



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3038A
Plant ID No.:	095-00025
Applicant:	Integrity Delaware, LLC
Facility Name:	Integrity-Friendly WV Site
Location:	Friendly, Tyler County
SIC/NAICS Code:	3952/325998
Application Type:	Modification
Received Date:	November 18, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	\$1,000
Date Received:	November 19, 2015
Complete Date:	December 17, 2015
Due Date:	March 16, 2016
Applicant's Ad Date:	November 25, 2015
Newspaper:	<i>Tyler Star News</i>
UTM's:	Easting: 491.561 km Northing: 4,369.371 km Zone: 17
Latitude/Longitude:	39.4739/-81.0981
Description:	Modification of the existing synthetic mud mixing facility (purchased from Steve Simpson & Associates, Inc. and which has been dismantled) to a similar process with new equipment.

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On April 15, 2013 Permit Number R13-3038 was issued to Steve Simpson & Associates, Inc. (SSA) for the construction of a synthetic mud mixing facility. Since that time, Integrity Delaware, LLC (Integrity) has leased the site from SSA, transferred the permit into their name, and removed the existing equipment. They are now proposing to install a new permanent mud mixing facility using a process similar to the previous SSA process.

DESCRIPTION OF PROCESS

Integrity is proposing to construct a new permanent 500,000 gallons/year mud mixing facility in place of the previous SSA facility. The facility will operate similar to, but not identical to, the SSA process. The most significant difference is the use of petroleum (diesel and other oils) as the

primary constituency of the produced synthetic drilling mud. Synthetic drilling mud is used in the process of natural gas drilling to protect and isolate wells from water penetration and decay.

Liquid additives (brine water and base oils) are delivered to the site by tank truck and delivery truck for other additives (which include dry bagged products and liquids in totes, drums, or pails). Delivered diesel and synthetic base oil are stored in 21,000 gallon vertical storage tanks (TK17-19 and TK28-30). Integrity is proposing to make two mud mixtures: (1) synthetic oil based mud and (2) diesel based mud (each has a specific use in the industry). The difference between the two mud types is the base oil used in the mix (either diesel or a proprietary petroleum based liquid base). The remaining ingredients are the same but the amount of the ingredients used may differ depending on the specific order. The other ingredients are calcium chloride (liquid and powder), various Bentone products, water, barite, gel, lime, and various other products. MSDS/SDS sheets are provided in Attachment H of the permit application for these chemicals.

The pulling of the liquid materials into the plant, batch mixing, and pumping off into storage tanks is accomplished using centrifugal pumps with a pump rate of approximately 2,000 gallons per minute (gpm). This pumping rate allows for proper mixing of the materials. Barite (a dry additive) is unloaded from trucks pneumatically (approximately at 50 TPH) to silos and also blown pneumatically to the mixers. When the 100 ton barite silos (BRS1 and BRS2) are being filled (TP2A and TP2B), they vent to the mixers which have dust socks (passive dust filters) on them for control of particulate. Also, when barite is blown to the mixers (TP3A and TP3B), the transfer is also controlled by the same dust socks.

Smaller quantity dry materials (other than barite) are fed manually through a hopper from bags. The circulating material in the mixer pulls the material into the fluid. This is a batch process and when an order is received, the mud is mixed in two 14,700 gallon mixing tanks (MT1 and MT2) and stored in the hold tanks (TK1-16 and TK22-27). Trucks will then be loaded with the material by the 2,000 gpm pumps (TRUCK) and product removed from the site. Some mud may be returned and loaded back into the product storage tanks. The overall mud production is anticipated to be a maximum of 500,000 gallons per year.

SITE INSPECTION

On February 27, 2013 the writer conducted an inspection of the (at that time) proposed location of the SSA facility. At the time of the inspection, site preparation activities were underway that included making repairs to an existing building on the site and setting up of an office trailer. Other observations from that inspection included:

- The state of WV was preparing to create a new access road to the proposed facility off of WV State Route 2;
- The facility was located in the Bens Run Industrial Park adjacent to an existing Aleris recycling facility; and
- The location was in an industrial location with no occupied residences visible from the site. The nearest occupied residences was located approximately 0.65 miles south of the facility in Bens Run.

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Due to the nature of the proposed modification, an additional site inspection by the writer was deemed as not necessary. On September 18, 2014, a site inspection of the SSA facility was conducted by Mr. James Robertson of the DAQ Compliance/Enforcement (C/E) Section. This inspection found the facility be "Status 41 - Not in Operation."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Material Handling and Unpaved Roads

Particulate matter emissions from material handling and unpaved haulroads were based on the following AP-42 Sections:

Table 1: Sources of Emission Factors for Particulate Matter

Emission Source	Emission Factor(s)	Emission Factor Source	Comments
Manual Dry Additive Loading	0.2431 lb-PM/ton-additive, 0.1150 lb-PM ₁₀ /ton-additive, 0.0174 lb- PM _{2.5} /ton-additive	AP-42 Section 13.2.4. (11/06)	(TP1) Uncontrolled. Maximum hourly/annual throughput based expected maximum usage rates.
Pneumatic Barite Transfer	0.73 lb-PM/ton-additive, 0.73 lb-PM ₁₀ /ton-additive, 0.73 lb- PM _{2.5} /ton-additive	AP-42 Section 11.12. (6/06)	(TP2A, TP2B, TP3A, TP3B) Uncontrolled. Based on loading of dry cement, but appropriate for barite.
Unpaved Haulroads	7.88 lb-PM/VMT, 2.33 lb-PM ₁₀ /VMT, 0.23 lb- PM _{2.5} /VMT	AP-42 Section 13.2.2 (11/06)	Uncontrolled. Based on mean vehicle weights (40 tons), percent silt in road surface (10%), and number of precipitation days (157).

