Air Quality Permitting
Statement of Basis

July 5, 2006

Permit to Construct No. P-060008

Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix
Portable Truck Mix Concrete Batch Plant

Facility ID No. 777-00377

Prepared by:

Shawnee Chen, P.E.,
Senior Engineer
AIR QUALITY DIVISION

FINAL

Table of Contents

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURES 3

1. PURPOSE 4

2. FACILITY DESCRIPTION 4

3. FACILITY / AREA CLASSIFICATION 4

4. APPLICATION SCOPE 4

5. PERMIT ANALYSIS 5

6. PERMIT FEES 8

7. PERMIT REVIEW 9

8. RECOMMENDATION 9

APPENDIX A - AIRS INFORMATION 10

APPENDIX B - EMISSIONS INVENTORY 12

APPENDIX C - MODELING REVIEW 14

Acronyms, Units, and Chemical Nomenclatures

AACC	acceptable ambient concentration for carcinogens
acfm	actual cubic feet per minute
AIRS	Aerometric Information Retrieval System
cy/hr	cubic yard per hour
DEQ	Department of Environmental Quality
G & B	Americrete ready-mix concrete, inc., G & B Redi-Mix portable truck mix concrete batch plant
EI	emissions inventory
EPA	U.S. Environmental Protection Agency
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
lb/day	pounds per day
lb/T	pounds per ton
MACT	Maximum Achievable 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
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	synthetic minor
SO_2	sulfur dioxide
T/yr	tons per year
UTM	Universal Transverse Mercator
VOC	volatile organic compound

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.

2. FACILITY DESCRIPTION

Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix (G & B) proposes to construct a portable truck mix concrete batch plant. The components of the plant are as follows: a two-compartment cement storage silo -60/40 split, one 14 cubic yards cement batcher, a four-compartment overhead aggregate bin, and one 12 cubic yards aggregate batcher. The plant combines sand, gravel, cement, cement supplement, if applicable, and water to produce concrete. Electricity for the plant is supplied by the local electric utility.

The point sources of emissions at the facility are a C & W central dust collection system (C & W CPR-6500-H) which picks up dust from cement silo, cement batcher, and truck mix loading; and a Stephens' SV 20 Vent dust collector which is used to collect dust from the cement batcher in an emergency situation (i.e. when the C & W CPR-6500-H dust collector becomes inoperable).

3. FACILITY / AREA CLASSIFICATION

G & B is not a major facility as defined in IDAPA 58.01.01.205 and 008.10, nor is it a designated facility as defined in IDAPA 58.01.01.006.26. The potential to emit any criteria air pollutant is below 100 T/yr, and below 25 T/yr for all HAPs collectively, and below 10 T/yr for any single HAP. The primary Standard Industrial Classification (SIC) code for the facility is 3273. The facility is defined as minor (B) facility. The material collected by the central dust collect is recycled to the production due to continuing increasing cement cost. The dust collect is qualified as part of the process in accordance with EPA's November 27, 1995 letter regarding *Criteria for Determining Whether Equipment is Air Pollution Control Equipment or Process Equipment.* The AIRS classification is "B." The facility is a portable facility and may locate anywhere in the state of Idaho except for PM_{10} nonattainment areas.

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant. This information is entered into the EPA AIRS database.

4. APPLICATION SCOPE

G & B has submitted a PTC application for a new portable truck mix concrete batch plant. This permit is the facility's initial permit.

4.1 Application Chronology

February 22, 2006	DEQ receives the PTC application.
April 3, 2006	DEQ determines the PTC application complete.
April 20, 2006	DEQ receives updated PTC application materials.
June 2, 2006	DEQ issued draft permit for facility review.

5. PERMIT ANALYSIS

This section of the statement of basis describes the regulatory requirements for this PTC action:

5.1 Equipment Listing

Table 5.1 contains the equipment listing and the emissions controls.

Table 5.1 EQUIPMENT LISTING AND EMISSIONS CONTROLS

Source Description	Emissions Control(s)
Concrete batch plant Manufacturer: Stephens manufacturing company Model: Thoroughbred portable batch Maximum throughput rate: 120 cubic yard of concrete per hour (cy/hr) The plant has the following major components: • Cement silo consists of two compartments – split 60/40 • 14 cubic yards cement batcher • 4 compartment aggregate bin • 12 cubic yards aggregate batcher	C & W central dust collection system (pick up dust from the cement silo, the cement weigh batcher, and truck mix loading): Manufacturer: C & W Manufacturing Co. Inc. Model: CPR-6500-H PM_{10} control efficiency: 99.99% stack parameters: Stack height: 7 ft 9 inch Stack opening: 14 7/16 inch x 19 1/6 inch or equivalent stack diameter of 1.56 ft. Exit air flow rate : 5,000 actual cubic feet per minute (acfm) Cement weight batcher safety/emergency dust collector: Manufacturer: Stephens manufacturing company Model: SV 20 Vent PM_{10} control efficiency: 99.96% stack parameters: Stack height: 27 ft 1/2 inch Stack opening: 10 inch x 13 inch or equivalent stack diameter of 1.07 ft. Exit air flow rate :+/- 500 acfm

