Air Quality Permitting
Statement of Basis

May 9, 2004

Permit to Construct No. P-040215

Jewett Crushing, Portable

Facility ID No. 777-00352

Prepared by:

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AIR QUALITY DIVISION

FINAL

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Acronyms, Units, and Chemical Nomenclatures

AACC	acceptable ambient concentration for carcinogens
ACFM	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
Bhp	brake horsepower
CO	carbon monoxide
DEQ	Department of Environmental Quality
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
kW	kilowatt
lb/hr	pound per hour
lb/day	pound per day
MACT	Maximum Achievable Control Technology
NAA	non-attainment area
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	sulfur dioxide
T/hr	tons per hour
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound
wt %	weight percent

1. PURPOSE

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

2. FACILITY DESCRIPTION

This facility is a portable rock crushing plant. The facility crushes pit rock and aggregate to reduce the material in size to desired specifications. Sand is screened at the facility. The plant is powered by electricity from a portable 300 kW generator. The equipment permitted for this facility is listed in Section 5.1 of this memorandum.

3. FACILITY / AREA CLASSIFICATION

Jewett Crushing is defined as a natural minor facility because without permit limits on the potential to emit, the emissions of any single regulated air pollutant will not exceed 100 tons per year. The AIRS classification is "B" because Jewett Crushing is a natural minor facility. The standard industrial classification (SIC) code is 1422, which applies to construction sand and gravel.

The facility is portable by design and is permitted to operate throughout the state of Idaho, except for the Sandpoint PM_{10} Non-attainment Area.

The AIRS information provided in Appendix C defines the classification for each regulated air pollutant at Jewett Crushing.

4. APPLICATION SCOPE

The applicant requested a PTC for an existing portable rock crushing operation that processes graded aggregate and sand.

4.1 Application Chronology

December 2, 2004	DEQ received a standard PTC application and $1000.00 application fee payment from Jewett Crushing
December 11, 2004	DEQ received additional information from Jewett Crushing via a telephone conversation between Bob Jewett, Owner, and Darrin Mehr, Associate Air Quality Engineer, DEQ
December 30, 2004	DEQ declared the application complete
April 22, 2005	DEQ received Jewett's $500.00 PTC processing fee payment

4.2 Permit Chronology

January 26, 2005	DEQ received a written request from Jewett Crushing to review a facility draft permit
January 26, 2005	The initial draft of the permit package was provided to the Lewiston Regional Office
January 28, 2005	The Lewiston Regional Office provided substantive comments on the permit and statement of basis memorandum
February 11, 2005	DEQ provided a draft permit for facility review.

March 18, 2005	DEQ provided another copy of the draft for facility review because of failure to receive the original permit package.

5. PERMIT ANALYSIS

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

5.1 Equipment Listing

The equipment in this permit application includes the portable rock crushing and sand screening plant.

The plant has a primary crusher was manufactured by Tailsmith with a rated capacity of 60 T/hr, and the crusher design is a jaw crusher. The date of manufacture was listed as the "early 1940's." Serial number and model number were not provided in the application.

The secondary crusher was manufactured by Cedar Rapids with a rated capacity of 40 T/hr, and the crusher design is a jaw and roll crusher. The date of manufacture was listed as the "early 1930's." The model is a "Commander Unit." The serial number was not provided in the application.

The tertiary crusher was manufactured by Cedar Rapids with a rated capacity of 30 T/hr and the crusher design is a secondary jaw and roll crusher. The date of manufacture was listed as the "early 1930's." The model is a "Commander Unit." The serial number was not provided in the application.

No documentation about the number, type, and configuration of the screens, transfer points, and material conveyance systems was provided in the Standard Permit to Construct Application for Portable Rock Crushers.

The generator used to provide electricity for this portable rock crusher and sand production plant is rated at 300 kW in prime operating mode. The generator set is a GMC Model 1271that is fired on diesel.

The facility is equipped with fugitive dust control equipment consisting of a water supply system and fugitive dust suppression spray bars and sprinklers which used on the main crusher, transfer points, and stock piles. The facility has a watering truck for wetting vehicle traffic areas.

5.2 Emissions Inventory

Emissions estimates for the generator engine were created by DEQ staff based upon comparison data for a typical 300 kW generator set. Additional information required to estimate emissions for quantifying potential emissions and modeling emissions rates were obtained by benchmarking against another manufacturer's physical data for the same 300 kW power output generator set fired on diesel fuel. The comparison engine was a Cummins Model NT855-G2 Turbocharged diesel generator engine rated at 480 bhp. Emission factors for criteria air pollutants, TAPs, and HAPs were obtained from AP-42 Section 3.3—Gasoline and Industrial Engines, released October 1996. The engine's horsepower rating and the operating hours of the generator were factors needed to estimate air pollutant emissions. Table 5.1 contains emissions for operating in an attainment or unclassifiable area.

All air pollutant emissions for operating in a PM_{10} non-attainment area were limited to levels where the predicted ambient impact of PM_{10} emissions were below the significant contribution levels of 5 $\mu g/m^3$, 24-hour average, and 1 $\mu g/m^3$, annual average.

Emissions from the rock crushing and sand screening are considered fugitive emissions and are not quantified for this project.