As noted above, the pneumatic transfer of barite into the silos and the mixers will be controlled by a passive dust filter on the mixers. Integrity has used a minimum filter capture efficiency of 95% in the calculations.

Storage Tanks and Truck Loading

While any VOC emissions from the diesel, synthetic base oil, and product storage tanks are expected to be very small based on the vapor pressures of the materials, Integrity calculated potential uncontrolled working/breathing emissions from these storage tanks using the TANKS 4.09d program as provided under AP-42, Section 7. Diesel (as the material with the highest vapor pressure) was used as a surrogate for all other liquids in the storage tanks. Only one TANKS model was run for a 21,000 gallon tank and emissions from other tanks were scaled down using a ration based on tank size. Uncontrolled emissions from truck loading was also calculated using results from the TANKS 4.09d program.

Emissions Summary

The new post-modification (dismantling of the old SSA equipment and installation of the new Integrity equipment) potential-to-emit (PTE) of the proposed facility is given in the following table:

Table 2: Facility-Wide PTE

Source	PM _{2.5}		PM ₁₀		PM		VOCs	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Material Handling	3.70	0.04	3.95	0.07	4.27	0.10	0.00	0.00
Haulroads	0.68	0.45	6.77	4.47	22.94	15.14	0.00	0.00
Storage/Mixing Tanks	0.00	0.00	0.00	0.00	0.00	0.00	8.37	0.12
Truck Loadout	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.04
Totals →	4.38	0.49	10.72	4.54	27.21	15.24	9.21	0.16

The change in PTE from the previous (SSA) facility is given in the following table:

Table 3: Change In Facility-Wide Annual PTE

Pollutant	R13-3038 ⁽¹⁾		R13-3038A		Change	
	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
PM _{2.5}	0.53	0.70	4.38	0.49	3.85	-0.21
PM ₁₀	5.17	6.30	10.72	4.54	5.55	-1.76
PM	17.16	19.73	27.21	15.24	10.05	-4.49
VOCs	0.00	0.00	9.21	0.16	9.21	0.16

(1) Emissions taken from R13-3038 Fact Sheet.

REGULATORY APPLICABILITY

The proposed Integrity facility is subject to the following substantive state air quality rules and regulations: 45CSR7 and 45CSR13. Each applicable rule (and those that have questionable non-applicability), and SSA's compliance therewith, will be discussed in detail below.

45CSR7: To Prevent and Control Particulate Air Pollution from Manufacturing Process Operations

45CSR7 has three substantive requirements potentially applicable to the particulate matter-generating operations at the modified synthetic mud mixing facility. These are the opacity requirements under Section 3, the mass emission standards under Section 4, and the fugitive emission standards under Section 5. Each of these sections will be discussed below.

45CSR7 Opacity Standards - Section 3

Section 3.1 sets an opacity limit of 20% on the dry additive transfer points. The manual dry additive transfer points shall take place at a hopper and be required to be done in such a manner so as to minimize any fugitive escape of particulate matter. The pneumatic transfer of dry material will be controlled by dust filters. This should mitigate any substantive opacity problems from these sources.

45CSR7 Weight Emission Standards - Section 4

Section 4.1 of 45CSR7 requires that each manufacturing process source operation or duplicate source operation meet a particulate matter limit based on the weight of material processed through the source operation. The mixing operations are defined as a type 'a' source type operation under §45-7-2.38. Section 4.1 compliance is given in the following table:

Table 4: 45CSR7 Section 4.1 Compliance

Source Operation	Source Type	Process Weight Rate (lb/hr)	Table 45-7A Limit (lb/hr)	PTE (lb/hr)	% of Limit	Control Device
TP1	A	5,000	5.00	0.61	12.2%	None
TP2A/3A ⁽¹⁾	A	100,000	33.00	1.83	5.5	Dust Filter
TP2B/3B ⁽²⁾	A	100,000	33.00	1.83	5.5	Dust Filter

- (1) Both sources emitted from dust filter 1E. PTE represents aggregate emissions from both transfer points.
(2) Both sources emitted from dust filter 2E. PTE represents aggregate emissions from both transfer points.

