

February 1, 2001

## MEMORANDUM

TO: Mark Dietrich, Administrator  
Pocatello Regional Office

FROM: Richard Elkins  
Pocatello Regional Office

SUBJECT: *PERMIT TO CONSTRUCT TECHNICAL ANALYSIS*  
Castle Concrete Company  
(Standard Concrete Batch Plant Permit to Construct No. 777-00143; Including Aggregate, Asphalt, and Concrete Production when Collocated in Attainment Areas)

### PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01.200 (*Rules for the Control of Air Pollution in Idaho*) for issuing Permits to Construct (PTC).

### PROJECT DESCRIPTION

Castle Concrete Company has purchased Monroc, Incorporated. The Standard PTC for a portable concrete batching facility also includes provisions for collocated operations in attainment areas with one other portable source (i.e., rock crusher, hot-mix asphalt, or concrete batch plant). The concrete batch plant's maximum hourly throughput is three hundred cubic yards per hour (300 cy/hr). Electricity is supplied to the facility by the local utility.

### SUMMARY OF EVENTS

On January 30, 2001, the Idaho Department of Environmental Quality received a letter from Castle Concrete Company stating that they had purchased the Monroc facility.

### DISCUSSION

#### 1. Process Description

Concrete is produced by combining water, sand and gravel, and Portland cement. A portable concrete batch plant consists of storage bins for the sand and gravel, a storage silo for the cement, weigh bins that weigh each component, a conveyor, a water supply, and a control panel. Sand and gravel are either produced on site or purchased elsewhere. Typically, three or four different sizes of gravel and one or two different sizes of sand are stockpiles for varying job specifications. Cement is delivered by truck and pneumatically transferred to its storage silo. A baghouse is mounted above the silo to capture cement as air is displaced in the silo. For this source category, the baghouse is considered process equipment primarily, and air pollution control equipment secondarily. Power to run the facility is provided by the local utility, or a gasoline-fired or diesel-fired generator.

After all the storage bins are filled, the production process begins when sand and gravel are drop-fed into their respective weigh bins. When a pre-determined amount of each is weighed, the sand and gravel is drop-fed onto an inclined conveyor which transfers the

mixture into a cement truck. A pre-determined amount of cement is also weighed and drop-fed through a rubber chute into the cement truck. The rubber chute directs the cement and provides a measure of dust control. Sometimes, a separate baghouse is used to capture cement dust from the cement weigh bin. Water is then added, and the components are mixed in the truck on the way to the job site.

The Standard PTC requested will allow this concrete batching facility to collocate and simultaneously operate with one 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 concrete batching facility is then part of a single, larger source engaged in the production of either concrete, aggregate and/or asphalt, depending upon which type of portable plant the concrete batching facility 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 concrete batching facility 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 concrete batching facility 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 facility is permitted assumes the following equipment would be used:

### 2.1 Portable Concrete Batch Plant

Manufacturer	Not known.
Model	Not known.
Maximum Capacity (cy/hr)	300 cy/hr

### 2.2 Cement Storage Silo Baghouse

Stack Height (m)	15.24 m
Stack Diameter (m)	0.91 m
Exit Air Flowrate (m/s)	0.47 m
Capture Efficiency	99.6%

### 2.3 Cement Weigh Bin Baghouse

Stack Height (m)	8.53 m
Stack Diameter (m)	0.46
Exit Air Flowrate (m/s)	2.15
Capture Efficiency	99.6%

When collocated, this concrete batch plant is then part of a single, larger source that produces either concrete, aggregate, and/or asphalt, depending upon which type of portable plant the concrete batch plant is collocated with. The equipment used by this single, larger source would include the concrete batch plant 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 concrete batching facility is a portable source and may operate in both attainment and nonattainment areas throughout the state of Idaho.

### 4. Emission Estimates

A spreadsheet has been developed specifically for concrete batching facilities to determine their potential to emit (PTE). PTE is used to determine if Prevention of Significant Deterioration (PSD) or Title V Operating Permit requirements apply. In determining PTE, the spreadsheet uses production data supplied by the applicant and emission factors from EPA's AP-42. For concrete batching facilities, PTE is based on emissions from the cement storage silo baghouse, and the cement weigh bin baghouse (if one is used). If the facility includes a generator, its emissions are also included in the determination of the facility's PTE. Because these facilities are not designated facilities or NSPS-affected facilities, fugitive emissions from concrete batch plants do not count toward determining PTE. This facility's PTE is 0.7 tons per any consecutive 12-month period (0.7 T/yr) based on PM-10 emissions.