Table 5.1 EMISSIONS ESTIMATES

Pollutant	PM_{10} Attainment or Unclassifiable Area		PM_{10} Non-attainment Area	
	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)
PM-10 (total)	1.06	3.17	1.06	2.22
CO	3.21	9.62	3.21	6.73
NO_x	14.88	44.64	14.88	31.25
SO_2	1.73	5.18	1.73	3.63
VOCs	1.19	3.56	1.19	2.49

Analysis for collocation of this source with other rock crusher, concrete batch plant, or hot mix asphalt plant was not conducted; all the production limits are developed under the assumption that this rock crusher and sand screening plant and generator will be operated alone. Should the facility be moved adjacent to another rock crusher, concrete batch plant, or hot mix asphalt plant, then a new permit application will have to be submitted and a collocation analysis will have to be performed.

TAPs

The detailed TAPs emissions inventory is contained in Appendix A of this memorandum. Emissions of benzene, 1,3-butadiene, and formaldehyde were estimated to exceed the screening emission rates listed in IDAPA 58.01.01.586. Table 5.2 lists the predicted emission rates and screening limitations for these air pollutants.

Table 5.2 TOXIC AIR POLLUTANT EMISSIONS RATES

Pollutant	Averaging Period	PM_{10} Attainment or Unclassifiable Area Operation Hourly Emission Rate (lb/hr)	Regulatory Screening Emission Rate (lb/hr)
Benzene	Annual	3.13E-3	8.00E-04
1,3-Butadiene	Annual	1.31E-04	2.40E-05
Formaldehyde	Annual	3.96E-03	5.10E-04

5.3 Modeling

Dispersion modeling was conducted for the generator engine stack using the SCREEN3 dispersion model. The generator engine stack was modeled as a single emissions point at the emissions rate of 1 lb/hr. The maximum predicted ambient impact concentration at a unit emissions rate were multiplied by the source's emissions rate to obtain the predicted source ambient concentration. Building and structure downwash, complex terrain, and elevated terrain were not incorporated in the modeling analysis. Receptor heights were established at ground elevation. See Appendix B to review the SCREEN3 modeling output and input values.

Background concentrations were obtained from Kevin Schilling, Modeling Coordinator, Stationary Source Programs Office, DEQ, via email communication, dated December 28, 2004. These values are represented in Table 5.4 and are based on state-wide upper monitored values. The allowable ambient PM_{10} impacts for operation in a PM_{10} non-attainment (except in the Sandpoint PM_{10} non-attainment area) were limited to the significant contribution levels listed in IDAPA 58.01.01.006.91.d., per email communication from Kevin Schilling, on January 19, 2005. All NO_x ambient impacts were assumed to be equal to NO_2 ambient impacts, which is a conservative approach.

Table 5.3 is the summary of the stack parameters used in the modeling. The exhaust temperature was provided by the applicant, and was determined by direct measurement using a thermocouple held in the exhaust plume while the generator was operating under normal conditions.

Table 5.3 SUMMARY OF THE STACK PARAMETERS

Point Source	Stack Height	Stack Diameter,	Exhaust Flowrate	Stack Temperature	Stack Exit configuration
	(ft)	(ft)	ACFM	^{0}F	Horizontal
Generator Engine, Generator Make and Model Number: GMC Model 1271	12	0.33	2,785	375	No

PM_{10} Attainment Area

The plant-wide 24-hour PM_{10} ambient concentration is added to the background for portable sources. Table 5.4 provides the summary of the plant ambient impacts while operating in a PM_{10} attainment or unclassifiable area. Ambient impacts of PM_{10}, SO_2, CO, and NO_2 were below applicable standards.

Table 5.4 MODELING RESULTS-ATTAINMENT AND UNCLASSIFIABLE AREAS

Pollutant	Averaging Period	Predicted Ambient Impact ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Ambient Concentration ($\mu g/m^3$)	Regulatory Limit ($\mu g/m^3$)	Percent of Standard
SO_2	3-hour	36.86	120	156.86	1300	12.1
	24-hour	16.38	40	56.38	365	15.5
	Annual	1.55	10	11.55	80	14.4
NO_2	Annual	57.97	40	97.97	100	98.0
PM_{10}	24-hour	10.01	81	91.01	150	60.7
	Annual	1.37	27	28.37	50	56.7
CO	1-hour	75.99	13,800	13875.99	40,000	34.7
	8-hour	53.19	4600	4653.19	10,000	46.5

PM_{10} Non-Attainment Area

The allowable PM_{10} ambient concentration is limited to the significant contribution levels of 5 $\mu g/m^3$, 24-hour average, and 1.0 $\mu g/m^3$, annual average. In order to meet this increment, operation of the generator is limited to 11.5 hours per day and 4,200 hours per year. The operations of the rock crusher are not limited by this modeling analysis. Only the generator engine's ambient impacts are included from this facility. Predicted ambient impacts are lower for the 24-hour PM_{10} and SO_2 standards and the annual SO_2, NO_2, and PM_{10} standards because the operating hours have been reduced to levels required for the generator's ambient impacts to remain below the PM_{10} significant contribution levels.

Table 5.5 provides the summary of the plant ambient impacts at PM_{10} nonattainment areas.

Detailed ambient impact analysis and SCREEN3 modeling output files can be found in Appendices A and B of the Statement of Basis, respectively.

