the raw shale.

A rotary kiln, fired with natural gas and/or coal, is used for heating the aggregate. The kiln emissions are controlled by a baghouse and wet scrubber. After leaving the kiln, the lightweight aggregate product is cooled, crushed and sized, and after addition of water, stored in product silos and stockpiles. The finished product is shipped from the site by truck and rail.

Additional air pollution controls include baghouses on the secondary shale crusher, shale silos, product cooler, product crushers and screens and product silos. In addition to shale and product handling, facility activities include the handling of coal, lime, and materials to treat the aggregate. Kiln scrubber waste and small quantities of treated baghouse dust are disposed of in the shale quarry. As mining proceeds in the quarry, new mining areas are opened and the mined areas are reclaimed in order to minimize the mining area exposed to erosion.

During the preparation of this Operating Permit a question developed regarding how much of the facility processes were subject to the 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO, "Standards of Performance for Nonmetallic Mineral Processing Plants". The existing construction permits were inconsistent in applying the Subpart OOO provisions. TXI took the position that the processes after the kiln were processing light weight aggregate, not shale, and therefore not subject to the Subpart OOO provisions. Review found EPA had issued determinations for brick, glass and gypsum board manufacturing that supported the TXI position. Gypsum board, brick and glass are commonly crushed, sometimes screened, and conveyed to a point to be mixed with the raw material stream being processed. EPA has taken the position that the processing of the manufactured products in order to return them to the raw material stream is not subject to the Subpart OOO provisions because the product is not listed on the non-metallic material list. However, a recent EPA determination regarding lightweight aggregate overturns the previous brick, glass and gypsum board manufacturing determination. EPA finds that equipment located after the kilns would be subject to Subpart OOO because lightweight aggregate product is a nonmetallic mineral. The APCD agrees with this determination and will add Subpart OOO requirements to the affected facilities downstream of the kiln.

The facility is located north of Golden, Colorado, on Highway 93 just south of the Jefferson-Boulder County line. There are no affected states within 50 miles of the facility. Rocky Mountain National Park, Rawah Wilderness Area, and Eagles Nest Wilderness Area are Federal Class I designated areas within 100 kilometers.

The plant operates in the Denver metropolitan area air shed. During the preparation of this Operating Permit the EPA Denver metropolitan area air quality status changed several times. The metropolitan area is currently classified as attainment/maintenance for ozone, carbon monoxide, and particulate matter smaller than 10 microns (PM_{10}), and as attainment for the other criteria pollutants. Under the attainment/maintenance classification all the State Implementation Plan (SIP) approved requirements for volatile organic compounds, carbon monoxide and PM_{10} will continue to apply in order to prevent backsliding under the provisions of Section 110(l) of the Federal Clean Air Act. The entire plant is classified as a major stationary source (potential to emit of any criteria pollutant > 250 tons per year) for nitrogen oxides for the Prevention of Significant Deterioration/New Source Review (PSD/NSR) provisions (Colorado Regulation No. 3, Part B, Section IV.D.3).

The plant is currently not a PSD-permitted facility. PSD/NSR requirements (as contained in 40 CFR Part 52 and Colorado Regulation No. 3, Part B) shall apply to any source modification, or contemporaneous modification of several sources, that results in a significant net emissions increase.

There were no Maximum Achievable Control Technology (MACT) standards applicable to the facility at the time this Operating Permit was prepared. The Title V application reported the facility is not subject to the provisions of 112(r).

The potential to emit for the facility emissions is shown in the following table. Potential emissions are based on permit limits for permitted sources and uncontrolled emissions at the maximum design rates for grandfathered and non-permitted units. Actual emissions are from the Division database for Data Year 2000.

		TONS PER YEAR					
Description	Construction Permit	NOx	VOC	CO	SO_2	PM	PM_{10}
Raw shale crusher	00JE0504					0.73	0.35
Secondary Shale Crush/Break	88JE372-3					4.54	2.20
Rotary Kiln	88JE372-1	248.0	22.0	128.4	150.0	25.0	25.0
Product Cooler	88JE372-2					26.0	14.0
Scrubber lime feed	88JE372-8					0.42	0.23
Storage silo	99JE0730					3.25	3.25
Extruder	00JE0505					0.25	0.25
Product silo load-in/screen	88JE372-6					2.45	1.32
Kiln raw shale storage silo	88JE372-4					3.67	1.98
Product crush/screen	88JE372-7					11.4	6.14
Product screen	00JE0803					2.10	1.00
Fug @ plant & quarry	88JE372-10					17.2	7.12
Insignificant Activities		0.74					
TOTALS		248.74	22.0	128.4	150.0	97.0	62.8
Actuals, Data Year 2000		152.4	7.1	115.9	10.6	57.3	41.9

The construction permits for the facility were at various stages of Initial Approval and Final Approval. The due date of the first semi-annual monitoring and deviation report required by this Operating Permit will be more than 180 days after the initial approval of the construction permits and/or the equipment commenced operation. Therefore, under the provisions of Colorado Regulation No. 3, Section V.A.2, the Division is allowing the Responsible Official certification submitted with that report to serve as the demonstration required pursuant to Colorado Regulation No. 3, Part B, Section IV.H and no final approval construction permit will be issued. The appropriate provisions of the initial approval construction permits have been directly incorporated into this Operating Permit.

