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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2902
Plant ID No.:	109-00196
Applicant:	Road Fork Development Company, Inc. (RFDC)
Facility Name:	Marianna Raw Coal Processing Plant
Location:	Marianna, Wyoming County
SIC Code:	1221 (Bituminous Coal & Lignite - Surface)
NAICS Code:	212111 (Bituminous Coal and Lignite Surface Mining)
Application Type:	Modification
Received Date:	October 11, 2011 (First Submission) February 9, 2012 (Revision)
Engineer Assigned:	Joe Kessler
Fee Amount:	$2,000
Date Received:	October 14, 2011
Complete Date:	May 25, 2012
Statutory Due Date:	August 23, 2012
Applicant's Ad Date:	October 19, 2011
Newspaper:	*Independent Herald*
UTM's:	Easting: 445.99 km Northing: 4,161.21 km Zone: 17
Description:	Modification to add a 78.00 mmBtu/hr natural gas-fired thermal dryer. Additionally, haulroads are being modified to reduce facility-wide post-modification potential-to-emit (PTE) below 45CSR14 applicability thresholds. Addition of thermal dryer necessitated replacement of existing facility Coal General Permit (G10-D122A) with site-specific permit.

On June 15, 2010, General Permit Registration G10-D122 was issued to Shane Coal Company for the construction of the Marianna Raw Coal Processing Plant. At some point thereafter, the name was changed to Road Fork Development Company, Inc. (RFDC), a subsidiary of Massey Energy Company. Subsequently, in January 2011, Massey Energy was purchased by Alpha Natural Resources. The site previously housed a coal preparation plant (109-00004) that shutdown in 2001.

On November 16, 2011, RFDC was issued G10-D122A for the addition of seven (7) conveyers, three (3) storage bins, and one (1) open storage pile. Other changes included rearrangement and re-labeling of existing equipment and modification of haulroads. The facility, however, has not yet begun to operate.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility

The existing Marianna facility is a typical wet-wash coal preparation plant with raw coal, clean coal, and refuse circuits. The wet-wash plant has a capacity to clean 900 tons per hour (TPH) and 4,275,000 tons per year (TPY) of raw coal. The facility is capable of loading out clean coal in trucks and rail cars and refuse is deposited into an on-site refuse area via conveyer loadout into trucks. The existing facility does not, as currently permitted, use thermal drying. The application contains a detailed process flow diagram and process description identifying the placement and relationship of all substantive pieces of equipment. As mentioned above, the facility has yet to operate.

Proposed Modifications

The proposed modifications evaluated herein are:

- Addition of a 78.00 mmBtu/hr natural gas-fired thermal dryer;
- Addition of an alternative refuse circuit; and
- Modification of haulroad routes.

The thermal dryer shall be a 78.00 mmBtu/hr and capable of drying a maximum of 140 tons of coal per hour. The coal will be dried by direct contact with the exhaust of the natural gas burners and removed from the gas stream through the use of a cyclone and a baghouse. Moisture content of the coal will be reduced from 15.0% to 7.0%.

The alternative refuse circuit shall be constructed to take refuse to a new disposal area northeast of the plant. It will consist of thirteen belt conveyers (BC14 through BC26), fifteen transfer points (TP29 through TP43), and one refuse bin (BS6).

The following table lists maximum post-modification throughputs of the various processes of the plant:

Table 1: Key Plant Throughputs

Circuit/Process	TPH	TPY	Comment
Raw Coal Into the Plant	1,500	4,750,000	From Mine Feed (BC1) and Truck Dump (BC3)
Wet Wash Plant Feed	900	4,275,000	As measured @ BC6
Clean Coal Loadout	1,900	2,992,500	As measured @ BS3, BS4, and BS5
Refuse Loaded Out(1)	200	1,757,500	Hourly Sum of BS2 and BS6 Annual Sum of S1 and Plant Reject

(1) Only throughput proposed for modification under R13-2902.

SITE INSPECTION

On March 28, 2012 the author conducted a site inspection of the Marianna Processing Plant. The contact for the inspection was Mr. Adam Watson, plant supervisor. Observations from the inspections include:

- The facility was under construction at the time of the inspection. While the facility was nearing completion, significant work remained including paving of plant grounds, erection of some conveyers, and removal of construction debris;

- The thermal dryer and the new refuse circuit were not under construction;

- The facility lies just west of the Guyandotte River along WV State Route 97 approximately 8.0 miles west-northwest of Pineville, WV;

- The area is bounded on all sides by the valley of the Guyandotte is generally industrial in nature with other coal-related facilities and mines nearby. At the time of the inspection, a temporary concrete batching operation was in operation next to the plant; and

- Many occupied residences are located near the facility in the town of Marianna.