Table 5.5 PM_{10} AMBIENT IMPACT AT PM_{10} NON-ATTAINMENT AREA

Source	Modeling Output	
	($\mu g/m^3$, 24-hour average)	($\mu g/m^3$, annual average)
GMC Model 1271 Generator Stack	4.80	0.96

TAPs Impact Analysis

The generator is subject to TAPs compliance because it was purchased and installed after July 1995. The worst-case emissions from the generator result from operation in attainment and unclassifiable areas where allowable operating hours are maximized. Emissions of the following compounds exceeded the screening emissions limitations and required an ambient impact analysis to demonstrate compliance with the AACC increments: benzene, 1,3-butadiene, and formaldehyde. Modeled emissions resulted in ambient impacts that were below the AACC for each pollutant. The detailed results are in Table 5.6. Impacts for operation in a PM_{10} non-attainment are less than those depicted in Table 5.6 due to decreased allowable annual operating hours of the generator.

Table 5.6 CARCINOGENIC TAPs AMBIENT IMPACTS

Pollutant	Averaging Period	PM_{10} Attainment or Unclassifiable Area Operation Maximum Concentration ($\mu g/m^3$)	Regulatory Limit (ug/m^3)	Percent Of Increment
Benzene	Annual	6.36E-03	0.12	5.3
1,3-Butadiene	Annual	2.67E-04	3.6E-03	7.4
Formaldehyde	Annual	8.05E-03	0.077	10.5

5.4 *Regulatory Review*

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

IDAPA 58.01.01.201 ..... Permit to Construct Required

This facility is proposing to operate air pollutant emitting equipment that requires a PTC. According to Bob Jewett, Owner, the rock crushing and sand screening facility was purchased and constructed at its present location in 1988. The 300 kW generator was purchased and installed at the facility in 1997. The facility is portable by design and has been relocated from its location at 26340 Central Grade in Lewiston, to another location, and then returned to the original Central Grade location.

The facility does not qualify for permitting under the Rock Crusher Permit by Rule because the owner intends to operate this portable source at the current location for a period of time greater than 12 consecutive months.

40 CFR 60 ..... New Source Performance Standards

This facility is not subject to NSPS-Subpart OOO based upon the information provided in a January 11, 2005 telephone conversation with Bob Jewett, Owner, Jewett Crushing. According to Mr. Jewett, the rock crushing and screening sources that are listed in NSPS-Subpart OOO as "affected facilities" have not been modified or reconstructed in a manner that trigger NSPS applicability.

The following factors have been reviewed with regard to applicability of NSPS-Subpart OOO: portable design of the facility; rated production capacities of the equipment; initial dates of construction of the sources; and the basis that no sources have been modified or reconstructed. The conclusion is that this facility is not subject to the requirements of NSPS-Subpart OOO.

40 CFR 61 and 63 ..... National Emission Standards for Hazardous Air Pollutants & MACT

This facility is not subject to NESHAP or MACT.

5.5 *Fee Review*

This permit action is subject to a $1,000 application fee in accordance with IDAPA 58.01.01.224. This permit action is also subject to a processing fee of $500 for a general permit in accordance with IDAPA 58.01.01.225. DEQ received the application fee on December 3, 2004, and the $500.00 processing fee on April 22, 2005.

6. PERMIT CONDITIONS

6.1 Permit Condition 2.1 limits the opacity of all visible emissions from any stack, vent, or other functionally equivalent opening to no more that 20% for a period or periods exceeding three minutes in any 60 minute period.

6.2 Permit Condition 2.2 contains the emission standards for fugitive sources at a rock crushing facility that is not subject to 40 CFR 60—Subpart OOO, as specified by IDAPA 58.01.01.793.02.

6.3 Permit Condition 2.3 limits the sulfur content of the diesel fuel to 0.3 wt % for ASTM Grade 1 distillate fuel oil and 0.5 wt % for ASTM Grade 2 distillate fuel oil. These are standard state-wide limitations.

6.4 Permit Condition 2.4 requires the facility to reasonably control fugitive emissions. The permit condition contains various methods that are to be used, where practical to prevent particulate matter from becoming airborne. The permittee will show compliance with this requirement by conducting weekly facility-wide inspections of potential fugitive emissions sources. The permittee is required to record the periodic methods used to control fugitive emissions.

Permit Condition 2.5 requires the facility to use fugitive dust control strategies based on triggering events. The triggering events are when fugitives are observed leaving the property boundary and when visible emission exceed 20%.

6.4 Permit Condition 2.6 requires that Jewett Crushing obtain and maintain records of the actual fuel sulfur content of the diesel fuel received on-site and used in the generator to demonstrate compliance with Permit Condition 2.3.

6.5 Permit Condition 2.7 requires that Jewett Crushing conduct daily inspections of potential sources of fugitive dust emissions and take corrective action if fugitive dust emissions are not being reasonably controlled. Documentation must be maintained of the results of each inspection and any measures taken to control fugitive dust.

6.6 Permit Condition 2.8 requires the permittee to register the portable rock crusher and sand screening plant with DEQ at least 10 days prior to relocation.

6.7 Permit Conditions 3.1 and 4.1 specify that this concrete batch plant shall not operate simultaneously with any other rock crusher, concrete batch plant, or hot mix asphalt plant. Analysis for collocation of this source with other rock crusher, concrete batch plant, or hot mix asphalt plant was not conducted; all the operating limits are developed under the assumption that this plant and generator will be operated alone. Should the facility be moved adjacent to another rock crusher, concrete batch plant, or hot mix asphalt plant, then a new permit application will have to be submitted and a collocation analysis will have to be performed.

6.8 Permit Condition 3.2 limits the generator to 6,000 hours per year in any consecutive 12-month period while operating in a PM_{10} attainment or unclassifiable area.