Compliance had been demonstrated under the provisions of Colorado Regulation No. 3, Part B, Section IV.H. for initial approval of most of the construction permits but a final approval construction permit has not been issued. Under the provisions of Colorado Regulation No. 3, Section V.A.3, the Division will not issue final approval construction permits and is allowing the

initial approval construction permits to continue in full force and effect. The appropriate provisions of the initial approval construction permits have been incorporated into this Operating Permit.

III. EMISSION SOURCES

The following sources are specifically regulated under terms and conditions of the Operating Permit for this site.

A. Primary Shale Crushing

The previous version of Construction Permit 88JE372-3 addressed the shale breaker and the secondary crusher/screening operation as one source. It appears at the time the operation started the two sources were located together. The shale breaker is now remote from the secondary crusher and the two operations need to be addressed as two separate sources.

The shale feeder breaker uses rotating picks to size the shale from the quarry to approximately 6". The breaker is enclosed, and the average shale moisture content of 10% limits the fugitive emissions from dumping the shale to the breaker, and the transfer from the breaker to the conveyor.

A1. Applicable Requirements – The applicable requirements are established by Construction Permit 00JE0504. This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A. A particulate matter compliance standard is set by the provisions of Regulation No. 6, Section III.C.2 that limits the particulate emissions by use of the equation $PE = 17.31(P)^{0.16}$ where PE = pounds per hour of particulate emissions and P = process weight rate in tons per hour.

A2. Emission Factors - The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions.

A3. Monitoring Plan - The equipment is designed to process material at a rate of 300 tons per hour as noted in the equipment description of Construction Permit 00JE0803. The calculations below demonstrate that the combination of the equipment design limit and the emission factor precludes exceedance of the hourly emission limit noted in the Applicable Requirements section just above.

Particulate emission limit @ 300 tons per hour = $17.31(300)^{0.16}$ = 43.12 pounds per hour.
Uncontrolled Emissions = 300 tons per hour X 0.005 pounds per ton = 1.50 pounds per hour

TXI only needs to retain a file copy of this calculation for demonstrating compliance in the absence of any other credible evidence.

The amount of shale crushed is to be recorded for each calendar month. The emissions are to be calculated for each month from the amount of shale processed and the emissions factor. A 12 month rolling total is to be maintained.

A4. Compliance Status – The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

B. Secondary Shale Crushing

The secondary crusher and separating screens are enclosed in a structure equipped with a baghouse to reduce the emissions to the atmosphere.

B1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-3. This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A. A particulate matter compliance standard is set by the provisions of Regulation No. 6, Section III.C.2 that limits the particulate emissions by use of the equation $PE = 17.31(P)^{0.16}$ where PE = pounds per hour of particulate emissions and P = process weight rate in tons per hour.

B2. Emission Factors - The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions. A 99% reduction in particulate emissions may be applied to the crushing and screening emissions when good air pollution control practices are being followed. An 80% reduction in particulate emissions may be applied to the conveyors and transfer points when good air pollution control practices are being followed.

B3. Monitoring Plan - The equipment is designed to process material at a rate of 300 or 350 tons per hour as noted in the equipment description of Construction Permit 88JE372-3. The calculations below demonstrate that the combination of the equipment design limit and the emission factor precludes exceedance of the hourly emission limit noted in the Applicable Requirements section just above.

Particulate emission limit @ 300 tons per hour = $17.31(300)^{0.16}$ = 43.12 pounds per hour.
Uncontrolled Emissions = 300 tons per hour X 0.0539 pounds per ton = 16.17 pounds per hour

Particulate emission limit @ 350 tons per hour = $17.31(350)^{0.16}$ = 44.19 pounds per hour.
Uncontrolled Emissions = 350 tons per hour X 0.0539 pounds per ton = 18.87 pounds per hour

TXI only needs to retain a file copy of this calculation for demonstrating compliance in the absence of any other credible evidence.

The amount of shale crushed is to be recorded for each calendar month. The emissions are to be calculated for each month from the amount of shale processed and the emissions factor. A 12 month rolling total is to be maintained.

