

October 2, 2000

**MEMORANDUM**

**TO:** Jim Johnston, Regional Administrator  
Idaho Falls Regional Office

**FROM:** Allan Johnson, Air Quality Engineer - *aj*  
Technical Services Office

**SUBJECT:** **PERMIT TO CONSTRUCT TECHNICAL ANALYSIS**  
P-000526, BECO Construction Company, Portable  
(Standard Rock Crusher Permit to Construct No. 777-00168; Including Aggregate,  
Asphalt, and Concrete Production when Collocated in Attainment Areas)

**PURPOSE**

The purpose of 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).

**PROJECT DESCRIPTION**

BECO Construction Company is proposing to modify a portable rock crushing facility. BECO is requesting a PTC be issued to cover the operations of the rock crushing facility in both attainment and nonattainment areas throughout the state of Idaho. Note that the Standard PTC for a portable rock crusher also includes provisions for collocated operations in attainment areas with one (1) other portable source (i.e., rock crusher, hot-mix asphalt, or concrete batch plant). The modification includes the addition of a crushing unit and the replacement of the existing generators with a single, larger generator.

**SUMMARY OF EVENTS**

On July 12, 2000, the Idaho Department of Environmental Quality (DEQ) received a PTC application.

**DISCUSSION**

1. **Process Description**

The majority of rock crushing facilities in Idaho mine rock deposits from pits using front-end loaders. However, rock may also be mined from quarries by drilling and blasting or dredged from stream beds. Rock crushing facilities generally produce three to four sizes of aggregate by employing a series of crushers and screens.

The rock is transferred to a vibrating grizzly to segregate large from small material. The large material is conveyed to the primary crusher (usually a jaw or gyratory crusher) where it is reduced to 3 to 12 inches in diameter. The crushed material is transferred to the primary screen where it is separated into two or three size ranges. The oversized material is conveyed to a secondary crusher, and the smaller material is transferred to a tertiary crusher or is stockpiled. The secondary crusher (usually a gyratory or cone crusher) reduces the material to roughly 1 to 4 inches in diameter. The material is re-screened. The oversized

material is crushed in a tertiary crusher and re-screened, and the small aggregate is stockpiled.

Particulate matter (PM) emissions are generated at all points of crushing, screening, and material transfer. The use of water spray is the most common method used to control particulate emissions. If an electrical generation unit is used, the combustion of fuel also results in PM emissions, as well as, oxides of nitrogen (NO<sub>x</sub>), oxides of sulfur (SO<sub>x</sub>), carbon monoxide (CO), and volatile organic compounds (VOCs). Fugitive PM emissions are generated by the mining activities, the aggregate storage piles, and front-end loader and truck traffic.

The Standard PTC requested will allow this rock crushing facility to collocate and simultaneously operate with one (1) other portable plant (i.e., rock crusher, hot-mix asphalt, or concrete batch plant) in attainment areas. It is important to note that during collocated operations, this crusher is then part of a single, larger source engaged in the production of either hot-mix asphalt, concrete, and/or aggregate; depending upon which type of portable plant the crusher is collocated with. While collocated, the two portable plants are now considered to be one source, and the emissions of this single source is the sum of the emissions from the two portable plants. This single, larger source must comply with all applicable federal, state, and local requirements. To maintain compliance, specific requirements and limitations have been included in the Standard PTC for this rock crusher for collocated operations. As described in the following sections of this technical memorandum, specific conservative assumptions and calculations were made to determine these Standard PTC collocation requirements. For this reason, the permit for the other portable plant with which this rock crusher will collocate must also contain specific collocation requirements based on the same conservative assumptions and calculations used in this Standard PTC.

## 2. Equipment Listing

The analysis upon which this permit was based assumed that the following equipment would be used:

### 2.1 Primary Crusher

Manufacturer/Type: Shop Built / Impact Crusher

### 2.2 Secondary Crusher

Manufacturer/Type: Symons / Cone Crusher

### 2.3 Tertiary Crusher

Manufacturer/Type: Missouri Rogers / Jaw Crusher

### 2.4 Additional Crusher

Manufacturer/Type: Kue-Ken / Jaw Crusher

### 2.5 Additional Crusher

Manufacturer/Type:	Remco DD-VSM 90-374 / Horizontal Impact
Date of Manufacture:	1999
Maximum Capacity:	200 Tons per hour

### 2.6 Generator

Manufacturer:	Caterpillar
Model:	3512
Rated Power Output (kW):	1000
Fuel Type (gasoline/diesel):	diesel
Fuel Usage (gal/hr):	72.4
Stack Diameter (ft):	0.667
Stack Height (ft):	12
Exhaust Flowrate (acfm):	3191
Exhaust Temperature (°F):	856

When collocated, this crusher is then part of a single, larger source that produces either hot-mix asphalt, concrete, and/or aggregate; depending upon which type of portable plant the crusher is collocated with. The equipment used by this single, larger source would include the crusher equipment listed above plus the equipment of the other portable plant. To see an equipment description for the other portable plant, see the corresponding permitting files for that plant.

