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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2900
Plant ID No.:	089-00041
Applicant:	Shaka, Inc.
Facility Name:	Bluestone Dam
Location:	Hinton, Summers County
NAICS Code:	327320
Application Type:	Construction
Received Date:	October 5, 2011
Engineer Assigned:	Mindy Hendrickson
Fee Amount:	$1,000.00
Date Received:	October 6, 2011
Complete Date:	November 17, 2011
Applicant Ad Date:	October 25, 2011
Newspaper:	*Hinton News*
UTM's:	Easting: 510.3 km Northing: 4166.2 km Zone: 17
Description:	Applicant proposes the construction and operation of a concrete batch plant for use in the Bluestone Lake Dam Safety Assurance project. The plant will operate with the maximum concrete production rate of 245 tons per hour and 312,000 tons per year. The facility will utilize a 2.8 Mmbtu/hr water heater, which is fueled by diesel at a maximum rate of 20 gallons per hour.

DESCRIPTION OF PROCESS

Shaka, Inc. (Shaka) proposes to construct and operate a concrete batch plant for use in the Bluestone Lake Dam Safety Assurance project. The Army Corps of Engineers project is scheduled to operate through 2014. The proposed operation will utilize portland cement, coarse aggregate materials, sand, flyash, add mixes, and water to produce concrete. The facility will produce a maximum of 12 batches of concrete per hour and will operate at 250 tons per hour (tph) and 200,000 tons per year (tpy) of aggregates, 250 tph and 48,000 tpy of sand, three (3) tph and 6,000 tpy of flyash, and three (3) tph and 22,000 tpy of cement. The amounts of materials used per batch may vary depending on the type of concrete being produced. Materials are trucked onto site. All concrete produced by the facility will be used on site.

Aggregates and sand are trucked to the site and stockpiled in multiple piles of various aggregates and sand SP1. An enloader feeds hoppers H1, H2, and H3 to conveyor BC1 to wet screen SC1 where fines are removed to stockpile SP2 via screw conveyor SCR1. The screened aggregates move via conveyors BC2 and BC3 to dry screen SC2, where they are separated for transfer via BC4, BC5, and BC6 to aggregate bins BS1, BS2, and BS3. Endloaders transfer sand to hopper H4, which is then transferred on conveyor BC7 to bin BS4. Aggregates and sand are transferred from bins BS1, BS2, BS3, and BS4 to batchers B1, B2, B3, and B4. Batchers B1-4 feed to conveyor BC8, to BC9, and then to concrete mixer B6. Cement and flyash are loaded pneumatically from trucks to silos S1, S2, and S3. Cement and flyash are fed from split silo S1 to the cement batcher B5. Auxiliary cement silo S2 and flyash silo S3 feed to silo S1 when the contents of S1 are low. B5 then transfers the cement and flyash to mixer B6 by gravity feed. Add Mixes from BS5 and water are added to B6, and the concrete mix is transferred to truck for use on site. The add mixes are water based and not a source of air emissions. A 2.8 Mmbtu/hr diesel water heater will be utilized when it is needed to heat the water that is added to the concrete mixture. The facility will utilize a local electric power source to operate all other equipment when necessary.

See the following table for description, maximum throughput, control equipment, and maximum storage for all permitted equipment at the Bluestone Dam facility:

Table 1: Equipment Summary

Equipment ID No.	Description	Year Installed	Maximum Production Rate		Control Equipment
			Hourly	Annual	
SC1	Single-deck Wet Screen	2012	250 tons/hr	200,000 tons/yr	PE, WS
SC2	Triple-deck Dry Screen	2012	250 tons/hr	200,000 tons/yr	PE
HWH1	Water Heater - Pearson Heating Systems, Inc. 2.8 MMBtu/hr – #2 Diesel Fuel	2012	20 gal (diesel)	175,200 gal/yr (diesel)	
SCR1	Screw Conveyor – aggregates	2012	25 tons/hr	20,000 tons/yr	
SCR2	Screw Conveyor – ice	2012	15 tons/hr	20,000 tons/yr	
BC1	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC2	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC3	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC4	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC5	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC6	Belt Conveyor – aggregates	2012	250 tons/hr	200,000 tons/yr	
BC7	Belt Conveyor – sand	2012	250 tons/hr	200,000 tons/yr	
BC8	Belt Conveyor – aggregates/sand	2012	213 tons/hr	248,000 tons/yr	
BC9	Belt Conveyor – aggregates/sand/ice	2012	213 tons/hr	248,000 tons/yr	
DC1	Dust Collector C&W MFG. Bag Pulse Jet BP-790	2012			
VF1	Silo Vent Filter	2012			
VF2	Silo Vent Filter	2012			
VF3	Silo Vent Filter	2012			
VF4	Silo Vent Filter	2012			
			Storage Capacity	Maximum Throughput	Control Equipment
SP1	Stockpile – aggregate / sand	2012	5,000 tons	248,000 tons/yr	
SP2	Stockpile – fines	2012	1,000 tons	248,000 tons/yr	
H1	Hopper – aggregate / sand	2012	100 tons	248,000 tons/yr	PE
H2	Hopper – aggregate / sand	2012	100 tons		PE