B4. Compliance Status - The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

C. Raw Shale Storage Silos

At the time Construction Permit 88JE372-4 was prepared the emissions from the conveyor discharge at the shale storage silos was controlled by a baghouse that discharged 6000 actual cubic feet per minute to the atmosphere. The emissions from the transfer and screening equipment at the shale storage silos were controlled by a second baghouse that discharged at 3000 actual cubic feet per minute to the atmosphere. A new baghouse has been installed to control both of these sources. The new baghouse is located at the site of the previous conveyor discharge and operates at 15, 590 actual cubic feet per minute. The permit requirements for the two points have been combined as a modification of Construction Permit 88JE372-4 and Construction Permit 88JE372-9 has been canceled. In reviewing the history of Construction Permit 88JE372-4 it was noted that some of the previous versions of the Construction Permit incorrectly identified the source as emissions from the product silos.

C1. Applicable Requirements - The applicable requirements were established by Construction Permit 88JE372-4. This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A. A particulate matter compliance standard is set by the provisions of Regulation No. 6, Section III.C.2 that limits the particulate emissions by use of the equation $PE = 17.31(P)^{0.16}$ where PE = pounds per hour of particulate emissions and P = process weight rate in tons per hour.

C2. Emission Factors - The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions. A 99% reduction in particulate emissions may be applied when good air pollution control practices are being followed.

C3. Monitoring Plan - The amount of shale delivered to the silos is to be recorded for each calendar month. The emissions are to be calculated for each month from the amount of shale processed and the emissions factor. A 12 month rolling total is to be maintained.

C4. Compliance Status - The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

D. Rotary Kiln

Construction Permit 88JE372-1, issued October 27, 1989, for the kiln permitted the use of coal or natural gas for fuel and identified a wet scrubber for sulfur dioxide and particulate matter control. The permit established the following limits based on the use of coal as fuel.

Pollutant or Material	Limit
PM	18.33 TPY
PM_{10}	11.55 TPY
SO_2	239.3 TPY

Pollutant or Material	Limit
NOx	219.7 TPY
VOC	1.23 TPY
CO	123.0 TPY
Aggregate Production	380,000 TPY
Shale Consumption	500,000 TPY
Coarse shale	Not to exceed 75% of total shale consumption
Coal Consumption	35,150 TPY
Natural Gas	Maintain records of use

The permit included a requirement to provide a Continuous Emissions Monitor (CEM) for sulfur dioxide and perform a compliance test when the source was placed in operation. During the final design of the process a baghouse was provided in place of cyclones for better particulate removal. The wet scrubber design was changed to provide a rubber lining to allow the use of stronger chemical solutions to control corrosive gases that might be present. The file notes that the baghouse may have been provided in response to preliminary review concerns for the particulate matter increment consumption.

The difference between the shale consumption and the aggregate production permit limits is a result of a loss of material from the combustion of organic material in the shale, and the loss of fine material during the shale handling and processing. The permit limit on the amount of coarse shale processed resulted from a pilot test that demonstrated a significant reduction in the sulfur dioxide emissions when the shale was extruded as pellets before being processed in the kiln. No explanation for this reduction was given other than a possible incorporation of sulfur in the aggregate produced when the pellets were used.

The permit was modified for Final Approval and was issued on September 9, 1991. The modifications included the provision to use landfill gas in addition to coal and natural gas, the provision of the baghouse for particulate control, and a limit of 30.3 pounds per year for hydrogen sulfide. Western Aggregates Incorporated (WAI) demonstrated that maintaining the pH at a value greater than 5.0 to 5.5 limited the sulfur dioxide emissions to less than 1 ppm or 1.42×10^{-7} pounds per dry standard cubic foot when burning natural gas. Coal was no longer being considered for a fuel source and none of the coal handling equipment had been provided. The Division approved the WAI request to not provide the CEM on the basis of pH control demonstration.

The equipment needed for coal handling was to be installed in the fall of 1993. The Division expressed concern about whether pH control would work when coal was used and larger amounts of sulfur dioxide had to be controlled, and reserved the right to require provision of the sulfur dioxide CEM. Subsequent to the construction of the coal handling equipment, a compliance test was performed with a shale feed rate of 33 tons per hour while burning coal and natural gas. The coal was providing approximate 60% of the heat input needed and the natural gas approximately 40%. The sulfur dioxide test results indicated the pH control was sufficient to control the sulfur dioxide emissions.

Final Approval of the modified permit was issued December 22, 1993. The modifications included a small increase in the carbon monoxide emissions (about 5 TPY), a permit limit of 752.4 million cubic feet per year of natural gas, and the inclusion of the need for the sulfur dioxide CEM. For unknown reasons the use of coal or any coal use limit was not provided in the permit raising a question as to whether coal burning was allowed.

