Air Quality Permitting
Technical Memorandum

Permit to Construct No. 777-00070

Concrete-Batching Facility
Including Aggregate, Asphalt, and Concrete Production
When Collocated in Attainment Areas

ACME CONCRETE PAVING, INC.

Prepared By:

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Project No. P-020002

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Permit Status:

FINAL

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ACRONYMS, UNITS, and CHEMICAL NOMENCLATURE

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
CO	carbon monoxide
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
HAPs	hazardous air pollutants
HMA	hot-mix asphalt
hp	horsepower
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
MACT	Maximum Available Control Technology
NAAQS	National Ambient Air Quality Standards
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
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
SIP	State Implementation Plan
SO_2	sulfur dioxide
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
VOC	Volatile Organic Compound

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

Acme Concrete Paving, Inc. (Acme), recently purchased a portable concrete-batching facility. Acme is requesting a PTC be issued to cover the operations of the concrete-batching facility in both attainment and nonattainment areas throughout the state of Idaho. Note that 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 (HMA), or concrete batch plant). The concrete batch plant's maximum hourly throughput is 400 cubic yards per hour. The facility includes an 820-kilowatt, diesel-fired, electrical generator set.

SUMMARY OF EVENTS

February 4, 2002	The Idaho Department of Environmental Quality (DEQ) received a PTC application from Acme for a concrete batch plant.
March 13, 2002	The application was determined complete.

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 onsite or purchased elsewhere. Typically, three or four different sizes of gravel and one or two different sizes of sand are stockpiled 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 predetermined 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, HMA, 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:	- Rex
Model:	- "S"
Maximum Capacity	- 400 cubic yards per hour

2.2 Cement Storage Silo Baghouse

Stack Height:	- 9.5 ft
Stack Diameter:	- 1.33 ft
Exit Air Flowrate:	- 8,000 actual cubic feet per minute (acfm)
Capture Efficiency:	- 99.9%

2.4 Generator

Manufacturer/Model:	- Caterpillar
Rated Power Output:	- 820 kW
Stack Diameter:	- .833 ft
Stack Height:	- 10 ft
Exhaust Gas Flowrate:	- 6,886 acfm
Exhaust Gas Temperature:	- 845°F
Fuel Type:	- Diesel
Fuel Usage:	- 63 gallons per hour

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 98 tons per any consecutive 12-month period based on NO_X 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 2,950,308 cubic yards per consecutive 12-month period while operating in any attainment or unclassifiable area.

4.2 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 ug/m^3 and 1.0 ug/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 2,950,308 cubic yards per year 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, HMA 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 1,475,154 cubic yards per consecutive 12-month period when collocated with another concrete batch plant, rock crushing plant, or HMA plant in any attainment or unclassifiable area. A daily throughput restriction is not required since the emissions from this plant are not great enough to violate any 24-hour ambient air standard, even when operating at full capacity.

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 pound-per-hour emission rate was input into the model which calculated a maximum one-hour concentration of 42.36 $\mu g/m^3$ for the cement silo baghouse. This information was input into the spreadsheet which calculated the allowable throughput.

5.2 Generator

The SCREEN3 model was used in this analysis using stack data provided by the applicant and exit flows determined by DEQ to predict the impact the generator emissions may have on the ambient air. A one pound-per-hour emission rate was input into the model which calculated a maximum one-hour concentration of 24.61 $\mu g/m^3$. The one-hour concentration was then input into the spreadsheet, which was used to calculate the facility's allowable throughput.

The SCREEN3 output for each applicable point source is presented as Appendix B of this document. The generator exhaust flow calculations are presented in Appendix C of this document.

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 $\mu g/m^3$, as follows:

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

where 150 $\mu g/m^3$ is the 24-hour average standard and 86 $\mu g/m^3$ 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 $\mu g/m^3$ 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 58.01.01.006.55 and IDAPA 58.01.01.008.10. Portable concrete batch plants are not designated facilities as defined in IDAPA 58.01.01.006.27. Concrete batch plants are not subject to federal New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAPS) regulation. The Standard Industrial Classification 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:

a. IDAPA 58.01.01.201 Permit to Construct

b. IDAPA 58.01.01.202 Application Procedures

c. IDAPA 58.01.01.203 Permit Requirements for New and Modified Stationary Sources

d. IDAPA 58.01.01.209 Procedures for Issuing Permits

e. IDAPA 58.01.01.211 Conditions for Permits to Construct

f. IDAPA 58.01.01.212 Obligation to Comply

g. IDAPA 58.01.01.577 Ambient PM_{10} Air Quality Standard

h. IDAPA 58.01.01.625 Visible Emissions

i. IDAPA 58.01.01.650 Rules for Control of Fugitive Dust

8. Permit Coordination

This concrete-batching facility is not a major facility as defined by IDAPA 58.01.01.006.55 and IDAPA 58.01.01.008.10, and it is not an NSPS-affected facility. Therefore, coordination with the Operating Permit Section is not necessary.