			Storage Capacity	Maximum Throughput	Control Equipment
H3	Hopper – aggregate / sand	2012	100 tons		PE
H4	Hopper – aggregate / sand	2012	100 tons		PE
S1	Split Silo – cement/flyash	2012	325 tons	28,000 tons/yr	VF1, VF2
S2	Auxiliary Silo - cement	2012	325 tons	22,000 tons/yr	VF3
S3	Silo – flyash	2012	100 tons	6,000 tons/yr	VF4
BS1	Aggregate Bin	2012	200 tons	248,000 tons/yr	PE
BS2	Aggregate Bin	2012	200 tons		PE
BS3	Aggregate Bin	2012	200 tons		PE
BS4	Sand Bin	2012	200 tons		PE
B1	Aggregate Batcher	2012	10 tons	248,000 tons/yr	PE
B2	Aggregate Batcher	2012	10 tons		PE
B3	Aggregate Batcher	2012	10 tons		PE
B4	Sand Batcher	2012	10 tons		PE
B5	Cement/Flyash Batcher	2012	3.5 tons	28,000 tons/yr	DC1
B6	Concrete Mixer	2012	25 tons	312,000 tons/yr	FE

SITE INSPECTION

A pre-construction site inspection was performed by the writer on December 1, 2011. No siting issues were seen with the proposed concrete batch plant site location. Directions in application: WV Route 3 in Hinton (Belle Point). Turn onto Miller Avenue and proceed south towards the Bluestone Dam to the site.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Fugitive emissions include particulate emissions from unpaved haulroads, stockpiles, and work areas. Water sprays will be utilized on these areas as necessary to minimize particulate emissions.

The cement batcher (B5) will be fully enclosed with the usage of a baghouse. The C&W BP-790 is a pulse jet baghouse that utilizes a polyester filter bag with a manufacturer's guaranteed control efficiency of 99.9%. Collected material from the baghouse will be returned to silo. Emissions from silos S1, S2, and S3 are controlled by silo vent filters. Each vent filter has a control efficiency of 99.9% with all collected materials being returned to the silos.

A diesel fueled 2.8 Mmbtu/hr water heater will be utilized by the facility to heat water that is added to the concrete mixture when necessary. The Pearson Heating Systems, Inc. direct fired water heater has the capability to heat up to 120,000 gallons of water per day. Water will be directly supplied to the heater's water inlet by a local source, so there is no need for a water storage tank. The heater can use up to 20 gallons of diesel per hour and 175,200 gallons per year.

The facility will produce a maximum of 12 batches of concrete per hour for use in the dam safety project. Emission factors were obtained from the following: AP-42 Section 13.2.4 for material handling; AP-42 Table 11.12-2 for non-aggregate/sand transfers; AP-42 Section 1.3 for the water heater fuel oil consumption; AP-42 Section 13.2.2 for the unpaved haulroads; and AP-42 Section 11.2.3 for the stockpiles. Emission calculations were performed by Chris Schultz of Potesta & Associates, Inc. on behalf of Shaka, Inc.

Table 2: Concrete production emissions summary

Emission Source	Controlled PM Emissions		Controlled PM_{10} Emissions	
	lb/hour	TPY	lb/hour	TPY
Fugitive Emissions				
Stockpile Emissions	0.10	0.41	0.05	0.20
Haulroad Emissions	84.79	51.27	25.00	15.12
Fugitive Emissions Total	*84.89*	*51.68*	*25.05*	*15.32*
Point Source Emissions				
Material Handling Emissions	13.36	5.16	6.44	2.33
Screening Emissions	4.38	1.75	1.53	0.61
Point Source Emissions Total (PTE)	*17.74*	*6.91*	*7.97*	*2.94*
EMISSIONS TOTAL	**102.63**	**58.59**	**33.02**	**18.26**

Table 3: Hot water heater emissions summary

Source ID	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
HWH1	Nitrogen Oxides	0.40	1.76
	Carbon Monoxide	0.10	0.44
	Sulfur Dioxide	0.15	0.63
	Total Particulate Matter	0.04	0.18
	Particulate Matter less than 10 microns	0.02	0.09
	Volatile Organic Compounds	0.01	0.03
	Lead	0.0001	0.0002
	Benzene	0.0001	0.0001
	Toluene	0.0002	0.0006
	Xylenes	0.0001	0.0001
	Formaldehyde	0.0007	0.0027
	Napthalene	0.0001	0.0001
	Ethylbenzene	0.0001	0.0001
	Total Haps	0.0014	0.0039