In 1995 a stack test had been performed to demonstrate compliance with the existing permit limits. The test was performed at a 60/40 coal to natural gas fuel mixture Unfortunately, the shale processing rate was not available in the test data.

In May, 1998, TXI, the new owner of the plant, requested the Construction Permit be modified to allow the use of a mixture of 70% coal and 30% coke for fuel. The analysis of the estimated emissions determined there would be a significant increase (more than 40 TPY) in the nitrogen oxides emissions. Because the area was non-attainment for particulate matter less than 10 microns (PM_{10}) in size at that time, and nitrogen oxides are a precursor for PM, under the Lowest Achievable Emissions Rate (LAER) requirements nitrogen oxides emission off-sets would have been needed. No offsets were available and the requested increase in emissions could not be approved.

TXI subsequently withdrew the request for the use of the coal/coke fuel mixture, and requested the permit be modified to allow a 40 ton per hour aggregate production rate, a fuel use mixture that would provide 60% of the heat from coal and the balance from natural gas, a particulate limit of 25 tons per year, and a VOC limit of 22 tons per year. The increase in the particulate matter requested was less than the New Source Review significance level and did not trigger the need for LAER review. The original VOC limit had been based only on the VOC emission expected from coal. The heating of the shale results in the release of significant volatile materials from the shale. The high VOC emission rate was confirmed in the 1995 compliance test. TXI requested the VOC permit limit be increased to properly reflect the emission rate. The requested increase did not trigger any PSD or NSR review requirements.

During the review for the requested modification of the permit it was determined that the kiln is subject to the 40 CFR Part 60 Subpart UUU Standards of Performance for Calciners and Dryers in the Mineral Processing Industry. The NSPS requires the installation of a Continuous Opacity Monitor (COM) when a dry particulate removal process is used. This kiln is not subject to the COM provision since the wet scrubber removes both particulate matter and sulfur dioxide.

The modified Construction Permit was issued with Initial Approval on November 30, 2001. The permit included a provision for a compliance test which was accomplished in the first part of July, 2002. TXI requested modifications of the Construction Permit based on the compliance test results.

D1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-1. This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A “General Provisions” and Subpart UUU , “Standards of Performance for Calciners and Dryers in Mineral Industries”.

This source is not subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO “Standards of Performance for Nonmetallic Mineral Processing Plants” because a kiln is not an affected facility.

A compliance standard for particulate emissions is set by set by Colorado Regulation No. 6, §III.C.2 by use of the following equation: $PE = 17.31(P)^{0.16}$ where PE = Particulate Emissions in pounds per hour and P = process weight rate in tons per hour. Colorado Regulation No. 6, §III.D.2 requires the use of the best practical control technology for control of the sulfur dioxide emissions as determined by the Division.

TXI requested the annual permit limits for nitrogen oxides be set to keep the facility as a synthetic minor source for the PSD provisions. The production limits, and fuel consumption were reduced in proportion to the nitrogen oxide limit. TXI requested a particulate emission limit that would allow for some decrease in the baghouse removal efficiency to reflect variation in bag quality and other factors.

TXI is considering future modification of the manner in which the kiln is operated. The modification would result in low sulfur dioxide emissions rates without the need for the scrubber. However, TXI's experience at other plants indicates the sulfur dioxide emission rates would not be expected to be as low as those achieved with the wet scrubber. TXI requested the sulfur dioxide emission limit be set at a level that could be achieved with a change in the methods of operating the kiln.

D2. Emission Factors – The following controlled emission factors were identified during the July, 2002 stack test.

Source	PM	PM_{10}	SO_2	NO_X	VOC	CO	Reductions
NG, Lb/MMscf	12.49	12.49	162	706	1.96	287	PM = 99.9 SO_2 = 98.5
Coal, lb/ton	0.36	0.36	3.41	16.65	0.24	6.62	

As noted just above the permitted emission limits were set to provide some cushion for variations in operations. The permit limits do not reflect a direct mathematical relationship between the fuel use and the permit limits.

D3. Monitoring Plan – New Source Performance Standard Subpart UUU requires monitoring devices to measure and record the pressure loss of the gas stream through the scrubber and the scrubbing liquid flow rate. The sulfur dioxide emissions are controlled by the pH of the scrubbing liquid. The pH monitoring system provides two pH monitors, one on-line and one as backup.

The Division considers the provision of the fabric filter and the wet scrubber represents the best practical control technology to control the sulfur dioxide emissions (Colorado Regulation No. 6, §III.D.2).

Construction Permit 88JE372-1 required the pH of the scrubber liquor to be maintained above a pH of 5. The July 2002 compliance test results indicated there would be significant emissions of sulfur dioxide at pH values less than 7. TXI was requested to conduct additional testing of the sulfur dioxide emissions to better define the pH/sulfur dioxide emissions relationship. The additional test results verified the sulfur dioxide emissions reduction could be improved by maintaining a higher pH value in the scrubber solution. Consequently, the monitoring requirements were modified directly in the Title V permit to require a pH set point of 7.5 and to maintain the scrubber solution above a pH of 7.0.