6.9 Permit Condition 3.3 requires that Jewett Crushing monitor and record the generator's operating hour on a monthly basis and annually for any consecutive 12-month period to verify that the annual operating hours limitation has not been exceeded.

6.10 Permit Condition 4.2 specifies that prior to moving to Sandpoint PM_{10} nonattainment area, the permittee needs to get DEQ approval. This is because the Sandpoint SIP has specific modeling requirements and ambient impact limitations the operating within the Sandpoint PM_{10} nonattainment area, which were not conducted for this permit. Should the facility be moved to that area, then an in-depth modeling analysis and coordination with the Coeur d'Alene Regional Office to satisfy Sandpoint SIP needs to be conducted.

6.11 Permit Condition 4.3 limits the generator's daily and annual operating hours to 11.5 hr/day and 4,200 hr/yr when the facility is located in a PM_{10} nonattainment area. The daily operation is limited to assure that the 24-hour average ambient impacts from the facility do not exceed the significant impact of 5 $\mu g/m^3$. The annual operation is limited to assure that the annual average ambient impacts from the facility do not exceed the significant impact of 1 $\mu g/m^3$.

6.12 Permit Condition 4.4 contains the method that the permittee must use to demonstrate compliance with the generator operating hour limits by monitoring and recording the generator's operating hours on a daily basis and adding these values monthly. The monthly operating hours will be added for any consecutive 12-month period to establish compliance with the annual operating hours limit specified in Permit Condition 4.3.

7. PERMIT REVIEW

7.1 Regional Review of Draft Permit

The draft permit was sent to the Lewiston Regional Office on January 26, 2005. On January 28, 2005, the Lewiston Regional Office provided comments on the draft permit and statement of basis.

7.2 Facility Review of Draft Permit

A draft permit was provided for facility review on February 11, 2005. The facility draft permit package was resent on March 18, 2005, because the facility did not receive the original permit package . The permittee did not provide any comments on the draft permit.

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided, in accordance with IDAPA 58.01.01.209.01.c., from January 12, 2005 to February 11, 2005. During this time, there were no comments on the application and no requests for a public comment period on DEQ's proposed action.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommends that Jewett Crushing be issued final PTC No. P-040215 for the portable rock crushing and sand screening plant. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

DM/sd Permit No. P-040215

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APPENDIX A

EMISSIONS INVENTORY AND AMBIENT IMPACT ANALYSIS

Emissions Calculation for an IC Engine Rated at Less Than 600 hp

Attainment and Unclassifiable Area Modeling Demonstration and Emissions Inventory

Source: IC Engine No. 1 Jewett Crushing
Permit No.: P-040215
Source Type: I.C. Engine
Manufacturer GMC
Model No.: 1271
Fuel Diesel

Table 1

No. of Sources	Maximum Capacity	Daily Hours	Annual Hours	Total Annual Usage	Emission Factors					Emissions									
					CO[f]	NOx[f]	PM_{10}[f]	SO_x[b,c,d]	VOC[f]	CO		NO_x	PM_{10}			SO_x			VOC
					lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hr	tpy	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	tpy
Long Term Base Case																			
1	480 hp	24	6000	2,880,000 hp-hr/yr	0.00668	0.031	0.00220	0.0036	0.00247	3.21	9.62	44.64	1.06	25.34	3.17	1.73	41.47	5.18	3.56
									Maximum Emissions:	**3.21**	**9.62**	**44.64**	**1.06**	**25.34**	**3.17**	**1.73**	**41.47**	**5.18**	**3.56**

[b] SO_2 factor based on % by weight sulfur in diesel; sulfur content of diesel = 0.5 % by weight

[f] From AP-42, October 1996, Table 3.3-1.

[c] BSFC from AP-42, October 1996, Section 3.3, Page 3.3-6: 7000 Btu/hp-hr

[d] Diesel heating value from AP-42, October 1996, Section 3.3, Page 3.3-6: 19300 Btu/lb

DEQ staff comparison: 300 kW Cummins (Generator Joe Warrior) Diesel Generator
300 kw = 535 brake horsepower for standby mode
300 kw = 480 brake horsepower for prime mode.
This operation is prime mode.

Attainment and Unclassifiable Area Modeling Demonstration and Emissions Inventory

Toxic Air Pollutants/Hazardous Air Pollutant Emission Rates

Emissions Factors were taken from EPA's AP-42 Table 3.3-2 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines, AP-42 Section 3.3 - Gasoline and Diesel Industrial Engines, October 1996

Jewett Crushing 300 kW Generator Engine
Table 2: TOXICs MODELING and HAPs/TAPs EMISSIONS INVENTORY