Table 4: Total facility emissions summary

Pollutant	Maximum Emissions (Including Fugitives)		Maximum Emissions (NOT Including Fugitives)	
	Hourly (lb/hr)	Annual (tons/yr)	Hourly (lb/hr)	Annual (tons/yr)
Total Particulate Matter	102.67	58.77	17.78	7.09
Particulate Matter Less Than 10 Microns	33.04	18.35	7.99	3.03
Volatile Organic Compounds	0.01	0.03	0.01	0.03
Carbon Monoxide	0.10	0.44	0.10	0.44
Nitrogen Oxides	0.40	1.76	0.40	1.76
Sulfur Dioxide	0.15	0.63	0.15	0.63
Total HAPs	0.0014	0.0039	0.0014	0.0039

REGULATORY APPLICABILITY

NESHAPS and PSD have no applicability to the proposed facility. The proposed construction of a concrete batch plant is subject to the following state and federal rules:

45CSR2 To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

The purpose of this rule is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units. Per this rule, Section 2.14 defines an indirect heat exchanger as a device that combusts any fuel and produces steam or heats water or any other heat transfer medium. Section 2.10 defines a fuel burning unit as any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. The facility is exempt from sections 4, 5, 6, 8, and 9 because the hot water heater (2.8 Mmbtu/hr) is below 10 MMbtu/hr.

45CSR7 To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

The purpose of this rule is to prevent and control particulate matter air pollution from manufacturing processes and associated operations.

The facility is subject to the requirements of 45CSR7 because it meets the definition of "Manufacturing Process" found in subsection 45CSR7.2.20. The facility will need to be in compliance with Subsection 3.1 -- no greater than 20% opacity (opacity monitoring, recordkeeping, and reporting requirements are included in permit 13-2900), Subsection 3.7 -- no visible emissions from any storage structure pursuant to subsection 5.1 which is required to have a full enclosure and be equipped with a control device (silo S1 is enclosed and controlled by vent filters VF1 and VF2, silo S2 is enclosed and controlled by vent filter VF3, and silo S3 is enclosed and controlled by vent filter VF4), Subsection 4.1 – PM emissions shall not exceed those allowed under Table 45-7A (see paragraph below), Subsection 5.1 – manufacturing process and storage structures must be equipped with a system to minimize emissions (baghouse DC1 controls emissions from cement/flyash batcher B5 and silos S1-3 are controlled by vent filters VF1-4), Subsection 5.2 – minimize PM emissions from haulroads and plant premises (Roads, stockpiles, and work areas will be sprayed with water when needed for dust control) when the particulate matter control methods and devices proposed within application 13-2900 are in operation.

According to Table 45-7A, for a type 'a' source with a maximum process weight rate of 500,000 lb/hour, the maximum allowable emission rate is approximately 47 lb/hour of particulate matter. The maximum point source emission rate at the proposed facility is 17.74 of particulate matter according to calculated emissions in permit application R13-2900.

45CSR10 To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides

The purpose of this rule is to prevent and control air pollution from the emission of sulfur oxides. Per this rule, Section 2.9 defines an indirect heat exchanger as a device that combusts any fuel and produces steam or heats water or any other heat transfer medium. Section 2.8 defines a fuel burning unit as any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. The facility is exempt from sections 3 and 6 because the hot water heater (2.8 Mmbtu/hr) is below 10 MMbtu/hr.

45CSR13 Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation

The purpose of this rule is to set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source and to relocate non-major stationary sources within the state of West Virginia.

A general permit is not applicable at the facility because of the proposed use of the diesel water heater. The applicant is applying for a Rule 13 construction permit for their proposed Bluestone Dam site. The facility is subject to the following sections of this rule: reporting requirements, requirements for modifications of stationary sources, demonstrating compliance with stationary sources, public review procedures, and permit application fees. The facility will demonstrate compliance by following all the applicable rules and regulations that apply to the facility. They will also following the terms and conditions set forth in permit R13-2900. The permittee published their Class I legal ad on October 25, 2011 in the Hinton News and they have submitted an application fee of $1,000.00 to the DAQ.

45CSR22 Air Quality Management Fee Program

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. Funds collected from these fees will be used to supplement the Director's budget for the purpose of maintaining an effective air quality management program. An Application for a Certificate to Operate (CTO) will be enclosed with the permit at time of issuance as this will be a new construction.