The pH of the scrubber solution is controlled by adding lime to the solution. The design and operation of the pH control and lime feed systems results in a time lag in the monitored responses to system changes. The system begins to add lime when the solution pH drops below the system set point, and continues the lime feed until the solution pH increases to above the set point. The system has a time lag after the lime feed starts during which the pH continues to drop, and another time lag during which the system pH continues to rise after the lime feed stops. Variation in the length of the time lags is primarily dependent on the amount of sulfur dioxide reaching the scrubber and the quality of the lime. TXI requested the use of an average value to compensate for the time lag during which the pH continues to drop below the set point. Operating experience found that about 15 minutes is needed to return the pH value to the desired level. On that basis, a 15 minute average pH value is used to monitor the low pH values. The 15 minutes period is for 15 clock minutes and is not a rolling average. TXI expressed some uncertainty about how the time lags will be impacted by raising the required pH values. The Division agreed to consider the need for adjustment of the required pH values if experience finds significant operating problems or compliance issues related to the new set points.

The amount of shale processed and the aggregate production is to be recorded for each calendar month. The emissions are to be calculated for each month from the aggregate production and the emissions factor. A 12 month rolling total is to be maintained.

D4. Compliance Status - The Division accepts the compliance test performed for Construction Permit 88JE372-1 application information demonstrates that the source was in compliance.

E. Product Cooler

E1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-2. A compliance standard for particulate emissions is set by Colorado Regulation No. 6, §III.C.2 by use of the following equation: $PE = 17.31(P)^{0.16}$ where PE = Particulate Emissions in pounds per hour and P = process weight rate in tons per hour.

This source is not subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" because a product cooler is not an affected facility.

E2. Emission Factors – The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions. A 99% reduction of the estimated emissions by the fabric filter is acceptable when good air pollution control practices are being demonstrated.

E3. Monitoring Plan – The hours of operation and the hourly production rate are to be monitored for each month and the estimated emissions calculated. The hourly emission limit is to be calculated from the equation shown in the Applicable Requirements section above using the hourly production rate. The hourly emissions are calculated from the estimated monthly emissions divided by the hours

of operation. The monthly emissions are estimated from the monthly process rate and the emission factor. A 12 month rolling total of the emissions is to be maintained.

E4. Compliance Status - The Division accepts that the application information demonstrates that the facility was in compliance at the time Operating Permit application was prepared.

F. Scrubber Lime Feeder

F1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-8.

This source is not subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" because a lime feeder is not an affected facility.

F2. Emission Factors - The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions. A 99% reduction of the estimated emissions by the fabric filter is acceptable when good air pollution control practices are being demonstrated.

F3. Monitoring Plan – The emissions are to be calculated for each month from the amount of lime fed and the emissions factor. A 12 month rolling total is to be maintained.

F4. Compliance Status - The Division accepts that the application information demonstrates that the facility was in compliance at the time Operating Permit application was prepared.

G. Extruder

Dust from the kiln baghouse, cooler baghouse, and cooler are transferred to the dust silo. Collected dust is treated in a pug mill and disposed of in the quarry or processed through the pellet extruder and returned to the process. The dust silo vent is controlled by a fabric filter. The return of the dust to the process requires less shale to be processed to produce a ton of product and decreases the difference between the shale processed and the product produced.

G1. Applicable Requirements - The applicable requirements are established by Construction Permit 00JE505. A compliance standard for particulate emissions is set by Colorado Regulation No. 6, §III.C.2 by use of the following equation: $PE = 17.31(P)^{0.16}$ where PE = Particulate Emissions in pounds per hour and P = process weight rate in tons per hour.

This source is not subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" because an extruder is not an affected facility.

G2. Emission Factors - The emission factor was derived from a bag filter discharge of 0.015 grains per dry standard cubic foot, a ratio of actual cubic foot to dry standard cubic foot of 0.798 and a bag filter discharge flow rate of 550 actual cubic feet per minute. The discharge rate is acceptable as long as good air pollution control practices are being maintained.

G3. Monitoring Plan - The hours of operation and the hourly process rate are to be monitored for each month and the estimated emissions calculated. The hourly emission limit is to be calculated from the equation shown in the Applicable Requirements section above using the hourly production rate. The hourly emissions are calculated from the estimated monthly emissions divided by the hours of operation. Compliance is determined by comparing the two values. The emissions are to be calculated for each calendar month from the process rate and the emission factor. A 12 month rolling total is to be maintained.