Directions: From the town of Pineville, travel west-northwest on WV State Route 97 approximately 8.0 miles to the town of Marianna. The processing plant lies across the Guyandotte River to the left (west) of Route 97.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Material Handling Emissions

Emissions from material handling operations (conveyer transfer points, coal screening, haulroad traffic, storage piles, etc.) were calculated using the DAQ's G10-C Excel Emission Calculation Spreadsheet (as modified by the writer to correct haulroad emission factors). The spreadsheet uses emission factors obtained from the appropriate sections of AP-42 (AP-42 is a database of emission factors maintained by USEPA) or well-known emission factors obtained from the Air Pollution Engineering Manual. Variables within the emission factor equations, including applicable particulate matter control devices, were based on guidance provided by DAQ or on reasonable values of anticipated inherent material properties. Maximum hourly and annual emission rates were based on the maximum hourly design and limited annual throughputs of the specific equipment, as applicable.

The control efficiency used for calculating potential fugitive emissions from use of paved haulroads was 85%. Due to the site specific nature of potential control strategies for paved haulroads, the DAQ has not given general guidance on control efficiencies for paved haulroad control. In most cases, the DAQ will accept the default control efficiencies for unpaved haulroads -

which includes 85% for use of a chemical dust suppressant when the G10-C default silt-loading value (sL) of 70 g/m^2 is used. This was done and accepted in this permitting action.

The post-modification particulate matter emissions profile from the material handling operations at the Marianna Processing Plant is given in the following table:

Table 2: Particulate Matter Emissions Profile(1)

Source	PM_{10}		PM	
	lb/hr	ton/yr	lb/hr	ton/yr
Transfer Points	1.10	2.35	2.33	4.96
Screening	9.40	22.33	20.00	47.50
Open Stockpiles	0.03	0.13	0.06	0.27
Paved Haulroads & Mobile Work Areas	8.84	3.77	44.19	18.83
Unpaved Haulroads & Mobile Work Areas	1.59	0.10	5.37	0.34
Total Material Handling ➜	*20.96*	*28.68*	*71.95*	*71.90*

(1) The applicant did not include an estimate of $PM_{2.5}$ emissions. Therefore, to be conservative, $PM_{2.5}$ emissions from material handling are considered to be equal to the PM_{10} emissions. This will be the case for all applicability purposes until such time the applicant is able to show that $PM_{2.5}$ emissions are less than PM_{10} emissions.

Thermal Dryer Emissions

Worst-case emissions from the thermal dryer are given in the following table.

Table 3: Thermal Dryer Potential-to-Emit

Pollutant	Emission Factor Source	lb/hr	tons/year(1)
NO_X	Vendor	12.30	35.82
CO	Vendor	17.30	50.38
CO_2	AP 42, Section 1.4	9,176.47	26,721.88
VOC	AP 42, Section 1.4	0.42	1.22
$PM_{2.5}$(2)	Vendor	4.56	13.28
PM_{10}(2)	Vendor	4.56	13.28
PM(2)	Vendor	4.56	13.28
SO_2	AP 42, Section 1.4	0.05	0.15

(1) Based on 5,824 hours operation/year.

(2) PM emissions are based on an outlet grain loading of 0.02 gr/acf from the baghouse and converted here to lb/hour using vendor-provided exhaust data of 26,585 acfm, a temperature of 215 degrees Fahrenheit, and a moisture content of 43%. As no particle size analysis was supplied, for worst-case purposes, all particulate matter emissions are assumed to be total PM. The proposed emission limit in the permit will include condensables.

Facility Potential to Emit

Based on the above estimation methodologies, which were determined to be appropriate, the post-modification annual PTE of the Marianna Processing Plant is given in the following table:

Table 4: Facility-Wide Annual Potential-to-Emit (PTE) Summary in TPY

Source	CO	NO_x	$PM_{2.5}$	PM_{10}	PM	SO_2	VOCs	CO_2e[(1)]
Thermal Dryer	50.38	35.82	13.28	13.28	13.28	0.15	1.22	26,722
Material Handling	0.00	0.00	28.68	28.68	71.90	0.00	0.00	0.00
Facility-Wide Totals [(2)]	**50.38**	**35.82**	**41.96**	**41.96**	**85.18**	**0.15**	**1.22**	**26,722**

(1) Only includes CO_2 emissions, the trace amounts of methane and N_2O emitted were ignored.
(2) Facility-wide totals are below those thresholds under 45CSR14 that would define the source as major (see REGULATORY APPLICABILITY below).