The spreadsheet inherently limits emissions below certain triggering levels (i.e., PSD and Title V thresholds) by limiting throughput. If a generator is not used, throughput is solely limited to limit a facility's PTE below 99 T/yr of PM-10 emissions. If a generator is used, throughput is limited to protect the NAAQS and it is limited to keep emissions below the 99 T/yr triggering level. The throughput limits for this facility are presented below. The spreadsheet used to calculate the PTE and throughput limit is included as Appendix A of this document.

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.

#### 4.1 Attainment Area Operations

In the standard permit, two throughput limit options are available to choose from. One option limits annual throughput (annual is any consecutive 12-month period) only and the other option limits daily and annual throughput. The annual throughput limit option is chosen to limit emissions to 99 T/yr or less. This option is most likely chosen if the facility does not include a generator. The daily and annual limit is

chosen when throughput has to be limited to protect the 24-hr PM-10 NAAQS and to limit facility emissions to 99 T/yr or less.

For this concrete batch plant, the concrete throughput is limited to two million six hundred twenty-eight thousand cubic yards per consecutive 12-month period (2,628,000 cy/yr) while operating in any attainment or unclassifiable area.

## 2 Nonattainment Area Operations

For facilities that use a generator in a PM-10 nonattainment area or proposed PM-10 nonattainment area, throughput is limited to protect the PM-10 nonattainment area 24-hour and annual ambient impact limits ( $5.0 \mu\text{g}/\text{m}^3$  and  $1.0 \mu\text{g}/\text{m}^3$ , respectively). When a generator is not used, throughput is limited to keep PM-10 emissions below 99 T/yr.

For this concrete batch plant, the concrete throughput is limited to five thousand sixteen cubic yards per day (5,016 cy/day) and one million eight hundred thirty thousand eight hundred fifty-nine cubic yards per consecutive 12-month period (1,830,859 cy/yr) while operating in PM-10 nonattainment area or proposed PM-10 nonattainment area.

### 4.3 Collocated Operations in Attainment Areas

Standard PTCs will only allow collocation with one other portable source (i.e., rock crusher, hot-mix asphalt plant, or concrete batch plant) which has also received a Standard PTC that specifically allows collocation. When a combination of one portable concrete batching 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 concrete batch plant 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).

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. For this concrete batch plant, the concrete throughput is limited to one million three hundred fourteen thousand cubic yards per any consecutive 12-month period (1,314,000 cy/yr) when collocated with another concrete batch plant, rock crushing plant, or hot-mix asphalt plant in any attainment or unclassifiable area.

### 4.4 Fugitive Emissions

Even though fugitive dust emissions are not included to determine PTE, they must be reasonably controlled at all times. In order to ensure the air quality is not degraded beyond the facility boundary, the standard permit requires that no visible emissions be seen crossing the facility boundary. It is assumed if no emissions visibly cross the boundary, the air quality is protected. This provision is included in the standard permit in lieu of fugitive dust modeling.

## 5. Modeling of Point Sources

### 5.1 Baghouse(s)

The EPA-approved SCREEN3 model was used in this analysis using stack data provided by the applicant to predict the impact the baghouse emissions may have on the ambient air. A one (1) pound-per-hour emission rate was input into the model which calculated a maximum 1-hour concentration of  $79.6 \mu\text{g}/\text{m}^3$  for the cement silo baghouse. A 1-hour concentration of  $134 \mu\text{g}/\text{m}^3$  was predicted for the weigh batch baghouse. This information was input into the spreadsheet which calculated the allowable throughput.

### 5.3 Collocated Operations

For collocated operations in attainment areas, operation of the concrete batch plant and its generator (if used) are 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 operation of the concrete batch plant and its generator (if used) would be limited as needed, based on the specific ambient impact modeling, so that the 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.

## 6. Facility Classification

This facility is not a major facility as defined in IDAPA 16.01.01.006.55 and IDAPA 16.01.01.008.10. Portable concrete batch plants are not designated facilities as defined in IDAPA 16.01.01.006.27. Concrete batch plants are not subject to federal New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAPS) regulation. The SIC code for concrete batch plants is 3273. The AIRS facility classification for this facility is "B" because the uncontrolled potential to emit is

less than (100 T/yr). The spreadsheet included as Appendix A automatically determines the facility classification.

7. Regulatory Review

The following rules and regulations have been reviewed for this permit analysis:

<u>IDAPA 16.01.01.201</u>	Permit to Construct;
<u>IDAPA 16.01.01.202</u>	Application Procedures;
<u>IDAPA 16.01.01.203</u>	Permit Requirements for New and Modified Stationary Sources;
<u>IDAPA 16.01.01.209</u>	Procedures for Issuing Permits;
<u>IDAPA 16.01.01.211</u>	Conditions for Permits to Construct;
<u>IDAPA 16.01.01.212</u>	Obligation to Comply;
<u>IDAPA 16.01.01.577</u>	Ambient PM-10 Air Quality Standard;
<u>IDAPA 16.01.01.625</u>	Visible Emissions; and
<u>IDAPA 16.01.01.650</u>	Rules for Control of Fugitive Dust.