Pollutant	HAP or TAP or HAP and TAP	24-hour or an Annual TAP	Emissions Factor (lb/MMBtu)	Hourly Emissions Rate (lb/hr)	Annual Emission Rate (lb/yr)	Annual Emission Rate (Tons/yr)	24 hour TAPs Modeling			Annual TAPs Modeling			Compliance Demonstrated YES or NO
							Ambient Impact (ug/m^3) 24-hr avg	Section 585 EL (lb/hr)	Section 585 AAC (ug/m^3) 24-hr avg	Ambient Impact (ug/m^3) annual avg	Section 586 EL (lb/hr)	Section 586 AACC (ug/m^3) annual avg	
Benzene	HAP & TAP	Annual	9.33E-04	3.13E-03	18.809	0.009405				6.36E-03	8.00E-04	1.20E-01	YES
Toluene	HAP & TAP	24-hour	4.09E-04	1.37E-03	8.245	0.004123	below EL	25	18750				
Xylenes	HAP & TAP	24-hour	2.85E-04	9.58E-04	5.746	0.002873	below EL	29	21750				
Propylene	HAP	NA	2.58E-03	8.67E-03	52.013	0.026006							
1,3-Butadiene	HAP & TAP	Annual	3.91E-05	1.31E-04	0.788	0.000394				2.67E-04	2.40E-05	3.60E-03	YES
Formaldehyde	HAP & TAP	Annual	1.18E-03	3.96E-03	23.789	0.011894				8.05E-03	5.10E-04	7.70E-02	YES
Acetaldehyde	HAP & TAP	Annual	7.67E-04	2.58E-03	15.463	0.007731				below EL	3.00E-03	4.50E-01	
Acrolein	HAP & TAP	24-hour	9.25E-05	3.11E-04	1.865	0.000932	below EL	0.017	12.5				
Individual Polycyclic Aromatic Hydrocarbons													
Naphthalene	**HAP&TAP**	**24-hour**	8.48E-05	2.85E-04	1.710	0.000855	below EL	3.33	2500				
Acenaphthylene	Neither		5.06E-06	1.70E-05	0.102	5.1E-05							
Acenaphthene	Neither		1.42E-06	4.77E-06	0.029	1.43E-05							
Fluorene	**TAP**	**24-hour**	2.92E-05	9.81E-05	0.589	0.000294	below EL	0.133	100				
Phenanthrene	Neither		2.94E-05	9.88E-05	0.593	0.000296							
Anthracene	Neither		1.87E-06	6.28E-06	0.0377	1.88E-05							
Fluoranthene	Neither		7.61E-06	2.56E-05	0.1534	7.67E-05							
Pyrene	Neither		4.78E-06	1.61E-05	0.0964	4.82E-05							
Benzo(a)anthracene	Neither		1.68E-06	5.64E-06	0.0339	1.69E-05							
Chrysene	Neither		3.53E-07	1.19E-06	0.0071	3.56E-06							
Benzo(b)fluoranthene	Neither		9.91E-08	3.33E-07	0.0020	9.99E-07							
Benzo(k)fluoranthene	Neither		1.55E-07	5.21E-07	0.0031	1.56E-06							
Benzo(a)pyrene	**HAP&TAP**	**Annual**	1.88E-07	6.32E-07	0.0038	1.9E-06				below EL	2.00E-06	3.00E-04	
Indeno(1,2,3-cd)pyrene	Neither		3.75E-07	1.26E-06	0.0076	3.78E-06							
Dibenzo(a,h)anthracene	Neither		5.83E-07	1.96E-06	0.0118	5.88E-06							
Benzo(g,h,I)perylene	Neither		4.89E-07	1.64E-06	0.0099	4.93E-06							
TOTAL PAHs	HAP		1.68E-04	5.64E-04	3.3869	0.001693					NA	NA	
Polycyclic Organics Matter * 7 PAH compounds compared to benzo(a)pyrene	TAP	Annual	3.43E-06	1.15E-05	0.0692	3.46E-05				below EL	9.10E-05	1.40E-02	
	Generator Aggregated Annual HAPs (T/yr) =					**0.066**							

* POM is made up of 7 bolded and italicized compounds. The sum of these emissions is compared against benzo(a)pyrene alone.

Attainment and Unclassifiable Area *Modeling Demonstration and Emissions Inventory*

PTC Processing Fees

Addition of the Requested Annual PTE Values in units of tons per year
(ie CO, SO2, NO_x, VOCs, PM-10, AND TAPs/HAPs which are not calculated in this spreadsheet.)

Table 3

Pollutant	Annual Emissions (T/yr)
CO	9.62
NOx	44.64
PM-10	3.17
SO2	5.18
VOCs	3.56
	66.17 T/yr

Fuel Usage Rate Emission Limitation Approach

Annual Fuel Consumption (gallons/yr) = Annual operating Hours (hr/yr) * Rated Horsepower (hp) * 7000 Btu/ hp - hr * (1 / 19,300 Btu/ lb diesel fuel) * (1 / 7.05 lb / gallon diesel fuel)

Annual Fuel Consumption (gallons/yr)=	148164 gallons diesel per year

Jewett Crushing PTC - *Generator* NAAQS
Ambient Impact Analysis NAAQS Compliance Demonstration Only

Persistence Factors, taken from Appendix A, *DEQ Air Quality Modeling Guideline*

Table 4

Averaging Period	Simple Terrain	Complex Terrain
3-hour	0.9	0.7
8-hour	0.7	
24-hour	0.4	0.15
Quarterly	0.13	
Annual	0.08	0.03
Annual (for carcinogenic TAPs	*0.125*	0.125

Worst case modeling demonstration (simple terrain)

Generator specifications for a comparable 300 kW generator set - Cummins Model NT855-G2 Turbocharged
Operation: Prime Mode
Exhaust flow rate *(acfm)* 2785

Exhaust Temperature (deg *Fahrenheit)* 375 Measured by applicant for the GMC 1271 engine that is in place

SCREEN3 (DOS format) ambient impact outputs based on a 1 lb/hr emission rate (Table 3)

Table 5

Distance to receptor (meters)	Ambient Impact (ug/m^3, 1-hr average)
100	22.96
200	19.15
300	15.47
400	12.74
500	10.84