5.2 Emissions Inventory

The emissions inventory (EI) was estimated by DEQ using emissions factors from AP-42 Section 11.12 (rev. 6/06) and production data provided in the application. The detailed EI can be found in Appendix B of the statement of basis. Table 5.2 provides a summary of the EI for criteria pollutants.

Table 5.2 PM_{10}/PM MAXIMUM EMISSIONS WITH PERMITTED PRODUCTION LIMITS

Emissions Point	Emission Rate, Max.	Emission Rate, 24-hour average	Emission Rate, annual average
	lb/hr [1, 2]	lb/day[3]	T/yr[4]
Process Fugitive Emissions			
Aggregate delivery to ground storage	0.37	4.46	0.78
Sand delivery to ground storage	0.08	1.01	0.18
Aggregate transfer to conveyor	0.37	4.46	0.78
Sand transfer to conveyor	0.08	1.01	0.18
Aggregate transfer to elevated storage	0.37	4.46	0.78
Sand transfer to elevated storage	0.08	1.01	0.18
Facility Wide Total (Except for Road Dust)	2.40	28.8	5.00
Point Sources Emissions			
Total emissions from CPR-6500-H[5]	1.03	12.4	2.15
Emissions from SV 20 Vent[6]	0.46	5.47	0.95

[1] The EFs are taken from AP-42, Tables 11.12-5, 11.12-2, and equation 11.12-2 (version 6/06)
[2] Max. hourly rate = EF x Max. hourly production rate (cy/hr)
[3] Hourly emissions rate, 24-hr average = Max.hourly emissions rate x proposed daily production / max. hour production rate
Daily emissions rate = hourly emissions rate, 24-hr average x 24 hr/day.
[4] Annual average hourly emissions rate = Max hourly rate x proposed annual production rate/max. hourly production rate.
Annual emissions rate = Annual average hourly emissions rate x 8760 hours/yr/(2000 lb/T)
[5] Per application, CPR-6500-H collects dust from cement silo, cement weight batcher, and truck mix loading
[6] SV 20 Vent is the safety dust control vent in case CPR-6500-H becomes non-operational.

5.3 *Modeling*

The facility has demonstrated compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard with the permitted production limits. Lead emissions are below the modeling thresholds set forth in the *State of Idaho Air Quality Modeling Guideline*. Therefore, no modeling analysis was required for lead. DEQ conducted the facility ambient impact analysis by using DEQ's generic modeling approach for a portable truck concrete batch plant with the exception of considering the use of central dust collector system (CPR-6500-H) to control the emissions from truck mix loadout. The detailed modeling analysis is included in Appendix C. A summary of the modeling analysis is presented in Tables 5.3 and 5.4.

Table 5.3 FULL IMPACT ANALYSIS RESULTS FOR PM_{10}

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[c]	24-hour	50.2[d]	73	123.2	150	82
	Annual	15.4[e]	26	41.4	50	83

[a] Micrograms per cubic meter
[b] National ambient air quality standards
[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d] Maximum 6th highest modeled concentration from modeling a five-year meteorological data set
[e] Maximum 1st highest modeled concentration from modeling each of five years separately

Table 5.4 FULL IMPACT ANALYSIS RESULTS FOR TAPS

TAP	Averaging Period	Maximum Modeled Concentration (µg/m3)	AACC (µg/m3)	Percent of AACC
Arsenic	Annual	1.88E-4	2.3E-4	82
Beryllium	Annual	1.69E-5	4.2E-3	0.4
Nickel	Annual	7.44E-4	4.2E-3	18

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

G&B has proposed to construct a new portable truck mix concrete batch plant. The proposed project does not qualify for an exemption under IDAPA 583.01.01.220 through 223; therefore, a Permit to Construction is required.

IDAPA 58.01.01.203.02 ..... NAAQS
"No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:....02. NAAQS...."

The facility has demonstrated compliance, to DEQ's satisfaction, that this project will not cause or significantly contribute to a violation of any ambient air quality standards of PM_{10}, and lead.