9. AIRS Information

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

AIR PROGRAM / POLLUTANT	SIP [c]	PSD [d]	NSPS [e] (Part 60)	NESHAP [f] (Part 61)	MACT [g] (Part 63)	TITLE V	AREA CLASSIFICATION A – Attainment U – Unclassifiable N – Nonattainment
SO_2 [h]	B						Portable
No_x [i]	B						Portable
CO [j]	B						Portable
PM_{10} [k]	B						Portable
PT (Particulate) [l]	B						
VOC [m]	B						Portable
THAP (Total HAPs) [n]	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 NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.
- 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).

[c] State Implementation Plan
[d] Prevention of Significant Deterioration
[e] New Source Performance Standards
[f] National Emission Standards for Hazardous Air Pollutants
[g] Maximum Achievable Control Technology
[h] Sulfur Dioxide
[i] Nitrogen Oxides
[j] Carbon Monoxide
[k] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[l] Particulate Matter
[m] Volatile Organic Compounds
[n] Hazardous Air Pollutants

PUBLIC COMMENT

After an application is determined complete, an opportunity for public comment is provided. The opportunity for public comment lasts 30 days from the completeness date. No public comment period was requested for this project.

FEES

The facility is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, registration and registration fees in accordance with 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 recommends that Acme Concrete Paving, 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.

DH/DS/bh

cc: Tom Harman, Coeur d'Alene Regional Office
Sherry Davis, Technical Services
Joan Lechtenberg, AQ Program Office

Appendix A

Emission Estimate Calculations

Concrete Batch Plant, Portable

Company Name:	Acme Concrete	Engineer:	Cons Dustin Holloway
Permit No.:	777-00070	Date:	20-Mar-02
Project:	P-020002	File:	BATCH.WK4
	CONCRETE BATCH PLANTS		

Ton per Year Emission Limit:	99 [=] Tons/yr

Concrete Batch Plant Information

Facility Production Capacity:	400	[=] yd^3/hr
Maximum Annual Hours of Operation	8,760	[=] hr/yr
Cement Silo:		
Modeled 1-hr Concentration:	42.36	[=] $\mu g/m^3$, at emission rate of 1 lb/hr
Baghouse Control Effcy.	99.9%	
Cement Hopper:		
Modeled 1-hr Concentration:	0	[=] $\mu g/m^3$, at emission rate of 1 lb/hr
Baghouse Control Effcy.	99.9%	

Generator Set Information

Generator? (Y/N)	Y		
Generator Size:	820	[=] kW	
Units:	B	(A = Horsepower)	
		(B = Kilowatts)	
Fuel Type:	A	(A = Diesel-Fired Generator)	
		(B = Gasoline-Fired or Dual-Fired Generator)	
Fuel Useage:	63	[=] gal/hr	
			Conversion Factor
Heat Output:	8.5721	[=] MMBtu/hr	1099.374
Modeled 1-hr Concentration:	24.61	[=] $\mu g/m^3$, at emission rate of 1 lb/hr	

Background Concentrations

	1-hr	3-hr	8-hr	24-hr	Annual
PM_{10}				86	32.7
CO	11400		5130		
NO_X					40
SO_X		543		144	23.5
TOC					

INPUTS TO PERMIT TO CONSTRUCT (PTC)		Value	Units
Section B "Attainment Area When Not Collocated"			
Section B.1.1 Facility Throughput Limits:	Annual Throughput Limit	2,950,308	yd^3/yr
	<<OR>>		
	Daily Throughput Limit	9,600	yd^3/day
	Annual Throughput Limit	2,950,308	yd^3/yr
Section B.1.3 Generator Hours of Operation:	Annual Hours of Operation	7,376	hr/year
	<<AND/OR>>		
	Daily Hours of Operation	24.0	hr/day
Section C "Attainment Area When Collocated"			
Section C.1.3 Facility Throughput Limits:	Annual Throughput Limit	1,475,154	yd^3/yr
	<<OR>>		
	Daily Throughput Limit	9,600	yd^3/day
	Annual Throughput Limit	1,475,154	yd^3/yr
Section C.1.4 Generator Hours of Operation:	Annual Hours of Operation	3,688	hr/year
	<<AND/OR>>		
	Daily Hours of Operation	24.0	hr/day
Section D "Nonattainment Area"			
Section D.1.1 Facility Throughput Limits:	Annual Throughput Limits	2,950,308	yd^3/yr
	<<AND/OR>>		
	Daily Throughput Limits	9,040	yd^3/day
	Annual Throughput Limits	2,950,308	yd^3/yr
Section D.1.3 Generator Hours of Operation:	Annual Hours of Operation	7,376	hr/year
	<<AND/OR>>		
	Daily Hours of Operation	22.6	hr/day