### 3. Area Classification

The rock crushing facility is a portable source and may operate in both attainment and nonattainment areas throughout Idaho.

### 4. Emission Estimates

Emission estimates to determine the potential to emit (PTE) for aggregate processing and handling are conservatively determined using a spreadsheet specifically developed for rock crushing facilities. The spreadsheet has been developed using emission factors from AP-42, Table 11.19.2-2, 1/95 Edition, to estimate the facility's emissions from crushers, screens, and transfer points. Fugitive emissions from sources that are not affected facilities, pursuant to 40 CFR 60.670, are not included in determining PTE. Likewise for collocated operations; fugitive emissions from hot-mix asphalt plant sources that are not affected facilities, pursuant to 40 CFR 60.90, are not included in determining PTE. PTE is used to determine if prevention of significant deterioration (PSD) or Title V Operating Permit requirements apply to the facility. Emissions from generators are also determined by the spreadsheet using emission factors from AP-42, Tables 3.3-2 and 3.4-2, 1/95 Edition. These emissions are included in the determination of PTE. Crusher, screen, and transfer point emissions are not limited to specific pound-per-hour or ton-per-year emission rates because of the margin of error inherent in the emission estimates, which are not source-specific, but rather are applicable to the broader source category of crushed stone processing. Generator emissions are not limited to specific emission rates either.

For collocated operations, a conservative approach is taken by limiting the emissions of each of the collocated units to half of the levels allowed when operating alone. Then the combined emissions of the two collocated sources will be within the allowable levels. See the information below for a more detailed description. This approach is designed to result in acceptable throughput limits for most collocation situations. In cases where the throughput limits are too restrictive, a site-specific analysis and permit amendment may be completed.

This facility's uncontrolled and controlled PTE is 323 tons per any consecutive 12-month period (T/yr) and 97 T/yr, respectively. The emission estimates are included as Appendix A. The following narrative briefly explains the methods and assumptions used in the development of the source-specific spreadsheet.

### **ATTAINMENT AREA OPERATIONS**

The spreadsheet inherently limits emissions below certain triggering levels (i.e., PSD and Title V thresholds) by limiting maximum throughput. If a generator is not used, throughput is solely limited to limit a facility's PTE to 99 T/yr of PM emissions. If a generator is used, throughput is limited based on the most limiting pollutant or pollutants (i.e., the pollutant whose emission rate is closest to 99 T/yr). The spreadsheet calculations incorporate the following to determine the throughput limit: the maximum hourly throughput of the primary crusher, the total number of crushers, the capacity of the generator (if used), the ambient impact from the generator, and the generator's fuel type and fuel consumption rate.

In the standard permit, two throughput limit options are available for attainment area operations. One is for an annual limit (annual is any consecutive 12-month period), and the other is for a daily and annual limit. The annual limit option is chosen only to limit emissions to 99 T/yr or less. The daily and annual limit option is chosen to protect a 24-hour ambient standard, an annual ambient standard, and to limit emissions to 99 T/yr. Depending on the circumstances, one or both options may be required.

### **NONATTAINMENT AREA OPERATIONS**

For facilities that operate in a nonattainment area, throughput is limited to protect the standard(s) for which the area is designated as nonattainment. For example, when these facilities operate in a particulate matter with an aerodynamic diameter of less than or equal to a nominal ten (10) microns (PM-10) nonattainment area, throughput is, or may have to be, limited on a daily basis to protect the 24-hour standard, or annually to protect the annual standard. In either case, the spreadsheet automatically calculates the allowable throughput that protects these standards. When a generator is used, the spreadsheet takes into account its ambient impact and limits throughput accordingly. If the impacts are not significant, the spreadsheet limits throughput to keep emissions at or below 99 T/yr.

In the standard permit, two throughput options are available to choose from for operations in a nonattainment area. The first option states the rock crushing facility cannot operate in any PM-10 nonattainment area or proposed PM-10 nonattainment area without DEQ approval. The choice of this option is obvious. The second option is a daily and annual throughput limit. Imposing this limit not only protects the 24-hour limit and annual limit, but also ensures facility emissions will not exceed 99 T/yr.