IDAPA 58.01.01.203.03 ..... Toxic Air Pollutants
"No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:....03. Toxic Air Pollutants Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586."

The controlled arsenic and nickel emissions exceed their respective net screening emissions level, but the predicted ambient impacts for arsenic and nickel controlled emissions comply with their respective acceptable ambient concentration (AACC) for carcinogens. The controlled Beryllium emissions are less than its EL and the predicted ambient impact of uncontrolled Beryllium emissions exceeds its AACC, but the predicted ambient impact of controlled Beryllium emissions complies its AACC. In accordance with IDAPA 58.01.01.210.08, the modeled controlled emissions rates of Arsenic, Beryllium, and Nickel are required to be included in the permit as emissions limits. With the emissions limits, the facility demonstrated compliance with IDAPA 58.01.01.203.03.

IDAPA 58.01.01.625 ..... Visible Emissions

This regulation states that any point of emission shall not have a discharge of any air pollutant for a period aggregating more than three minutes in any 60-minute period of greater than 20% opacity.

The emissions points at this facility are subject to this regulation.

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

The facility is not subject to NSPS.

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

This facility is not subject to NESHAP or MACT.

5.5 *Permit Conditions Review*

5.5.1 Permit Condition 1.1 states the purpose for this permitting action.

5.5.2 Permit Conditions 2.1 and 2.2 provide the plant process description and the emissions control description.

5.5.3 Permit Condition 2.3 sets the emissions limits for PM_{10}, Arsenic, Beryllium, and Nickel. With permitted daily production rate, the ambient impact from the plant does not exceed the PM_{10} 24-hour ambient air quality standard (NAAQS). The Arsenic, Beryllium, Nickel emissions are in particulate form and are controlled by the C & W central dust collection system. The controlled arsenic and nickel emissions exceed their respective net screening emissions level, but the predicted ambient impacts for arsenic and nickel controlled emissions comply with their respective AACCs. The controlled Beryllium emissions are less than its EL and the predicted ambient impact of uncontrolled Beryllium emissions exceeds its AACC, but the predicted ambient impact of controlled Beryllium emissions complies its AACC. In accordance with IDAPA 58.01.01.210.08, the modeled controlled emissions rates of Arsenic, Beryllium, and Nickel are required to be included in the permit as emissions limits.

To demonstrate compliance with the emissions limits, the daily and annual concrete production rates are limited in Permit Condition 2.5, and the concrete production rates monitoring is required in Permit Condition 2.9. In Permit Condition 2.6, the dust collectors are required to operate in accordance with the O&M manual to ensure the control of the emissions.

5.5.4 Permit Condition 2.4 establishes the visible emissions limit for and stacks, vents, and openings in the plant.

To demonstrate compliance with the visible emissions limit, the permittee is required to conduct monthly visible emissions inspection as specified in Permit Condition 2.10. The permittee is required to operate the dust collectors in accordance with the O & M manual in Permit Condition 2.6.

5.5.5 The permittee is required to control fugitive emissions as specified in Permit Conditions 2.7, 2.8 and 2.11.

5.5.6 Permit Condition 2.12 states that the plant cannot operate in any PM_{10} nonattaiment area.

5.5.7 Permit Condition 2.13 requires the permittee to remain records on site for the most recent two-year period and to make the records available to DEQ representatives upon request.

5.5.8 Permit Condition 2.14 requires the permittee to register its plant whenever relocated.

6. PERMIT FEES

G & B submitted a $1,000 PTC application fee on February 22, 2006, in accordance with IDAPA 58.01.01.224. G & B's emissions increase is between 1 to 10 tons range. In accordance with IDAPA 58.01.01.225, the PTC processing fee is $2,500. G & B submitted $2,500 PTC processing fee on July 10, 2006.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM_{10}	2.15	0	2.15
VOC	0.0	0	0.0
TAPS/HAPS	0[a]	0	0
Total:	2.15	0	2.15
Fee Due	**$2,500.00**		

[a] TAP emissions change is included in the PM_{10} emissions change

7. PERMIT REVIEW

7.1 *Regional Review of Draft Permit*

DEQ's Boise Regional Office was provided the draft permit for review on June 2, 2006. No comments have been provided.

7.2 *Facility Review of Draft Permit*

The facility was provided the draft permit for review on June 2, 2006. The facility has no comments on the 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. During this time, there were no comments on the application and no requests for 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 G & B be issued final PTC No. P-060008. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

SYC/bf Permit No. P-060008

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Appendix A

Permit to Construct No. P-060008

Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix Portable Truck Mix Concrete Batch Plant

Facility ID No. 777-00377

AIRS Information

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

Facility Name: Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix
Facility Location: Portable
AIRS Number: 777-00377

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	--							U
NO_x	--							U
CO	--							U
PM_{10}	B						B	U
PT (Particulate)	B							U
VOC	B							U
THAP (Total HAPs)	B							U
			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).