PERMIT LIMITS TABLE

	Non-Attainment Area		Attainment Area		Collocated Attainment Area	
Production Rate:	400 yd^3/hr		400 yd^3/hr		400 yd^3/hr	
Operational Schedule:	22.6 hr/day	7,376 hr/year	24.0 hr/day	7,376 hr/year	24.0 hr/day	3,688 hr/year
Throughput Limits:	9,040 yd^3/day	2,950,308 yd^3/yr	9,600 yd^3/day	2,950,308 yd^3/yr	9,600 yd^3/day	1,475,154 yd^3/yr
Limiting Pollutant:	PM-10		None	and NOx	None	and NOx
AIRS Facility Classification	B		B		B	

CO 1-hr Standard	SO_2 3-hr Standard	CO 8-hr Standard	
minutes/1-hr	hr/3-hr	hr/8-hr	
60.00	3.00	8.00	

OUTPUT

POTENTIAL TO EMIT -- EMISSIONS ANALYSIS USING AMBIENT AIR QUALITY STANDARDS

Attainment/Non-Classifiable Areas

Generator

Pollutant	Permitted Controlled Emission Rates	
PM_{10}	0.49 lbs/hr	1.81 Tons/yr
CO	6.94 lbs/hr	25.61 Tons/yr
NO_X	26.57 lbs/hr	98.00 Tons/yr
SO_X	4.33 lbs/hr	15.96 Tons/yr
TOC	0.86 lbs/hr	3.16 Tons/yr
Concrete Batching Point Sources		
PM_{10}	0.0560 lbs/hr	0.207 Tons/yr

	Uncontrolled	Controlled		Classification
Potential to Emit:	98.0 Tons/yr	98.0 Tons/yr	NOx	B

Enforceable Limits:

Production Rate:	400 yd^3/hr		
Operational Schedule:	24.0 hr/day	7,376 hr/year	
Throughput Limits:	9,600 yd^3/day	2,950,308 yd^3/yr	
Limiting Pollutant:	None	and NOx	

Non-Attainment Areas

Generator

Pollutant	Permitted Controlled Emission Rates	
PM_{10}	0.49 lbs/hr	1.81 Tons/yr
CO	6.94 lbs/hr	25.61 Tons/yr
NO_X	26.57 lbs/hr	98.00 Tons/yr
SO_X	4.33 lbs/hr	15.96 Tons/yr
TOC	0.86 lbs/hr	3.16 Tons/yr
Concrete Batching Point Sources		
PM_{10}	0.0560 lbs/hr	0.207 Tons/yr

	Uncontrolled	Controlled		Classification
Potential to Emit:	98.0 Tons/yr	98.0 Tons/yr	NOx	B

Enforceable Limits:

Production Rate:	400 yd^3/hr		
Operational Schedule:	22.6 hr/day	7,376 hr/year	
Throughput Limits:	9,040 yd^3/day	2,950,308 yd^3/yr	
Limiting Pollutant:	PM-10	and NOx	

ATTAINMENT/NON-CLASSIFIABLE AREAS

Concrete Batching Point Sources

Source	PM Emission Factor [=] lb/yd^3 Concrete	Pre-Baghouse PM Emissions [=] lb/hr	Pre-Baghouse PM Emissions [=] T/yr	Given	Baghouse Control Efficiency	Post-Baghouse PM Emissions [=] lb/hr	Post-Baghouse PM Emissions [=] T/yr
Cement Silo Loading (Pneumatic)	0.07	28.0	103.3	7,376 hrs/yr	99.9%	0.028	0.10
Weigh Hopper Loading (Cement)	0.07	28.0	103.3	7,376 hrs/yr	99.9%	0.028	0.10
Total		56.0	206.5			0.056	0.21