8. Permit Coordination

This concrete batching facility is not a major facility as defined by IDAPA 16.01.01.006.55 and IDAPA 16.01.01.008.10, and it is not an NSPS-affected facility. Therefore, coordination with the Operating Permit Section is not necessary.

9. AIRS Information

This modification request does not change the information contained in the AIRS data base. The information necessary for the AIRS data base is included as Appendix C of this technical analysis.

FEES

The facility is not a major facility as defined in IDAPA 16.01.01.008.10. Therefore, registration and registration fees in accordance with IDAPA 16.01.01.526 are not applicable.

RECOMMENDATION

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

DEQ State Office  
Pocatello Regional Office  
Marilyn Seymore  
EPA Region 10

# **Appendix A**

***Emission Estimate Calculations***

***Castle Concrete Company, Inc.***

***Concrete Batch Plant, Portable***



UNITED STATES DEPARTMENT OF THE ARMY  
 WASHINGTON, D. C. 20315

Quantity	Particulars	Quantity	Particulars
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UNITED STATES DEPARTMENT OF THE ARMY  
 WASHINGTON, D. C. 20315

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# **Appendix B**

## ***Modeling***

***Castle Concrete Company, Inc.***

***Concrete Batch Plant, Portable***

07/11/00  
15:10:37

\*\*\* SCREEN3 MODEL RUN \*\*\*  
\*\*\* VERSION DATED 96043 \*\*\*

Monroc 777-00143-45 Cement Silo Baghouse

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT  
EMISSION RATE (G/S) = .126000  
STACK HEIGHT (M) = 15.2400  
STK INSIDE DIAM (M) = .9144  
STK EXIT VELOCITY (M/S) = .4676  
STK GAS EXIT TEMP (K) = 293.1500  
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

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

BUOY. FLUX = .000 M\*\*4/S\*\*3; MOM. FLUX = .046 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	14.57	.42	.20	NO
100.	74.17	2	1.0	1.0	320.0	14.57	19.27	10.61	NO
200.	67.78	3	1.0	1.0	320.0	14.55	23.62	14.03	NO
300.	67.08	4	1.0	1.1	320.0	14.50	22.61	12.10	NO
400.	53.31	4	1.0	1.1	320.0	14.50	29.46	15.27	NO
500.	48.25	5	1.0	1.2	10000.0	15.47	27.02	12.82	NO

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

142. 79.63 3 1.0 1.0 320.0 14.55 17.34 10.33 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	----- 79.63	----- 142.	----- 0.

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

\*\*\* SCREEN3 MODEL RUN \*\*\*  
\*\*\* VERSION DATED 96043 \*\*\*

Monroc 777-00143-45 Weigh Hopper Baghouse

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT  
EMISSION RATE (G/S) = .126000  
STACK HEIGHT (M) = 8.5300  
STK INSIDE DIAM (M) = .4572  
STK EXIT VELOCITY (M/S) = 2.1500  
STK GAS EXIT TEMP (K) = 293.0000  
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

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

BUOY. FLUX = .000 M\*\*4/S\*\*3; MOM. FLUX = .242 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	11.48	.51	.35	NO
100.	132.5	3	1.0	1.0	320.0	11.48	12.49	7.49	NO
200.	122.1	4	1.0	1.0	320.0	11.48	15.59	8.54	NO
300.	114.5	5	1.0	1.0	10000.0	11.48	16.92	8.74	NO
400.	105.9	6	1.0	1.0	10000.0	11.41	14.66	7.10	NO
500.	106.0	6	1.0	1.0	10000.0	11.41	17.98	8.44	NO

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

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	----- 134.1	----- 109.	----- 0.

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

# **Appendix C**

*AIRS Database Update Form*

*Castle Concrete Company, Inc.*

*Concrete Batch Plants, Portable*

**ABBREVIATED AIRS DATA ENTRY SHEET - CONCRETE BATCH PLANT**

Name of Facility: Castle Concrete Company, Inc.  
 AIRS/Permit #: 777-00143  
 Permit Issue Date: February 1, 2001

<u>Source/Emissions Unit Name</u> (25 spaces) (Please use name as indicated in permit)	<u>SCC #</u> (8 digit #)	<u>Air Program</u> (SIP/NESHAP/NSPS/PSD)
Flyash/Cement to Silo	30501199	SIP
Diesel Generator	20200401	SIP
Agg Handling/Piles	30500204	SIP
Transit Mix Truck Loading	30501110	SIP
Fugitives	30588801	SIP
Property Boundary	30588801	SIP

**RETURN TO PAT RAYNE**  
 AIRS-PT.LST (9/95)