Appendix B

Permit to Construct No. P-060008

Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix Portable Truck Mix Concrete Batch Plant

Facility ID No. 777-00377

Emissions Inventory

Emissions Calculation for Truck Mix Portable Concrete Batch Plants

Facility Information

Company:	G & B Redi-Mix
Facility ID:	777-00077
Permit No.:	P-[illegible]
Source Type:	Truck Mix Portable Concrete Batch Plant
Manufacturer:	[illegible]

Production[1]

Maximum Hourly Production Rate:	120	yd^3/hr	
Proposed Daily Production Rate:	1,440	yd^3/day	
Proposed Annual Production Rate:	[illegible]	yd^3/yr	

[1] [illegible]

PM_{10} Emissions

Emissions Point	PM_{10} Emission Factor[1] (lb/yd3)		Emission Rate, Max.	Emission Rate, 24-hour average		Emission Rate, annual average	
	Controlled	Uncontrolled	lb/hr[2]	lb/hr[3]	lb/day[3]	lb/hr[4]	T/yr[4]
Aggregate delivery to ground storage		0.0031	0.37	0.19	4.46	0.177	0.78
Sand delivery to ground storage		0.0007	0.08	0.04	1.01	0.040	0.18
Aggregate transfer to conveyor		0.0031	0.37	0.19	4.46	0.177	0.78
Sand transfer to conveyor		0.0007	0.08	0.04	1.01	0.040	0.18
Aggregate transfer to elevated storage		0.0031	0.37	0.19	4.46	0.177	0.78
Sand transfer to elevated storage		0.0007	0.08	0.04	1.01	0.040	0.18
Cement delivery to site	0.0001		0.01	0.01	0.14	[illegible]	0.03
Cement supplement delivery to Site	0.0002		0.02	0.01	0.26	0.011	0.05
Weigh hopper loading (aggregate loading)	0.0038		0.46	0.23	5.47	0.217	0.95
Truck mix loading	0.00461		0.54	0.27	6.49	0.257	1.13
Facility Wide Total ([illegible])			2.45		35.61		5.00
Total emissions from CPR-[illegible][5]			1.80	0.82	13.30	0.48	2.15
Emissions from SV 20 Vent[6]			0.46	0.23	5.47	0.22	0.95

[1] The EFs are taken from AP-42, Table 11.12-[illegible] [illegible]

[2] [illegible]

[3] [illegible]

[4] [illegible]

[5] [illegible]

[6] [illegible]

Lead Emissions

Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max.	Emission Rate, quarterly average	
	Controlled with fabric filter	Uncontrolled	lb/hr	lb/hr[5]	lb/quarter[5]
Cement delivery to site[2]	1.09E-06	7.36E-07	3.21E-07	1.61E-07	3.51E-04
Cement supplement delivery to Site[3]	5.20E-07	ND	[illegible]	1.14E-08	2.49E-05
Truck mix loading[4]	1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total emissions from CPR-[illegible][6]				2.73E-08	
2.30E-01 T/yr lead					

[1] [illegible]

[2] [illegible]

[3] [illegible]

[4] [illegible]

[5] [illegible]

[6] [illegible]

TAP EF[1]

Emissions Point	Arsenic Emission Factor (lb/ton of material loaded)		Beryllium Emission Factor (lb/ton of material loaded)		Cadmium Emission Factor (lb/ton of material loaded)		Chromium Emission Factor (lb/ton of material loaded)		Manganese Emission Factor (lb/ton of material loaded)		Nickel Emission Factor (lb/ton of material loaded)		Phosphorus Emission Factor (lb/ton of material loaded)		Selenium Emission Factor (lb/ton of material loaded)	
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled
Cement delivery to site	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.17E-07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ND	ND
Cement supplement delivery to Site	[illegible]	ND	[illegible]	ND	[illegible]	ND	[illegible]	ND	[illegible]	ND	[illegible]	ND	[illegible]	ND	[illegible]	ND
Truck mix loading	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.14E-0[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1] [illegible] AP-42, Table 11.12-[illegible]