Generator and Concrete Batching Point Source Emissions

Pollutant	Generator Emission Factor [=] lb/MMBtu	Generator Emission Rate [=] lb/hr	Allowable Impacts: AAQS Hours of Operation [=] hr/day	AAQS Hours of Operation [=] hr/year	AAQS Other	< 99 TPY Hours of Operation [=] hr/year	Hours of Operation [=] hr/day	Hours of Operation [=] hr/year	Based on:	Generator & Site Allowable Impacts: Emission Rates [=] lb/day	Emission Rates [=] Tons/year	Permitted Impacts: AAQS Calculated 24-hr Impact [=] µg/m	AAQS Calculated Annual Impact [=] µg/m	AAQS Other	< 99 TPY Calculated Emissions [=] ton/year
PM	0.0697	0.60	N/S	N/S		N/S	24.0	7,376		14.3	2.20	N/S	N/S		2.41
PM_{10}	0.0573	0.49	24.0	8,760		8,760			Based on:	11.8	1.81	5.3	0.9		2.02
CO	0.8100	6.94	N/S	N/S		8,760	None	NOx		166.6	25.61	68.4	11.5		25.61
CO [4]					1.0									170.9	
CO [5]					8.0									119.6	
NO_X	3.1000	26.57	N/S	8,760		7,376				637.8	98.00	261.6	44.1		98.00
SO_2	0.5050	4.33	24.0	8,760		8,760				103.9	15.96	42.6	7.2		15.96
SO_2 [4]					3.0									95.9	
TOC	0.1000	0.86	N/S	N/S		8,760				20.6	3.16	8.4	1.4		3.16

Pollutant	Ambient Air Concentrations w/ Background Values (ug/m3)				
	1-hr	3-hr	8-hr	24-hr	Annual
PM					
PM_{10}				91	34
CO	11,571		5,250		
NO_2					84
SO_2		639		187	31
TOC					

NON-ATTAINMENT AREAS

Concrete Batching Point Sources

Source	PM Emission Factor (=) lb/yd3 concrete	Pre-Baghouse PM Emissions (=) lb/hr	Pre-Baghouse PM Emissions (=) T/yr	Given	Baghouse Control Efficiency	Post-Baghouse PM Emissions (=) lb/hr	Post-Baghouse PM Emissions (=) T/yr
Cement Silo Loading (Pneumatic)	0.07	28.0	103.26	7,376 hrs/yr	99.9%	0.028	0.10
Weigh Hopper Loading (Cement)	0.07	28.0	103.26	7,376 hrs/yr	99.9%	0.028	0.10
Total		56.0	206.52			0.056	0.21

Generator and Concrete Batching Point Source Emissions -- Non-Attainment Areas

Pollutant	Generator Emission Factor (=) lb/hp-hr	Generator Emission Rate (=) lb/hr	Allowable Impacts AAQS Hours of Operation (=) hr/day	AAQS Hours of Operation (=) hr/year	AAQS Hours of Operation Other [2,3,4]	<99 TPY Hours of Operation (=) hr/year
PM	0.0697	0.60	N/S	N/S		N/S
PM_{10}	0.0573	0.49	22.6	8,249		8,760
CO	0.8100	6.94	N/S	N/S		8,760
CO [2]					1.0	
CO [3]					8.0	
NO_x	3.1000	26.57	N/S	8,760		7,376
SO_2	0.5650	4.33	24.0	8,760		8,760
SO_2 [4]					3.0	
TOC	0.1000	0.86	N/S	N/S		8,760

Generator & Silo Allowable Impacts: Hours of Operation (=) hr/day	(=) hr/year	Emission Rate (=) lb/day	(=) Tons/year
22.6	7,376	13.5	2.20
Based on: PM-10	Based on: NO_x	11.1	1.81
		156.9	25.61
		600.6	98.00
		97.8	15.96
		19.4	3.16

Permitted Impacts: AAQS Calculated 24-hr Impact (=) ug/m	AAQS Calculated Annual Impact (=) ug/m	Other	<99 TPY Calculated Emissions (=) ton/year
N/S	N/S		2.41
5.0	0.9		2.02
64.4	11.5		25.61
		170.9	
		119.6	
246.3	44.1		98.00
40.1	7.2		15.96
7.9	1.4	95.9	3.16

Notes: [1] TPY calculations include concrete batching point source emissions.
[2] CO 1-hr Averaging Period
[3] CO 8-hr Averaging Period
[4] SO_2 3-hr Averaging Period
** Assumes ambient TSP concentrations exceed NAAQS in PM-10 Non-Attainment Areas.