The proposed construction of a concrete batch plant will NOT be subject to the following state and federal rules:

45CSR16 Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60

This rule establishes and adopts standards of performance for new stationary sources promulgated by the United States Environmental Protection Agency pursuant to section 111(b) of the federal Clean Air Act, as amended (CAA). There are no current standards of performances for new stationary sources that apply to this facility.

45CSR17 To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Matter

The purpose of this rule is to prevent and control particulate matter air pollution from materials handling, preparation, storage and other sources of fugitive particulate matter. Because the facility is subject to 45CSR7, it is exempt from this rule per section 6.1.

45CSR30 Requirements for Operating Permits

The facility's potential to emit will be 3.23 TPY of a regulated air pollutant (PM_{10}), which is less than the 45CSR30 threshold of 100 TPY for a major source.

40CFR63 Subpart JJJJJJ

National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

Per 63.11195(f), hot water heaters as defined in this subpart are exempt. The definition of a hot water heater limits the storage capacity to 120 gallons. The hot water heater proposed at the Bluestone Dam site does not require water storage because water will be provided from a local source directly to the heater's water inlet. Therefore, the proposed hot water heater is exempt from this subpart.

40CFR60 Subpart OOO

National Emission Standards of Performance for Nonmetallic Mineral Plants

The provisions of this subpart are applicable to affected facilities in fixed or portable nonmetallic mineral processing plants. Nonmetallic mineral processing plants are defined by this rule as any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c). The facility does not crush or grind the aggregate in the process. Therefore, this rule does not apply.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Benzene:
Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

Ethyl Benzene:
Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

Formaldehyde:
Formaldehyde is used mainly to produce resins used in particle board products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

Naphthalene:
Naphthalene is used in the production of phthalic anhydride; it is also used in mothballs. Acute (short-term) exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Cataracts have also been reported in workers acutely exposed to naphthalene by inhalation and ingestion. Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Hemolytic anemia has been reported in infants born to mothers who "sniffed" and ingested naphthalene (as mothballs) during pregnancy. Available data are inadequate to establish a causal relationship between exposure to naphthalene and cancer in humans. EPA has classified naphthalene as a Group C, possible human carcinogen.

Toluene:

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. `Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

Xylene:

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.

AIR QUALITY IMPACT ANALYSIS

Air dispersion modeling was not performed due to the size and location of this facility and the limit of the proposed construction. This facility will be located in Summers, WV, which is designated as attainment for PM2.5 (particulate matter less than 2.5 microns in diameter). The facility is a minor source and not subject to 45CSR14.

MONITORING OF OPERATIONS

Maximum concrete production throughput, diesel fuel usage, and visible emissions will be monitored –

4.2.1. For the purpose of determining compliance with maximum throughput and emission limits set forth in 4.1.1. and 4.1.2., the permittee shall monitor grout production and maintain certified daily records. An example form is included as Appendix A. Such records shall be retained onsite by the permittee for at least five (5) years. Certified records shall be made available to the Director or his duly authorized representative upon request.

4.2.2. For the purpose of determining compliance with the maximum fuel usage limits set forth in 4.1.3. and 4.1.4., the permittee shall maintain monthly diesel fuel records for the 2.8 MMBTU/hr water heater HWH1 utilizing the form identified as Appendix C.

4.2.3. For the purpose of determining compliance with the opacity limits of 45CSR§2 and 45CSR§7, the permittee shall conduct visible emission checks and / or opacity monitoring and recordkeeping for all emission sources subject to an opacity limit.

a. The visible emission check shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training may

be obtained from written materials found in the References 1 and 2 from 40CFR Part 60, Appendix A, Method 22 or from the lecture portion of the 40CFR Part 60, Appendix A, Method 9 certification course.

b. Visible emission checks shall be conducted at least once per calendar month with a maximum of forty-five (45) days between consecutive readings. These checks shall be performed at each source (stack, transfer point, fugitive emission source, etc.) for a sufficient time interval, but no less than one (1) minute, to determine if any visible emissions are present. Visible emission checks shall be performed during periods of facility operation and appropriate weather conditions.

c. If visible emissions are present at a source(s) for three (3) consecutive monthly checks, the permittee shall conduct an opacity reading at that source(s) using the procedures and requirements of Method 9 as soon as practicable, but within seventy-two (72) hours of the final visual emission check. A Method 9 observation at a source(s) restarts the count of the number of consecutive readings with the presence of visible emissions.

RECOMMENDATION TO DIRECTOR

The information contained in the permit application R13-2900 indicates that compliance with all applicable state rules and federal regulations should be achieved when all proposed control methods are in operation. Therefore, the granting of a permit to Shaka, Inc. for the construction of a concrete batch facility located in Hinton, Summers County, West Virginia, is hereby recommended.

Mindy Hendrickson
Permit Writer

March 6, 2012

Date