TAP Emissions

Emissions Point	Arsenic Emission		Beryllium Emission		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium	
	lb/hr annual avg.	lb/yr[4]	lb/hr annual avg.	lb/yr	lb/hr annual avg.	lb/yr	lb/hr 24-hr avg.	lb/yr[4]	lb/hr 24-hr avg.	lb/yr	lb/hr annual avg.	lb/yr	lb/hr 24-hr avg.	lb/yr	lb/hr 24-hr avg.	lb/yr
Cement delivery to site[1]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.27E-07	1.76E-0[illegible]	1.72E-0[illegible]	7.1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ND	ND
Cement supplement delivery to Site[2]	2.[illegible]	1.[illegible]	1.[illegible]E-07	[illegible]	4.1[illegible]	[illegible]	1.[illegible]	1.11E-0[illegible]	[illegible]	[illegible]	4.7[illegible]	[illegible]	[illegible]	[illegible]	1.[illegible]E-07	[illegible]
Truck mix loading[3]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.4[illegible]E-07	1.[illegible]	[illegible]	[illegible]	[illegible]	1.47[illegible]	7.[illegible]	[illegible]	[illegible]	[illegible]	2.47E-07	7.[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.21E-01	[illegible]	[illegible]	[illegible]	[illegible]

[1] [illegible]

[2] [illegible]

[3] [illegible]

[4] [illegible]

[5] [illegible]

[6] [illegible]

[7] [illegible]

Coarse aggregate		1865 pounds
Sand		1428 pounds
Cement		491 pounds
Cement supplement		73 pounds
Water		20 gallons
Concrete		4024 pounds

1

Appendix C

Permit to Construct No. P-060008

Americrete Ready-Mix Concrete, Inc., G & B Redi-Mix Portable Truck Mix Concrete Batch Plant

Facility ID No. 777-00377

Modeling Review

MEMORANDUM

DATE: June 26, 2006

TO: Shawnee Chen, Senior Engineer, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT NUMBER: P-060008

SUBJECT: Modeling Review for the Americrete Ready-Mix Concrete, Inc. DBA - G&B Redi-Mix Permit to Construct Application for a new Portable Truck Ready-Mix Concrete Plant

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1.0 Summary

Americrete Ready-Mix Concrete, Inc. DBA - G&B Redi-Mix (G&B) submitted a Permit to Construct (PTC) application for a portable truck ready-mix concrete batch plant. DEQ conducted air quality analyses involving atmospheric dispersion modeling of emissions associated with operation of the plant to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02).

The modeling analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the proposed facility were below significant contribution levels (SCLs); or b) that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Impacts for the facility were based on generic modeling analyses conducted for a hypothetical facility, with impacts scaled by the proposed production rates.	Although the actual plant configuration may vary from that used for the generic modeling analyses, DEQ air modeling staff have determined the generic analyses appropriately represent impacts from facility operations.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The G&B facility will only be located in areas designated as an attainment or unclassifiable for particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). Because there are no emissions of sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), or ozone (O_3) associated with operation of the ready-mix plant, the area classification for these pollutants has no impact on location restrictions for the plant.

2.1.2 *Significant and Full Impact Analyses*

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the ready-mix plant exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.91, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1[st] highest[g]
	24-hour	5.0	150[h]	Maximum 6[th] highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2[nd] highest[g]
	1-hour	2,000	40,000[j]	Maximum 2[nd] highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1[st] highest[g]
	24-hour	5	365[j]	Maximum 2[nd] highest[g]
	3-hour	25	1,300[j]	Maximum 2[nd] highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1[st] highest[g]
Lead (Pb)	Quarterly	NA	1.5[k]	Maximum 1[st] highest[g]

[a] IDAPA 58.01.01.006.91
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1[st] highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

2.2 *Background Concentrations*

Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Default rural/agricultural PM_{10} background concentrations of 73 $\mu g/m^3$ for the 24-hour averaging period and 26 $\mu g/m^3$ for the annual averaging period were used because ready-mix batch plants are typically located outside of urban areas.

3.0 Modeling Impact Assessment

3.1 *Modeling Methodology*

Table 3 provides a summary of the modeling parameters used in analyses.

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1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

Table 3. MODELING PARAMETERS		
Parameter	Description/Values	Documentation/Additional Description
Model	ISC-PRIME	ISC-PRIME version 04269
Meteorological data	1987-1991	Boise, Idaho, surface and upper air data
Terrain	Not Considered	Initial location of plant is effectively flat
Building downwash	Considered	The building profile input program (BPIP-PRIME) was used
Receptor grid	Grid 1	25-meter spacing along boundary out about 100 meters
	Grid 2	50-meter spacing out about 600 meters

[1]Universal Transverse Mercator

3.1.1 Modeling protocol and Methodology

DEQ conducted the modeling analyses; therefore, a modeling protocol was not submitted. Modeling was conducted using methods and data presented in the *State of Idaho Air Quality Modeling Guideline.*

A generic plant configuration for the ready-mix plant was used because of the potable nature of the facility. Emissions sources were located within a 20-meter by 20-meter area, and the ambient air boundary was assumed to be a 100-meter radius from the center of the emissions source area. Downwash from any buildings and equipment was accounted for by modeling effects from a 20-meter by 20-meter building, 10 meters high, centered on the emissions area.