Attainment Area - Collocated Units - Calculations

Collocated Ambient Air Quality Standards - Calculations

(1-hr, 3-hr, 8-hr, 24-hr standards are cut in half for collocation)

Pollutant	1-hr	3-hr	8-hr	24-hr	Annual (50% Attainment Hours)
PM					
PM_{10}				26.69038181	7.542139231
CO	14129.123		2315.386101		
NO_2					7.974611872
SO_2		282.6190173		67.88422909	24.66199322
TOC					

Background Concentrations -- Attainment/Non-Classifiable Areas (ug/m3)

Pollutant	1-hr	3-hr	8-hr	24-hr	Annual
PM					
PM_{10}				86	32.7
CO	11400		5130		
NO_2					40
SO_2		543		144	23.5
TOC					

Appendix B

Modeling

Concrete Batch Plant, Portable

02/27/02
10:58:44

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

Silo

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	2.8956
STK INSIDE DIAM (M)	=	0.4054
STK EXIT VELOCITY (M/S)	=	29.2523
STK GAS EXIT TEMP (K)	=	293.1500
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 = 0.000 M**4/S**3; MOM. FLUX = 35.158 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.	0.3684E-06	6	1.0	1.0	10000.0	18.03	2.63	2.63	NO
100.	40.68	4	10.0	10.0	3200.0	6.45	8.26	4.76	NO
200.	32.35	5	5.0	5.0	10000.0	10.01	11.80	6.56	NO
300.	33.19	5	1.0	1.0	10000.0	19.51	17.55	9.91	NO
400.	38.52	5	1.0	1.0	10000.0	19.51	22.52	11.81	NO
500.	38.57	5	1.0	1.0	10000.0	19.51	27.43	13.65	NO
600.	41.13	6	1.0	1.0	10000.0	18.03	21.67	10.61	NO
700.	42.36	6	1.0	1.0	10000.0	18.03	24.84	11.75	NO
800.	41.31	6	1.0	1.0	10000.0	18.03	27.97	12.73	NO
900.	39.58	6	1.0	1.0	10000.0	18.03	31.08	13.68	NO
1000.	37.52	6	1.0	1.0	10000.0	18.03	34.16	14.61	NO

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

700.	42.36	6	1.0	1.0	10000.0	18.03	24.84	11.75	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	42.36	700.	0.

03/19/02
12:34:25

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

Acme Concrete Generator

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	3.0480
STK INSIDE DIAM (M)	=	0.2540
STK EXIT VELOCITY (M/S)	=	38.8891
STK GAS EXIT TEMP (K)	=	724.8167
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 = 3.663 M**4/S**3; MOM. FLUX = 9.866 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	59.78	1.80	1.76	NO
100.	24.28	4	15.0	15.0	4800.0	6.83	8.26	4.76	NO
200.	18.65	4	8.0	8.0	2560.0	10.14	15.69	8.74	NO
300.	14.48	4	5.0	5.0	1600.0	14.39	22.84	12.52	NO
400.	11.78	4	4.0	4.0	1280.0	17.23	29.73	15.80	NO
500.	9.900	4	3.5	3.5	1120.0	19.26	36.44	18.87	NO
MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:									
85.	24.61	4	20.0	20.0	6400.0	5.88	7.16	4.14	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	24.61	85.	0.

Appendix C

Generator Exhaust Flow Estimate

Concrete Batch Plant, Portable

Combustion Evaluation

ISP

Fuel Data (% by weight)	
S	0.5
N2	0.2
C	86.4
H2	12.7
H20	0.46
O2	0.2
	100.46

Fuel burned (lb/hr)	453.978
Excess air (%)	5
Stk temp (F)	845
Stk press (atm)	0.95

Combustion Air Required

	O2 lb.mole	N2 lb.mole
S	0.0708013	0.2662129
N2	0	0
C	32.656481	122.85057
H2	14.306503	53.819701
O2	-0.028374	
	47.005411	176.93648

stioc. comb air = 238.63981 lb.mole/hr
stoic. dry comb air = 209.66377 lb.mole/hr

Flue Products

	lb.mole	lb/hr
SO2	0.0708013	4.5312838
N2	185.81574	5202.8406
CO2	32.656481	1436.8852
H2O(comb)	28.827603	518.89685
O2	2.3502706	75.208658
H2O(fuel)	0.12	2.0882988
dry	220.89329	
wet	249.83691	

Volume of flue gas (acfm)	**4176.7**
Volume of flue gas (sdcfm)	1397.9
Volume of flue gas (dscfm@7%O2)	1990.3
Volume of flue gas (dscfm@15%O2)	4643.9
Volume of flue gas (dscfm@8%O2)	2143.4
Volume of flue gas (dscfm@3%O2)	1548.0
Volume of flue gas (dscfm@10%O2)	2533.1