G4. Compliance Status - The Division accepts that the application information demonstrates that the facility was in compliance at the time Operating Permit application was prepared.

H. New Silo For Kiln Dust

H1. Applicable Requirements - The applicable requirements are established by Construction Permit 99JE0730.

This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A.

H2. Emission Factors – The emission factors are provided in the in the Construction Permit.

H3. Monitoring Plan – The hours of operation and the hourly process rate are to be monitored for each month and the estimated emissions calculated. The hourly emission limit is to be calculated from the equation shown in the Applicable Requirements section above using the hourly production rate. The hourly emissions are calculated from the estimated monthly emissions divided by the hours of operation. Compliance is determined by comparing the two values. The emissions are to be calculated for each calendar month from the process rate and the emission factor. A 12 month rolling total is to be maintained.

H4. Compliance Status - The Division accepts that the application information demonstrates that the facility was in compliance at the time the Operating Permit application was prepared.

I. Product Crushing/Screening

The source is equipped with three baghouses, one for the vertical shaft crushers, one for the cone crusher, and one for the product elevator to the storage silos. The Wheelabrator baghouses are both Model #36 WCC Size 45. They both have the same model number (45WCC1MOD36) and serial number (20-4177). TXI has assigned Dust Collector 7 (DC-7) for the vertical shaft crushers the serial number 20-4177-1. DC-8 for the product elevators was assigned serial number 20-4177-2.

I1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-7. A compliance standard for particulate emissions is set by Colorado Regulation No. 6, §III.C.2 by use of the following equation: $PE = 17.31(P)^{0.16}$ where PE = Particulate Emissions in pounds per hour and P = process weight rate in tons per hour.

This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A.

I2. Emission Factors - The emission factor was derived from a bag filter discharge of 0.015 grains per dry standard cubic foot, a ratio of actual cubic foot to dry standard cubic foot of 0.798 and a bag filter discharge flow rate. The particulate discharge rate is acceptable as long as good air pollution control practices are being maintained.

I3. Monitoring Plan - The hours of operation and the hourly process rate are to be monitored for each month and the estimated emissions calculated. The hourly emission limit is to be calculated from the equation shown in the Applicable Requirements section above using the hourly production rate. The hourly emissions are calculated from the estimated monthly emissions divided by the hours of operation. Compliance is determined by comparing the two values. The emissions are to be calculated for each calendar month from the process rate and the emission factor. A 12 month rolling total is to be maintained.

I4. Compliance Status - The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

J. Product Sizing Screen

J1. Applicable Requirements – Construction Permit 00JE0803 established the annual emission limits for this source. A compliance standard for particulate emissions is set by Colorado Regulation No. 6, §III.C.2 by use of the following equation: $PE = 17.31(P)^{0.16}$ where PE = Particulate Emissions in pounds per hour and P = process weight rate in tons per hour.

This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A.

J2. Emission Factors – AP-42 emission factors were used for determining the Construction Permit limits. The factors were adjusted for the dustiness of the material. Spray bars are available for use to control the particulate emissions as necessary. The emissions may be reduced by 50% for the water sprays when good air pollution practices are being followed.

J3. Monitoring Plan – The equipment is designed to process material at a rate of 200 tons per hour as noted in the equipment description of Construction Permit 00JE0803. The calculations below demonstrate that the combination of the equipment design limit and the emission factors preclude exceedance of the hourly emission limit noted in the Applicable Requirements section just above.

Particulate emission limit @ 200 tons per hour = $17.31(200)^{0.16}$ = 40.41 pounds per hour.

Uncontrolled Emissions = 200 tons per hour X 0.0630 pounds per ton = 12.6 pounds per hour

TXI only needs to retain a file copy of this calculation for demonstrating compliance in the absence of any other credible evidence.

The amount of aggregate screened is to be recorded for each calendar month. The emissions are to be calculated for each month from the amount of aggregate screened and the emissions factor. A 12 month rolling total is to be maintained.

J4. Compliance Status – The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

K. Product Silo Load-in & Screening

K1. Applicable Requirements – Construction Permit 88JE372-6 established the annual emission limits for this source.

This source is subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart A "General Provisions" and Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" as stated in Colorado Regulation No. 6, Part A.

K2. Emission Factors – The emissions factors were obtained from the calculations submitted in the Title V application, the EPA AP-42 reference publication or are based on the bagfilter performance guarantee for the emissions. The uncontrolled emission factors used for all the sources are tabulated at the end of this document for ready reference as needed. The emissions reduction for an emission control device is listed in the table. The PM_{10} emissions were assumed to be 54% of the PM emissions. A 99% reduction of the estimated emissions by the fabric filter is acceptable when good air pollution control practices are being demonstrated.