3.1.2 Model Selection

ISC-PRIME was used by DEQ to conduct the ambient air analyses. ISC-PRIME utilizes the PRIME downwash algorithm that is superior to the downwash algorithm used in ISCST3. AERMOD, the dispersion model replacing ISCST3, also utilizes the PRIME downwash algorithm.

3.1.3 Meteorological Data

Boise, Idaho, meteorological data were used for the ambient air quality analyses since the plant is primarily proposed for an area near Nampa, Idaho.

PCRAMMET, the meteorological data preprocessor for ISCST-3, occasionally generates unrealistically low mixing heights as a result of interpolation algorithms used with the twice daily measured mixing heights. The modeling analyses were conducted using meteorological data corrected for low mixing heights. All mixing height values below 50 meters were replaced with a value of 50 meters.

3.1.4 Terrain Effects

DEQ determined it would not be appropriate to consider terrain effects because the plant is portable and the topography of future plant locations cannot be reasonably anticipated. The proposed initial location of the plant is effectively flat for dispersion modeling purposes.

3.1.5 Facility Layout

A generic, hypothetical plant layout was used because of the portable and dynamic nature of the equipment used. A 20-meter by 20-meter building, 10 meters high, was located at the center of the facility. Table 4 describes the modeled locations of emissions sources.

Table 4. LOCATIONS OF EMISSIONS SOURCES				
Emissions Source - Description	Source Type	Source Location[a]		Size of Volume Source (meters)
		Easting Location (meters)	Northing Location (meters)	
SILO – baghouse, central dust collector[b]	Point	0	10	NA
AGG&SAN – aggregate/sand to/from storage pile	Volume	10	0	50 x 50 x 3
AGGTOST – aggregate/sand to elevated storage	Volume	10	10	5 x 5 x 10
TRUCKLO – uncaptured truck loading emissions	Volume	0	0	10 x 10 x 10

[a]The center of the facility is at 0 meters east and 0 meters north, located at the center of a 20 meter by 20 meter building
[b]Captures and controls emissions from silo filling, weigh hopper loading, and truck loading

3.1.6 Building Downwash

Potential plume downwash effects caused by structures and equipment potentially associated with the facility were accounted for in the modeling analyses by incorporating a 20-meter by 20-meter building, 10 meters high. The Building Profile Input Program for the PRIME algorithm (BPIP-PRIME) was used to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for ISC-PRIME.

3.1.7 Ambient Air Boundary

The property boundary was assumed to be 100 meters from the center of the facility. DEQ assumed reasonable measures would be taken to ensure the general public are excluded from access to the property.

3.1.8 Receptor Network

The receptor grid used met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined the receptor grid was adequate to reasonably resolve maximum modeled concentrations.

3.1.9 Modeling Methodology

Generic modeling was conducted in support of permitting ready-mix concrete batch plants. This modeling assumed a throughput of 1,500 yd^3/day and 500,000 yd^3/year. Impacts for other throughput values are calculated by multiplying the generic modeling result by a ratio of potential throughput to 1,500 yd^3/day or 500,000 yd^3/year.

3.2 Emission Rates

Emissions rates used in the generic ready-mix concrete batch plant dispersion modeling analyses were based on emissions factors from EPA's AP-42 Section 11.12 (June 2006), Concrete Batching. Emissions estimates specifically for the G&B plant were based on maximum throughputs of 1,440 yd^3/day and 500,000 yd^3/year and were calculated by multiplying emissions rates for the generic modeling by a ratio of the potential throughput to the throughput used in the generic modeling (1,440/1,500 for 24-hour and 500,000/500,000 for annual).

Emissions estimates used in the G&B modeling analyses, generated from the generic ready-mix concrete batch plant modeling analyses and G&B-specific throughput values, vary somewhat from those calculated for the permit. This is primarily a result of rounding methods and slight differences between the emission factors used in the newer AP-42 Section 11.12 and the previous AP-42 Section 11.12. These differences will not substantially affect the results of the modeling analyses, and will not change the conclusions of the compliance demonstration.