## COLLOCATED OPERATIONS IN ATTAINMENT AREAS

Standard PTCs will only allow collocation with one (1) other portable source (i.e., rock crusher, hot-mix asphalt, or concrete batch plant) which has also received a Standard PTC that specifically allows collocation. When a combination of one portable crusher unit and one other portable unit are operated at a single location, the emissions of both units must be added together when determining PTE. Consistent with the approach taken for attainment area operations, the spreadsheet inherently limits the combined emissions of the two portable units to below certain triggering levels (i.e., PSD and Title V thresholds) by limiting the maximum throughput of each. For collocated operations, half of the attainment area triggering levels are used as limits for calculating throughput for each source. The crusher throughput is then established based on the most limiting pollutant or pollutants (i.e., the pollutant whose emission rate is closest to 49.5 T/yr). The spreadsheet calculations incorporate the following to determine the throughput limit: the maximum hourly throughput of the primary crusher, the total number of crushers, the capacity of the generator (if used), the ambient impact from the generator, and the generator's fuel type and fuel consumption rate.

In the standard permit, two throughput limit options are available for collocated attainment area operations. One is for an annual limit (annual is any consecutive 12-month period), and the other is for a daily and annual limit. The annual limit option is chosen only to limit the combined emissions to 99 T/yr or less. The daily and annual limit option is chosen to protect a 24-hour ambient standard, an annual ambient standard, and to limit emissions to 99 T/yr. Depending on the circumstances, one or both options may be required.

## FUGITIVE EMISSIONS AT THE PROPERTY BOUNDARY

In order to ensure the air quality at and beyond the facility boundary is not further degraded, the standard permit requires that no visible emissions cross the facility boundary. It is assumed if no emissions visibly cross the boundary, the air quality is protected and not further degraded. The permit requirement is offered in lieu of fugitive dust modeling.

### 5. Modeling

Estimated emissions due to aggregate crushing and handling are expected to vary considerably from the facility's actual emissions. Modeling results would reflect the emission estimates with an added level of conservatism built into the modeling. Because of the degree of uncertainty involved in the emissions estimate, modeling of fugitive dust emissions was not conducted. However, to ensure no ambient air quality standard will be violated due to emissions generated by crushing, screening, aggregate handling, and fugitive sources; the permit requires that emissions from these sources not be seen leaving the property boundary for more than three (3) minutes in any sixty (60) minute period. If visible emissions are not seen crossing the property boundary, no significant impact on ambient air quality nor a violation of National Ambient Air Quality Standards (NAAQS) will occur.

If a generator is used to provide power to the facility, an ambient impact analysis must be performed to ensure its emissions do not cause or contribute to a violation of any applicable ambient air quality standard. Normally, the EPA-approved SCREEN3 modeling program is used to predict the ambient impact from the generator. The spreadsheet then uses the

modeling result and calculates a throughput limit based on the proposed operating area (attainment, nonattainment, or collocated attainment). For collocated operations, the crusher generator operation is limited as needed so that the modeled impacts will be half of the available allowable ambient impact. Likewise for collocated operations; the modeled impacts of the other portable facility will also be limited to half of the available allowable, ambient impact so that the combined emissions of the two collocated sources will remain within the NAAQS. Using the 24-hour NAAQS standard for PM-10 (attainment area) as an example, one-half of the allowable available impact would be equal to  $32 \mu\text{g}/\text{m}^3$ , as follows:

$$32 \mu\text{g}/\text{m}^3 = 0.5 \times [150 \mu\text{g}/\text{m}^3 - 86 \mu\text{g}/\text{m}^3],$$

where  $150 \mu\text{g}/\text{m}^3$  is the 24-hour average standard and  $86 \mu\text{g}/\text{m}^3$  is the conservative statewide 24-hour average background value. Then the generator operations would be limited as needed, based on the specific ambient impact modeling for this generator, so that its modeled 24-hour concentration does not exceed  $32 \mu\text{g}/\text{m}^3$  at or beyond the facility's property boundary. This approach is designed to result in acceptable operational limits for most collocation situations. In cases where these limits are too restrictive, a site-specific analysis and permit amendment may be completed. If a generator is used, the modeling estimates are included as Appendix B.

6. Facility Classification

Rock crushing plants (including collocated operations producing asphalt, concrete, and aggregate) are not designated facilities, as defined in IDAPA 58.01.01.006.27. This facility is not a major facility as defined in IDAPA 58.01.01.006.55 and IDAPA 58.01.01.008.10. The SIC code for this rock crushing facility is 1442, "Construction Sand and Gravel." The AIRS facility classification for this facility is SM because the uncontrolled PTE is greater than 100 T/yr.