K3. Monitoring Plan – The amount of aggregate processed is to be recorded for each calendar month. The emissions are to be calculated for each month from the amount of aggregate processed and the emissions factor. A 12 month rolling total is to be maintained.

K4. Compliance Status – The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

L. Quarry/Plant Fugitive Particulate Emissions

Operating hours for the mine (quarry) are 10 hours per day, 5 days per week, 50 weeks per year for a total of 2500 hours per year. The plant operates 24 hours per day, 7 days per week, 47 weeks per year for a total of 7920 hours per year.

A review of the sources listed in the construction permit identified sources which are point sources and not fugitive emission sources. The distinction is that emissions from point sources may be collected and discharged through a stack. The sources identified as point sources were: loading of coal day bin, product truck loading, product train loading, scrubber waste loading, coal train off-loading, coal handling, and coal stacking. The emission estimates for these points were reviewed

and determined to below the APEN reporting threshold, thus APEN exempt. These sources are now identified in the list of insignificant activities for the plant.

L1. Applicable Requirements - The applicable requirements are established by Construction Permit 88JE372-10. As noted at the beginning of this review document, short term limits are no longer included in Construction Permits unless there is a regulatory requirement for such limits. However, the Division is exercising its discretion and providing short term limits for some of the sources of fugitive emissions at this plant. The annual limits for some of the sources are relatively small and could be achieved in a short time frame. The Division believes the short term limits are needed to limit the potential emissions impact of an intense, short duration activity.

Product truck and train loading is not subject to the provisions of 40 CFR Part 60 New Source Performance Standards (NSPS) Subpart OOO "Standards of Performance for Nonmetallic Mineral Processing Plants" because the trucks and railcars are not enclosed.

L2. Emission Factors - The emission estimates were provided in the Title V application. The estimates were based on the equations and emission factors provided in AP-42.

L3. Monitoring Plan - The presence of visible emissions identifies the need to investigate and correct a problem. Method 9 opacity observations are required if the problem persists after the correction(s) have been made.

The fugitive emissions are to be calculated for each calendar year. A revised APEN is to be submitted as necessary to comply with the emission reporting requirements.

L4. Compliance Status - The Division accepts that the source was in compliance at the time this Operating Permit was issued based on the most recent Division inspections of the source.

M. Cold Solvent Cleaner

M1. Applicable Requirements - The Denver metropolitan area is currently classified as attainment for ozone (VOC). The cold solvent cleaner emissions remain subject to the Colorado Regulation No. 7 provisions under the maintenance provisions of the attainment designation. The Colorado Regulation No. 7 work practices and equipment design requirements are used to limit the volatile organic compound emissions.

M2. Emission Factors - No factors are required.

M3. Monitoring Plan – The annual certification of compliance is accepted as evidence that the equipment in use meets the design requirements of Colorado Regulation No. 7 provisions and proper work practices are being conducted.

M4. Compliance Status - The Division accepts the application information demonstrates that the facility was in compliance at the time Operating Permit application was prepared.

IV. Alternate Operating Scenarios

No alternate operating scenarios were identified

V. Permit Shield

The intent of the permit shield is to provide limited protection in the event of an error in the evaluation of whether a regulation, or portion of a regulation applies. The permittee identifies the issue and presents its position. The Division reviews the position. If the Division and the permittee mutually agree on the position, the issue is recorded in the operating permit. If there is a disagreement on the position, the Division has reserved the right to make the final decision. If, at a later date, it is discovered that an error was made in the mutual decision, the source is protected from the non-compliance due to the error. However, the permittee must move rapidly to obtain compliance.

In the Title V application the applicable sections of the Federal and State regulations are identified for the sources. The shield request was granted and noted in the Operating Permit where a specific request for the shield was identified, justified and accepted by the Division. The shield was not granted where a blanket request lacked specific detail, the request was not justified, or the Division did not agree that shield protection could be applied.

VI. Hazardous Air Pollutants

The hazardous air pollutants originate as a component cleaning solvents and paint used. Hazardous air pollutant emissions are estimated by using the mass balance approach of calculating the amount of materials used, and the emissions associated with their use.

VII. Accidental Release Program – 112(r)

Section 112(r) of the Clean Air Act mandates a new federal focus on the prevention of chemical accidents. Sources subject to these provisions must develop and implement risk management programs that include hazard assessment, a prevention program, and an emergency response program. They must prepare and implement a Risk Management Plan (RMP) as specified in the Rule.

Based on information proved by the applicant, this facility is not subject to the provisions of the Accidental Release Prevention Program (Section 112(r) of the Federal Clean Air Act).