3.2.1 Fugitive Dust Emissions from Sand and Aggregate Handling

The modeling of fugitive emissions from sand and aggregate handling are a function of wind speed, as indicated in EPA's AP-42, Section 13.2.4:

$$E = k(0.0032)\left[\frac{(U/5)^{1.3}}{(M/2)^{1.4}}\right]$$

E	=	PM_{10} Emission factor (lb/ton)
k	=	Particle size multiplier (0.35 for PM_{10})
U	=	Wind speed (miles per hour)
M	=	Material moisture content (percent)

AP-42 Section 11.12 (Ready-Mix Concrete Batch Plants) suggested moisture content values of 1.77 percent for aggregate and 4.17 for sand.

The base material handling emissions calculated for input to the model were based on a wind speed of 10 miles per hour (4.5 meters per second). Sand and aggregate handling emissions occur from three sources, including: 1) sand and aggregate to outside storage; 2) sand and aggregate from outside storage to conveyor; 3) sand and aggregate from conveyor to elevated storage. The first two sources types (sand and aggregate handling to the storage pile and handling from the storage pile to a conveyor) were grouped together for modeling purposes. Table 5 summarizes PM_{10} emissions from sand and aggregate handling for the generic modeling, at 1,500 yd^3/day and 500,000 yd^3/year throughput, and for calculating the G&B plant-specific modeling results.

Table 5. PM_{10} EMISSIONS FROM AGGREGATE AND SAND HANDLING

Criteria	Aggregate	Sand	Combined Sand and Aggregate
Base Emissions Factor	3.27E-3 lb/ton	9.86E-4 lb/ton	
Emissions for 1,500 yd^3/day-point	0.179 lb/hr	0.0440 lb/hr	0.223 lb/hr
Emissions for 1,440 yd^3/day-point	0.172 lb/hr	0.0422 lb/hr	0.214 lb/hr
AGG&SAN[a] daily rate	0.344 lb/hr	0.0845 lb/hr	0.429 lb/hr
AGGTOST[b] daily rate	0.172 lb/hr	0.0422 lb/hr	0.214 lb/hr
Emissions for 500,000 yd^3/year-point	0.164 lb/hr	0.0402 lb/hr	0.204 lb/hr
AGG&SAN[a] annual rate	0.328 lb/hr	0.0804 lb/hr	0.408 lb/hr
AGGTOST[b] annual rate	0.164 lb/hr	0.0402 lb/hr	0.204 lb/hr

[a] Includes two emissions points for sand and aggregate handling: 1) transfer to storage pile; 2) transfer to conveyor. Emissions for 1,440 yd^3/day throughput.
[b] Includes only transfer from conveyor to elevated storage. Emissions for 500,000 yd^3/year.

DEQ modeling used six emissions rates calculated at different wind speeds, then used an option within ISC to vary emissions as a function of wind speed. The base emissions calculated at 10 miles per hour were left unchanged, but adjustment factors were used as a function of wind speed for each hour modeled. ISC uses default wind speed categories with upper wind speeds in each category of 1.54 m/sec, 3.09 m/sec, 5.14 m/sec, 8.23 m/sec, and 10.8 m/sec. The sixth wind speed category does not have an upper bound.

Emissions were calculated for each category using the midpoint of the wind speed. For category 1, a lower bound of 0.0 m/sec was used, and for category 6 an upper bound of 14 m/sec was used. Table 6 shows the emissions adjustment factor for each wind speed category.

3.2.2 Total Facility Emissions

Table 7 and Table 8 list criteria emissions rates for sources included in the short-term and long-term dispersion modeling analyses, respectively. Emissions rates in the tables are representative of G&B operations of 1,440 yd^3/day and 500,000 yd^3/year. Emissions from silo filling, weigh hopper loading, and truck loading are captured and routed to the central dust collector baghouse. Uncaptured truck loading emissions were calculated by assuming 99.85 percent of uncontrolled emissions are captured, resulting in 0.15 percent of uncontrolled emissions at the truck loading point.

Table 6. WIND SPEED ADJUSTMENT FACTORS FOR SAND AND AGGREGATE HANDLING EMISSIONS

Wind Speed Category	Midpoint Wind Speed for Category (m/sec (mph))	Emissions Adjustment Factor[a]
1	0.77 (1.72)	0.101
2	2.32 (5.18)	0.425
3	4.12 (9.20)	0.897
4	6.69 (14.95)	1.69
5	9.52 (21.28)	2.67
6	12.4 (27.74)	3.77

[a]Applied to the base emissions or emissions factor calculated for a wind speed of 10 mph.