7. Regulatory Review

The following rules and/or regulations have been reviewed in this permit analysis:

<u>IDAPA 58.01.01.201</u>	Permit to Construct;
<u>IDAPA 58.01.01.202</u>	Application Procedures;
<u>IDAPA 58.01.01.203</u>	Permit Requirements for New and Modified Stationary Sources;
<u>IDAPA 58.01.01.209</u>	Procedures for Issuing Permits;
<u>IDAPA 58.01.01.211</u>	Conditions for Permits to Construct;
<u>IDAPA 58.01.01.212</u>	Obligation to Comply;
<u>IDAPA 58.01.01.577</u>	Ambient PM-10 Air Quality Standard;
<u>IDAPA 58.01.01.625</u>	Visible Emissions;

IDAPA 58.01.01.650

Rules for Control of Fugitive Dust; and

IDAPA 58.01.01.728.02

Distillate Fuel Oil.

With regard to 40 CFR 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants, this is an affected facility per the applicant's permit application.

8. Permit Coordination

This facility is not a major facility as defined by IDAPA 58.01.01.006.55 and IDAPA 58.01.01.008.10. However, the applicant has indicated that it is an NSPS-affected facility (40 CFR Part 60, Subpart OOO), and therefore, it is a Tier I source as defined by IDAPA 58.01.01.006.104(b). In accordance with IDAPA 58.01.01.301.02(b), these Tier I sources not located at major facilities do not require a Tier I Operating Permit until June 1, 2001, unless an earlier date is required by an applicable standard or EPA determines that no Tier I Operating Permit is required.

9. AIRS Information

Since each of these facilities is considered a new facility for AIRS purposes, an update to the AIRS data base is required. The information necessary to update the data base is included as Appendix C of this technical analysis.

FEES

The facility is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, registration and registration fees, according to IDAPA 58.01.01.526, are not applicable.

RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommend that BECO Construction Company be issued a PTC for a portable rock crushing facility. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD PTC requirements.

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cc: DEQ State Office  
Idaho Falls Regional Office

# **Appendix A**

*Emission Estimate Calculations*

*P-000526*

*BECO Construction Co., Idaho Falls, ID*

DATA ENTRY

Company Name: RETO CONSULTING  
 Project: Poudre Canals  
 POC: 737 63161  
 Engineer: ASK J. Johnson  
 Unit: 23-Aug-97  
 Flammets: 0002/0044

Generator Information

Rated Production Capacity: 450 [k] units  
 Application: 34 [k] units  
 Requested Hours of Operation: 8,748 [k] hours  
 Estimated Throughput: 3,541,000 [k] units  
 Maximum Hours of Operation: 8,748 [k] hours  
 Maximum Throughput: 3,541,000 [k] units

Number of Cycles: 1  
 Annual Throughput Emission Limit: A (A = <10> Tons/yr; Below Title V Threshold)  
 (B = <50> Tons/yr; PSD Threshold)  
 Selected Distribution Instructions: 300 Tons/yr

Generator Information

Generator: (V) V  
 Generator Size: 1,000 [k] W 1340.7 Conversion Factor  
 Units: b (A = Horsepower)  
 (B = Kilowatts)  
 Fuel Type: A (A = Diesel (Fluid Generator))  
 (B = Gasoline-Fluid/Dual-Fuel Generator)  
 Fuel Usage: 72.4 [k] gal/yr  
 Fuel Handling Values: 9,851,000 [k] MMBtu/yr  
 Estimated 1-hr Concentration: 31.89 [k] ppb/yr (at emission rate of 1 hr/yr)

State Point Emission Factor

Source: (A)  
 Selected Milestone Conversion (A)  
 POC: (B) (C) (D)  
 POC: (E) (F) (G) (H)  
 POC: (I) (J) (K) (L)  
 POC: (M) (N) (O) (P)  
 POC: (Q) (R) (S) (T)  
 POC: (U) (V) (W) (X)  
 POC: (Y) (Z) (AA) (AB)

Max. cap. 100 = 10,000,000, 1,000,000, 10,000

SECTION TO REPORT TO CONSTRUCTION (PTC)	Value	Units
Section A.1.1 Number of Cycles	1	
Section A.2.1 Number of Cycles	3	
Section A.3.1 Hours of Operation	1,000	h/yr
Section B.1.1 Annual Throughput Limit	981,996	Tyr
Section B.1.2 Annual Hours of Operation	6,444	h/yr
Section B.1.3 Daily Hours of Operation	NA	
Section C.1.1 Annual Throughput Limit	431,498	Tyr
Section C.1.2 Annual Hours of Operation	3,262	h/yr
Section C.1.3 Daily Hours of Operation	NA	
Section D.1.1 Annual Throughput Limit	981,996	Tyr
Section D.1.2 Annual Hours of Operation	6,444	h/yr
Section D.1.3 Daily Hours of Operation	20.3	h/Day