45CSR7 Fugitive Emissions - Section 5

Sections 5.1 and 5.2 of Rule 7 states that each manufacturing process or storage structure must include a system to minimize the emissions of fugitive particulate matter. The potential fugitive particulate emissions from the facility are the storage and use of the dry additives and the haulroads/plant mobile work areas. The draft permit requires the following under 4.1.3. and 4.1.4.:

- 4.1.3. Fugitive escape of particulate matter from use of dry additives shall be mitigated by the following:
- a. Air displaced from silos BRS1 and BRS2 during pneumatic loading shall be controlled by venting exhausting the air through the diesel/mud mixers so as to be controlled by baghouses on those units;
 - b. Good operating practices shall be implemented for all manual addition of bagged or otherwise open dry additive to the mixers so as to minimize any fugitive escape of particulate matter. Good operating practices shall include the use of a hopper of reasonable depth or a suitable enclosure around the hopper to minimize the blowing of dry additive;
 - c. The building and plant grounds shall be regularly cleaned of any spilled dry additives; and
 - d. Dry additives delivered to the facility in bags or other containers shall, where reasonable, remain unopened until they are used in the mixing process.
- 4.1.5. The permittee shall maintain all paved and unpaved areas on plant grounds in good condition, including shoulder areas, where truck traffic or forklift activity may occur.

These methods of control are determined to be sufficient to meet Section 5 of 45CSR7.

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

The proposed modification of the old SSA Ben's Run facility has the potential to increase a regulated pollutant (see Table 2 above). However, no regulated pollutant is increased is in excess of six (6) lbs/hour and ten (10) TPY or 144 lbs/day and, therefore, the proposed changes would normally be eligible to be reviewed as a Class II Administrative Update. However, Integrity voluntarily submitted the application as a modification and it was reviewed as such. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, Integrity is required to obtain a permit under 45CSR13 for the modification of the old SSA Ben's Run facility.

As required under §45-13-8.3 ("Notice Level A"), SSA placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on November 25, 2015 in the *Tyler Star News* and the affidavit of publication for this legal advertisement was submitted on December 1, 2015.

45CSR30: Requirements for Operating Permits - (NON APPLICABILITY)

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The modified Integrity-Friendly WV Site does not meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The modified facility-wide PTE of any regulated pollutant does not exceed 100 TPY, 10 TPY of any individual HAP, or 25 TPY of aggregate HAPs. Further, no equipment or processes at the proposed facility are subject to a federal standard under 40 CFR 60, 61, or 63. Therefore, Title V will not apply to the modified facility.

40 CFR60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Subpart Kb of 40 CFR 60 is the New Source Performance Standard (NSPS) for storage tanks containing Volatile Organic Liquids (VOLs) which construction commenced after July 23, 1984. The Subpart applies to storage vessels used to store volatile organic liquids with a capacity greater than or equal to 75 m³ (19,813 gallons). However, storage tanks with a capacity greater than or equal to 151 m³ (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m³ but less than 151 m³ storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from Subpart Kb.

The diesel, synthetic base, and product storage tanks are 21,000 gallons, which are larger than the minimum applicability threshold under Subpart Kb. However, as each material has a true vapor pressure less than 15.0 kPa (the highest is diesel at a maximum of ~1.33 kPa @ 100°F), each of these tanks are, as noted above, exempt from the requirements of Subpart Kb.

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TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the modified Monroe Compressor Station and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM₁₀), Particulate Matter less than 2.5 microns (PM_{2.5}), and Sulfur Dioxide (SO₂). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs for the modified sources were discussed above under REGULATORY APPLICABILITY.

Integrity did not identify any potential emissions of HAPs from the modified facility. However, diesel and other petroleum-based additives that are used in the process do contain small amounts of HAPs (ethylbenzene, xylene, naphthalene). However, based on the expected small emissions from the use of these liquids (based on the relatively low vapor pressures), no substantive amount of HAP emissions are expected from the facility.

In searching the MSDS, several other chemicals were noted as constituents of materials used at the modified facility: 2-Butoxyethanol (111-76-2) and 2-Ethylhexanol (104-76-7). Both were determined not to be HAPs and are otherwise unregulated (as air pollutants) in West Virginia. However, a search of the Integrated Risk Information System (IRIS) indicated that 2-Butoxyethanol was not likely to be carcinogenic to humans. No information on the IRIS database could be found for 2-Ethylhexanol. It is noted that emission rates of both chemicals are expected to be insignificant due to the low emission rates of the materials in question.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the modified facility are less than applicability thresholds that would define the proposed facility as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature and location of the modified source, an air quality impacts modeling analysis was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The following substantive monitoring, compliance demonstration, and record-keeping requirements (MRR) shall be required:

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- For the purposes of demonstrating continuous compliance with the material usage and production limitations set forth in 4.1.2. of the draft permit, the permittee shall be required to monitor and record the monthly and rolling twelve month usage of dry additive used in all mixing operations and the amount of mud produced at the facility.

PERFORMANCE TESTING OF OPERATIONS

The following substantive performance testing requirements shall be required:

- At such reasonable time(s) as the Secretary may designate, in accordance with the provisions of 3.3 of the draft permit, SSA shall be required to conduct or have conducted test(s) to determine compliance with the emission limitations established in this permit and/or applicable regulations.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3038A to Integrity Delaware, LLC for the proposed modification of the Integrity-Friendly WV Site located near Friendly, Tyler County, WV.



Joe Kessler, PE
Engineer

2/04/16

Date

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