Maximum Ambient Impact		
77 meters,	23.7	ug/m^3, 1 hr avg

Table 6
Impact = Potential hourly emission rate (lb/hr) * Maximum ambient impact (ug/m^3, 1-hr avg) * Persistence factor for avg period * (operating hours for that averaging period) / 8,760 hours/year

Table 6

Pollutant / Averaging Period	Worst-case Ambient Impact (ug/m^3)	Background Concen. (ug/m^3)	Total Predicted Ambient Impact (ug/m^3)	National Ambient Air Quality Standard (ug/m^3)	Percent of the Standard	Compliance Demonstrated ? Yes or No
PM-10						
24 hour avg	10.01	81	91.01	150	60.67	Yes
Annual avg	1.37	27	28.37	50	56.74	Yes
SO2						
3-hr avg	36.86	120	156.86	1300	12.07	Yes
24-hr avg	16.38	40	56.38	365	15.45	Yes
Annual avg	1.55	10	11.55	80	14.44	Yes
CO						
1-hr avg	75.99	13800	13875.99	40000	34.69	Yes
8-hr avg	53.19	4600	4653.19	10000	46.53	Yes
NO2						
Annual avg	57.97	40	97.97	100	97.97	Yes

Emissions Calculation for an IC Engine Rated at Less Than 600 hp

PM-10 Nonattainment Area Case (limited operation to below 5.0 ug/m^3, 24 hour avg and 1.0 ug/m^3, annual avg

Source: IC Engine No. 1 Jewett Crushing 777-00352
Permit No.: P-040215
Source Type: I.C. Engine
Manufacturer GMC
Model No.: 1271
Fuel Diesel

Table 1: PM-10 Non-attainment Area Case (limited to 5.0 ug/m^3, 24-hr avg, and 1.0 ug/m^3, annual avg for PM-10)

					Emission Factors					Emissions									
No. of	Maximum	Daily	Annual	Total	CO[f]	NOx[f]	PM_{10}[f]	SO_x[b,c,md]	VOC[f]	CO		NO_x	PM_{10}			SO_x			VOC
Sources	Capacity	Hours	Hours	Annual Usage	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hp-hr	lb/hr	tpy	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	tpy
Long Term Base Case																			
1	480 hp	11.5	4200	2,016,000 hp-hr/yr	0.00668	0.031	0.00220	0.0036	0.00247	3.21	6.73	31.25	1.06	12.14	2.22	1.73	19.87	3.63	2.49
									Maximum Emissions:	**3.21**	**6.73**	**31.25**	**1.06**	**12.14**	**2.22**	**1.73**	**19.87**	**3.63**	**2.49**

[b] SO_2 factor based on % by weight sulfur in diesel; sulfur content of diesel = *0.5* % by weight

[f] From AP-42, October 1996, Table 3.3-1.

[c] BSFC from AP-42, October 1996, Section 3.3, Page 3.3-6: 7000 Btu/hp-hr

[md] Diesel heating value from AP-42, October 1996, Section 3.3, Page 3.3-6: 19300 Btu/lb

DEQ staff comparison: 300 kW Cummins (Generator Joe Warrior) Diesel Generator
300 kw = 535 brake horsepower for standby mode
300 kw = 480 brake horsepower for prime mode.
This operation is prime mode.

Toxic Air Pollutants/Hazardous Air Pollutant Emission Rates

PM-10 Nonattainment Area Case (limited operation to below 5.0 ug/m^3, 24 hour avg and 1.0 ug/m^3, annual avg

Emissions Factors were taken from EPA's AP-42 Table 3.3-2 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines, AP-42 Section 3.3 - Gasoline and Diesel Industrial Engines, October 1996