Pollutant	Generator Emissions		Crew Emissions (Crewed)		Total Emissions	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
PM <sub>10</sub>	14.45	5,261	2,132	787.2	11,144	4,053
PM <sub>2.5</sub>	11.35	4,141	1,612	590.4	8,753	3,151
SO <sub>2</sub>	193.37	70,375	24.8	9,072	198.17	71,447
NO <sub>x</sub>	720.87	263,913	113.8	41,522	834.67	305,435
CO	119.68	43,581	11.7	4,218	131.38	47,799
CH <sub>4</sub>	11.64	4,231	1.4	504	13.04	4,735

Allowable Limits	PM <sub>10</sub>	5.0	PM <sub>2.5</sub>	3.5
Generator - Operation	10,000	1.0	1.0	1.0
Generator - Production	10,000	1.0	1.0	1.0

**EMISSION ANALYSIS - BASED ON AMBIENT AIR QUALITY STANDARDS**  
 Emissions limited to the above

Attachment 4.c

Pollutant	Generator Emissions (lb/day)	Generator Emissions (lb/yr)	Crew Emissions (Crewed)		Total Emissions		Allowable Limits (lb/yr)	Exceedance
			lb/day	lb/yr	lb/day	lb/yr		
PM <sub>10</sub>	14.45	5,261	2,132	787.2	11,144	4,053	0	
PM <sub>2.5</sub>	11.35	4,141	1,612	590.4	8,753	3,151	0	
SO <sub>2</sub>	193.37	70,375	24.8	9,072	198.17	71,447	0	
NO <sub>x</sub>	720.87	263,913	113.8	41,522	834.67	305,435	0	
CO	119.68	43,581	11.7	4,218	131.38	47,799	0	
CH <sub>4</sub>	11.64	4,231	1.4	504	13.04	4,735	0	





Anderson Area - Calloway Units - Oil Expenditures

Subelement	Calloway Area Oil Expenditures - Anderson Area Oil Expenditures (If the 2007-08 or 2008-09 standards are not in bold for well completion)				Actual to Address (Max. Rows to Address 60,377)
	1-07	2-07	3-07	4-07	
24					
25-18					
25	1,099		3,080	263	4,442
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25-100					

Subelement	Anderson Area Oil Expenditures - Anderson Area Oil Expenditures (If the 2007-08 or 2008-09 standards are not in bold for well completion)				Actual to Address (Max. Rows to Address 60,377)
	1-07	2-07	3-07	4-07	
24					
25-18					
25	1,099		3,080	263	4,442
25-19					
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# **Appendix B**

*Modeling Results*

*P-000526*

*BECO Construction Co., Idaho Falls, ID*

BECO 1000 kW Generator

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT  
 EMISSION RATE (G/S) = 0.126000  
 STACK HEIGHT (M) = 3.6576  
 STK INSIDE DIAM (M) = 0.2032  
 STK EXIT VELOCITY (M/S) = 46.4344  
 STK GAS EXIT TEMP (K) = 730.9278  
 AMBIENT AIR TEMP (K) = 293.1500  
 RECEPTOR HEIGHT (M) = 0.0000  
 URBAN/RURAL OPTION = RURAL  
 BUILDING HEIGHT (M) = 0.0000  
 MIN HORIZ BLDG DIM (M) = 0.0000  
 MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.  
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 2.815 M\*\*4/S\*\*3; MOM. FLUX = 8.927 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.	0.000	1	1.0	1.0	320.0	50.22	1.75	1.71	NO
100.	24.69	4	15.0	15.0	4800.0	6.76	8.25	4.73	NO
200.	20.32	4	8.0	8.0	2560.0	9.48	15.65	8.66	NO
300.	16.67	4	4.5	4.5	1440.0	14.01	22.80	12.45	NO
400.	13.72	4	3.5	3.5	1120.0	16.96	29.70	15.74	NO
500.	11.63	4	2.5	2.5	800.0	22.28	36.54	19.06	NO
600.	10.14	4	2.5	2.5	800.0	22.28	43.05	21.87	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:  
 75. 25.89 3 10.0 10.0 3200.0 8.31 9.74 5.90 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	25.89	75.	0.

# **Appendix C**

## ***AIRS Information***

***P-000526***

***BECO Construction Co., Idaho Falls, ID***