VIII. Emission Factors

From time to time published emission factors and/or other emission estimating methods are changed based on new or improved data. A logical concern is what happens if the use of the new factors/methods in a calculation results in a source being out of compliance with a permit limits. Except as noted below, the emission factors, equations, and/or other emission estimating methods included in the permit are considered to be fixed until changed by the permit. Obviously, emission factors dependent on the fuel sulfur content or heat content of the fuel can not be fixed and will vary with the test results. The method of determining the emission is, however, fixed. It is the responsibility of the permittee to be aware of changes in the emission factors, etc. and to notify the Division in writing of impacts on the permit requirements when there is a change. Upon notification, the Division will work with the permittee to address the situation. In addition, the Division will review the factors, etc. as appropriate during permit modifications and renewals. The exception to the above is that emission factors and/or other emission estimating methods used only to comply with the reporting requirements of Colorado Regulation No. 3, Part A, Section II can be updated and modified without a permit modification, although the resulting emission estimates may trigger

permitting activities.

IX. Insignificant Activities

The kiln permit limit of 248 tons per year for nitrogen oxides is within 10% of the major stationary source threshold of 250 tons per year for the Prevention of Significant Deterioration (PSD) provisions. It is possible for the combination of the kiln potential to emit (the permit limit) and the contribution to the plant potential to emit from insignificant sources of nitrogen oxides emissions to exceed the PSD major source threshold. TXI must monitor the insignificant activities that are sources of nitrogen oxides emissions and calculate their potential to emit for the calendar year. The plant will be become a major stationary source for the PSD provisions if the total plant potential to emit for nitrogen oxide emissions, including the insignificant activities, exceed the 250 tons per year potential to emit threshold.

X. Summary of Title V Permit Emissions Factors

Point #	Permit #	Source	Source	PM	PM_{10}	SO_2	NOx	VOC	CO	Comments
013	00JE0504	Primary shale crusher	Primary shale crusher hopper	0.00039 lb/ton shale loaded	0.00018 lb/ton shale loaded					
			Primary shale crusher	0.005 lb/ton shale processed	0.0024 lb/ton shale processed					Based on 50% reduction for shale moisture
003	88JE372-3	Secondary shale crushing and screening	Screening	0.0315 lb/ton shale	0.015 lb/ton shale					Based on 99% reduction for building enclosure and bagfilter
			Secondary crushing	0.005 lb/ton shale	0.0024 lb/ton shale					
			Conveyors & transfer point	0.00294 lb/ton shale transferred per point	0.0014 lb/ton shale transferred per point					5 transfer points – Based on 80% control for partial enclosure of the conveyor and baghouse control for some points
001	88JE372-1	Kiln	NG	12.49 lb/MMscf	12.49 lb/MMscf	162 lb/MM scf	706 lb/MM scf	1.96 lb/MM scf	287 lb/MM scf	Based on 99.9% reduction for particulates Based on 98.5% reduction for sulfur dioxide
			Coal	0.36 lb/ton	0.36 lb/ton	3.41 lb/ton	16.65 lb/ton	0.24 lb/ton	6.62 lb/ton	Based on 99.9% reduction for particulates Based on 98.5% reduction for sulfur dioxide
002	88JE372-2	Product cooler	Bagfilter	0.137 lb/ton of product	0.074 lb/ton of product					Emission factor based on 99.0% reduction by bagfilter

Point #	Permit #	Source	Source	PM	PM_{10}	SO_2	NOx	VOC	CO	Comments
008	88JE372-8	Scrubber lime feed	Bagfilter	0.56 lb/ton lime used	0.31 lb/ton lime used					
012	99JE0730	New product storage silo	Bagfilter	0.27 lb/ton of kiln dust	0.27 lb/ton of kiln dust					
014	00JE0505	Extruder	Bagfilter	0.167 lb/ton of thruput	0.167 lb/ton of thruput					
004	88JE372-4	Raw Shale storage silos	Bagfilter	0.0193 lb/ton of product	0.0104 lb/ton of product					
007	88JE372-7	Product crushing	Bagfilter	0.0599 lb/ton of product	0.0323 lb/ton of product					
006	88JE372-6	Product silo load-in & screen	Bagfilter	0.0128 lb/ton of product	0.00695 lb/ton of product					
016	00JE0803	Product sizing screen	Screen	0.0315 lb/ton of product processed	0.0150 lb/ton of product processed					Based on 50% reduction for material moisture
010	88JE372-10	Fugitive particulate emissions								Based on emissions from each source. No single composite emission factor may be applied.

The calculations in the Appendix of the Title V application stated the emissions from the bagfilters, with the exception of the kiln bagfilter, were estimated based on a discharge of 0.015 grain/dscf and the design specification air flow rates. A table with the specifications was provided. For these bagfilters the emission factor was determined by dividing the permit limit by the process rate for the source. The PM_{10} emissions were assumed to be 0.54 of the PM emissions.