Jewett Crushing 300 kW Generator Engine

Table 2: TOXICs MODELING and HAPs/TAPs EMISSIONS INVENTORY

Pollutant	HAP or TAP or HAP and TAP	24-hour or an Annual TAP	Emissions Factor (lb/MMBtu)	Hourly Emissions Rate (lb/hr)	Annual Emission Rate (lb/yr)	Annual Emission Rate (Tons/yr)	24 hour TAPs Modeling			Annual TAPs Modeling			Compliance Demonstrated YES or NO
							Ambient Impact (ug/m^3) 24-hr avg	Section 585 EL (lb/hr)	Section 585 AAC (ug/m^3) 24-hr avg	Ambient Impact (ug/m^3) annual avg	Section 586 EL (lb/hr)	Section 586 AACC (ug/m^3) annual avg	
Benzene	HAP & TAP	Annual	9.33E-04	3.13E-03	13.166	0.006583				4.45E-03	8.00E-04	1.20E-01	YES
Toluene	HAP & TAP	24-hour	4.09E-04	1.37E-03	5.772	0.002886	below EL	25	18750				
Xylenes	HAP & TAP	24-hour	2.85E-04	9.58E-04	4.022	0.002011	below EL	29	21750				
Propylene	HAP	NA	2.58E-03	8.67E-03	36.409	0.018204							
1,3-Butadiene	HAP & TAP	Annual	3.91E-05	1.31E-04	0.552	0.000276				1.87E-04	2.40E-05	3.60E-03	YES
Formaldehyde	HAP & TAP	Annual	1.18E-03	3.96E-03	16.652	0.008326				5.63E-03	5.10E-04	7.70E-02	YES
Acetaldehyde	HAP & TAP	Annual	7.67E-04	2.58E-03	10.824	0.005412				below EL	3.00E-03	4.50E-01	
Acrolein	HAP & TAP	24-hour	9.25E-05	3.11E-04	1.305	0.000653	below EL	0.017	12.5				
Individual Polycyclic Aromatic Hydrocarbons													
Naphthalene	**HAP&TAP**	**24-hour**	8.48E-05	2.85E-04	1.197	0.000598	below EL	3.33	2500				
Acenaphthylene	Neither		5.06E-06	1.70E-05	0.071	3.57E-05							
Acenaphthene	Neither		1.42E-06	4.77E-06	0.020	1E-05							
Fluorene	**TAP**	**24-hour**	2.92E-05	9.81E-05	0.412	0.000206	below EL	0.133	100				
Phenanthrene	Neither		2.94E-05	9.88E-05	0.415	0.000207							
Anthracene	Neither		1.87E-06	6.28E-06	0.0264	1.32E-05							
Fluoranthene	Neither		7.61E-06	2.56E-05	0.1074	5.37E-05							
Pyrene	Neither		4.78E-06	1.61E-05	0.0675	3.37E-05							
Benzo(a)anthracene	Neither		1.68E-06	5.64E-06	0.0237	1.19E-05							
Chrysene	Neither		3.53E-07	1.19E-06	0.0050	2.49E-06							
Benzo(b)fluoranthene	Neither		9.91E-08	3.33E-07	0.0014	6.99E-07							
Benzo(k)fluoranthene	Neither		1.55E-07	5.21E-07	0.0022	1.09E-06							
Benzo(a)pyrene	**HAP&TAP**	**Annual**	1.88E-07	6.32E-07	0.0027	1.33E-06				below EL	2.00E-06	3.00E-04	
Indeno(1,2,3-cd)pyrene	Neither		3.75E-07	1.26E-06	0.0053	2.65E-06							
Dibenzo(a,h)anthracene	Neither		5.83E-07	1.96E-06	0.0082	4.11E-06							
Benzo(g,h,l)perylene	Neither		4.89E-07	1.64E-06	0.0069	3.45E-06							
TOTAL PAHs	HAP		1.68E-04	5.64E-04	2.3708	0.001185					NA	NA	
Polycyclic Organics Matter * 7 PAH compounds compared to benzo(a)pyrene	TAP	Annual	3.43E-06	1.15E-05	0.0484	2.42E-05				below EL	9.10E-05	1.40E-02	
	Generator Aggregated Annual HAPs (T/yr) =					**0.046**							

* POM is made up of 7 bolded and italicized compounds. The sum of these emissions and impacts is compared against benzo(a)pyrene's AACC alone.

PM-10 Nonattainment Area Case (limited operation to below 5.0 ug/m^3, 24 hour avg and 1.0 ug/m^3, annual avg

PTC Processing Fees

Addition of the Requested Annual PTE Values in units of tons per year
(ie CO, SO2, NOx, VOCs, PM-10, AND TAPs/HAPs which are not calculated in this spreadsheet.)

Table 3

Pollutant	Annual Emissions (T/yr)
CO	6.73
NOx	31.25
PM-10	2.22
SO2	3.63
VOCs	2.49
	46.32 T/yr

Fuel Usage Rate Emission Limitation Approach

Annual Fuel Consumption (gallons/yr) = Annual operating Hours (hr/yr) * Rated Horsepower (hp) * 7000 Btu/ hp - hr * (1 / 19,300 Btu/ lb diesel fuel) * (1 / 7.05 lb / gallon diesel fuel)

Annual Fuel Consumption (gallons/yr)=	103715 gallons diesel per year

Jewett Crushing PTC - Generator NAAQS
Ambient Impact Analysis NAAQS Compliance Demonstration Only

Persistence Factors, taken from Appendix A, DEQ Air Quality Modeling Guideline

Table 4

Averaging Period	Simple Terrain	Complex Terrain
3-hour	0.9	0.7
8-hour	0.7	
24-hour	0.4	0.15
Quarterly	0.13	
Annual	0.08	0.03
Annual (for carcinogenic TAPs	0.125	0.125

Worst case modeling demonstration (simple terrain)

Generator specifications for a comparable 300 kW generator set - Cummins Model NT855-G2 Turbocharged
Operation: Prime Mode
Exhaust flow rate (acfm) 2785

Exhaust Temperature (deg Fahrenheit) 375 Measured by applicant for the GMC 1271 engine that is in place

SCREEN3 (DOS format) ambient impact outputs based on a 1 lb/hr emission rate (Table 3)

Table 5

Distance to receptor (meters)	Ambient Impact (ug/m^3, 1-hr average)
100	22.96
200	19.15
300	15.47
400	12.74
500	10.84

Maximum Ambient Impact		
77 meters,	23.7	ug/m^3, 1 hr avg

Table 6

Impact = Potential hourly emission rate (lb/hr) * Maximium ambient impact (ug/m^3, 1-hr avg) * Persistence factor for avg period * (operating hours for that averaging period) / 8,760 hours/year

Table 6

Pollutant / Averaging Period	Worst-case Ambient Impact (ug/m^3)	Background Concen. (ug/m^3)	Total Predicted Ambient Impact (ug/m^3)	National Ambient Air Quality Standard (ug/m^3)	Percent of the Standard	Compliance Demonstrated ? Yes or No
PM-10						
24 hour avg	4.80	81	85.80	150	57.20	Yes
Annual avg	0.96	27	27.96	50	55.92	Yes
SO2						
3-hr avg	36.86	120	156.86	1300	12.07	Yes
24-hr avg	7.85	40	47.85	365	13.11	Yes
Annual avg	0.52	10	10.52	80	13.15	Yes
CO						
1-hr avg	75.99	13800	13875.99	40000	34.69	Yes
8-hr avg	53.19	4600	4653.19	10000	46.53	Yes
NO2						
Annual avg	28.41	40	68.41	100	68.41	Yes