Table 7. MODELED EMISSIONS RATES FOR SHORT-TERM (24-HOUR AND LESS)

Source Id	Description	Emission Rates (lb/hr)[a]
		PM_{10}[b]
SILO	Central dust collector[c]	0.524
Fugitive Emissions Sources		
AGG&SAN	Aggregate/sand to/from storage pile[d]	0.429[f]
AGGTOST	Aggregate/sand to elevated storage[e]	0.214[f]
TRUCKLO	Truck loading	0.00790

[a]Pound per hour emissions
[b]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c]Includes controlled emissions from cement and supplement transfer to the storage silo, weigh hopper loading, and controlled emissions from truck loading
[d]Includes two transfer points for both sand and aggregate
[e]Includes one transfer point for both sand and aggregate
[f]Emissions in the table are based on emissions calculated for a 10 mph wind speed; actual emissions will vary with wind speed as indicated in Table 6.

Table 8. MODELED EMISSIONS RATES FOR LONG-TERM (ANNUAL)		
Source Id	Description	Emission Rates (lb/hr)[a]
		PM_{10}[b]
SILO	Central dust collector[c]	0.498
Fugitive Emissions Sources		
AGG&SAN	Aggregate/sand in/from storage pile[d]	0.408[f]
AGGTOST	Aggregate/sand to elevated storage[e]	0.204[f]
TRUCKLO	Truck loading	0.00751

[a]Pound per hour emissions
[b]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c]Includes controlled emissions from cement and supplement transfer to the storage silo, weigh hopper loading, and controlled emissions from truck loading
[d]Includes two transfer points for both sand and aggregate
[e]Includes one transfer point for both sand and aggregate
[f]Emissions in the table are based on emissions calculated for a 10 mph wind speed; actual emissions will vary with wind speed as indicated in Table 6.

Table 9 lists applicable TAP emissions increases associated with the ready-mix concrete batch plant. Total TAP emissions of all other TAPs were below applicable screening emissions levels (ELs) and modeling was not required.

Table 9. TAP EMISSIONS RATES USED IN MODELING		
TAP	TAP Emissions Rates (lb/hr)	
	SILO[b]	TRUCKLO
Arsenic	2.08E-5	7.33E-8
Beryllium	1.87E-6	5.88E-9
Nickel	8.22E-5	2.87E-7

[a]Pounds per hour
[b]Includes controlled emissions from cement and supplement transfer to the storage silo and controlled emissions from truck loading
[c]Value for emissions not captured and controlled by the storage silo baghouse

3.3 *Emission Release Parameters*

Table 10 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity.

Table 10. EMISSIONS AND STACK PARAMETERS					
Release Point /Location	Source Type	Stack Height (m)[a]	Modeled Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
SILO	Point	2.4	0.5	0 (ambient)	13.1
WEIGHOP	Point	8.4	0.3	0 (ambient)	2.8
Volume Sources					
Release Point /Location	Source Type	Release Height (m)	Initial Horizontal Dispersion Coefficient σ_{yo} (m)	Initial Vertical Dispersion Coefficient σ_{zo} (m)	
AGG&SAN	Volume	1.5	11.6	0.7	
AGGTOST	Volume	5	1.16	4.65	
TRUCKLO	Volume	5	2.33	4.65	

[a]Meters
[b]Kelvin
[c]Meters per second

3.4 Results for Significant and Full Impact Analyses

Compliance with NAAQS was demonstrated using full impact analyses. Results of preliminary significant impact analyses are not presented. Results of the full impact analyses are presented in Table 11.

Table 11. RESULTS OF FULL IMPACT ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[c]	24-hour	50.2[d]	73	123.2	150	82
	Annual	15.4[e]	26	41.4	50	83

[a] Micrograms per cubic meter
[b] National ambient air quality standards
[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d] Maximum 6th highest modeled concentration from modeling a five-year meteorological data set
[e] Maximum 1st highest modeled concentration from modeling each of five years separately

3.5 Results for TAPs Analyses

Compliance with TAP increments were demonstrated by modeling controlled TAP emissions (those TAPs with emissions exceeding the ELs) from silo loading and truck loading operations. Emissions limits for modeled TAPs are needed in the permit, as per IDAPA 58.01.01.210.08.c, since impacts of controlled emissions were used to demonstrate compliance. Table 10 summarizes the ambient TAP analyses.

Table 13. RESULTS OF TAP ANALYSES

TAP	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	AACC ($\mu g/m^3$)	Percent of AACC
Arsenic	Annual	1.88E-4	2.3E-4	82
Beryllium	Annual	1.59E-5	4.2E-3	0.4
Nickel	Annual	7.44E-4	4.2E-3	18

[a] Micrograms per cubic meter

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.