APPENDIX B

SCREEN3 MODEL OUTPUT

12/29/04
10:15:56

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Jewett Crushing Generator Stack; 375 deg F; Cummins 480 bhp diesel engine

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.126000
STACK HEIGHT (M)	=	3.6600
STK INSIDE DIAM (M)	=	.1000
STK EXIT VELOCITY (M/S)	=	167.3512
STK GAS EXIT TEMP (K)	=	463.7000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 2785.0000 (ACFM)

BUOY. FLUX = 1.510 M**4/S**3; MOM. FLUX = 44.241 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	.0000	1	1.0	1.0	320.0	53.87	3.02	3.00	NO
100.	22.96	4	15.0	15.0	4800.0	7.01	8.26	4.75	NO
200.	19.15	4	8.0	8.0	2560.0	9.94	15.67	8.69	NO
300.	15.47	4	4.5	4.5	1440.0	14.82	22.83	12.51	NO
400.	12.74	4	3.5	3.5	1120.0	18.00	29.74	15.81	NO
500.	10.84	4	3.0	3.0	960.0	20.40	36.46	18.91	NO
600.	9.449	4	2.5	2.5	800.0	23.74	43.10	21.97	NO
700.	8.334	4	2.0	2.0	640.0	28.76	49.71	25.08	NO
800.	8.603	5	1.0	1.0	10000.0	37.76	42.67	20.70	NO
900.	9.286	6	1.0	1.0	10000.0	31.96	31.82	15.29	NO
1000.	10.02	6	1.0	1.0	10000.0	31.96	34.84	16.13	NO
1100.	10.46	6	1.0	1.0	10000.0	31.96	37.84	16.88	NO
1200.	10.77	6	1.0	1.0	10000.0	31.96	40.82	17.62	NO
1300.	10.95	6	1.0	1.0	10000.0	31.96	43.80	18.35	NO
1400.	11.04	6	1.0	1.0	10000.0	31.96	46.75	19.06	NO
1500.	11.04	6	1.0	1.0	10000.0	31.96	49.69	19.76	NO
1600.	10.99	6	1.0	1.0	10000.0	31.96	52.62	20.45	NO
1700.	10.89	6	1.0	1.0	10000.0	31.96	55.53	21.12	NO
1800.	10.75	6	1.0	1.0	10000.0	31.96	58.43	21.79	NO
1900.	10.58	6	1.0	1.0	10000.0	31.96	61.31	22.44	NO
2000.	10.38	6	1.0	1.0	10000.0	31.96	64.19	23.09	NO
2100.	10.15	6	1.0	1.0	10000.0	31.96	67.05	23.64	NO
2200.	9.906	6	1.0	1.0	10000.0	31.96	69.89	24.17	NO
2300.	9.667	6	1.0	1.0	10000.0	31.96	72.73	24.70	NO
2400.	9.430	6	1.0	1.0	10000.0	31.96	75.55	25.22	NO

				SCREEN				
2500.	9.197	6	1.0	1.0 10000.0	31.96	78.37	25.73	NO
2600.	8.968	6	1.0	1.0 10000.0	31.96	81.17	26.23	NO
2700.	8.744	6	1.0	1.0 10000.0	31.96	83.96	26.72	NO
2800.	8.525	6	1.0	1.0 10000.0	31.96	86.74	27.21	NO
2900.	8.313	6	1.0	1.0 10000.0	31.96	89.52	27.69	NO
3000.	8.106	6	1.0	1.0 10000.0	31.96	92.28	28.16	NO
3500.	7.156	6	1.0	1.0 10000.0	31.96	105.96	30.09	NO
4000.	6.373	6	1.0	1.0 10000.0	31.96	119.44	31.88	NO
4500.	5.721	6	1.0	1.0 10000.0	31.96	132.75	33.56	NO
5000.	5.173	6	1.0	1.0 10000.0	31.96	145.89	35.15	NO
5500.	4.709	6	1.0	1.0 10000.0	31.96	158.90	36.66	NO
6000.	4.311	6	1.0	1.0 10000.0	31.96	171.77	38.10	NO
6500.	3.967	6	1.0	1.0 10000.0	31.96	184.52	39.48	NO
7000.	3.668	6	1.0	1.0 10000.0	31.96	197.16	40.81	NO
7500.	3.411	6	1.0	1.0 10000.0	31.96	209.69	41.95	NO
8000.	3.184	6	1.0	1.0 10000.0	31.96	222.13	43.05	NO
8500.	2.983	6	1.0	1.0 10000.0	31.96	234.48	44.11	NO
9000.	2.803	6	1.0	1.0 10000.0	31.96	246.74	45.13	NO
9500.	2.642	6	1.0	1.0 10000.0	31.96	258.92	46.12	NO
10000.	2.496	6	1.0	1.0 10000.0	31.96	271.02	47.08	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

77.	23.87	3	10.0	10.0	3200.0	8.68	10.01	6.10	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	23.87	77.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

APPENDIX C

AIRS INFORMATION

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

Facility Name: Jewett Crushing
Facility Location: Portable
AIRS Number: 777-00352

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

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

[b] AIRS/AFS Classification Codes:

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

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

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

C = Class is unknown.

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