Based on the facility wide emission estimate from G10-D122A, the change in facility-wide PTE associated with this modification is:

Table 5: Post-Modification Change in Annual PTE

Source	CO	NO_x	$PM_{2.5}$	PM_{10}	PM	SO_2	VOCs	CO_2e
G10-D122A	0.00	0.00	63.59	63.59	199.64	0.00	0.00	0.00
R13-2902	50.38	35.82	41.96	41.96	85.18	0.15	1.22	26,722
Change	***50.38***	***35.82***	***(21.63)***	***(21.63)***	***(114.46)***	***0.15***	***1.22***	***26,722***

REGULATORY APPLICABILITY

The RFDC facility is subject to substantive requirements in the following state and federal air quality rules and regulations: 45CSR5, 45CSR13, and 40 CFR 60 Subpart Y. Each applicable rule (and those that have questionable applicability), and RFDC's compliance therewith, will be discussed in detail below with respect to the new/modified equipment: the thermal dryer and the new refuse conveyers.

45CSR5: To Prevent and Control Air Pollution from Coal Preparation Plants, Coal Handling Operations, and Coal Refuse Disposal Operations

The coal handling operations at the proposed facility are defined as a "coal preparation plant" under §45-5-2.4 and are, therefore, subject to the applicable requirements of 45CSR5. The substantive requirements applicable to the new/modified equipment are discussed below.

45CSR5 Emission of Particulate Matter - Section 3

Section 3 of 45CSR5 sets a twenty percent (20%) opacity limit on all stack and fugitive dust control systems. RFDC's proposed use of partial enclosures on the transfer points of the new refuse conveying system and the use of a baghouse as a control device on the thermal dryer should allow them to meet this requirement.

45CSR5 Control of Particulate Emissions From Thermal Drying - Section 4

Section 4.1(a) of 45CSR5 requires that a thermal dryer built after 1974 meet the requirements of 45CSR16 - which in turn adopts the New Source Performance Standards (NSPS). The applicability and compliance with 40 CFR 60, Subpart Y are discussed below.

Section 4.3 of 45CSR5 requires that "the exhaust gases from a thermal dryer to be vented into the open air at an altitude of less than eighty (80) feet above the foundation grade of the structure containing the dryer or less than ten (10) feet above the top of said structure or any adjacent structure, whichever is greater." This requirement has been placed in the draft permit.

45CSR5 Fugitive Emissions - Section 6

Section 6 of 45CSR5 requires all facilities subject to the rule to minimize emissions through the use of a fugitive dust control system. RFDC has proposed a fugitive dust control system of partial enclosures on the new refuse conveying system and a water truck on all rerouted haulroads. These methods are considered appropriate fugitive emissions minimization.

<u>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</u>

The proposed thermal dryer has the potential to increase NO_x and CO at the facility in excess of the thresholds that define the action as a "modification" under §45-13-2.17 (six (6) lbs/hr and 10 TPY) - see Table 3 above. Pursuant to §45-13-5.1, a permit is required for a modification to an existing stationary source.

As required under §45-13-8.3 ("Notice Level A"), RFDC placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on October 19, 2011 in the *Independent Herald*. The affidavit of publication for this legal advertisement was submitted on October 28, 2011.

<u>45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration</u>

The existing Marianna Processing Plant - which has been significantly constructed but has not yet operated - is located in an area classified as "in attainment" with the National Ambient Air Quality Standards (NAAQS) and, therefore, the major source status of the existing source is determined under 45CSR14. The existing facility does not include a thermal dryer and is therefore not a source listed under §45-14-2.43(a). The threshold for defining a non-listed source as a "major stationary source," pursuant to §45-14-2.43(b), is a potential-to-emit (PTE) of 250 TPY of any regulated pollutant. However, pursuant to §45-14-2.43(e), for coal preparation plants, in determining the PTE of the facility for 45CSR14 major source applicability purposes, fugitive emissions shall only be counted from all "affected facilities" as defined under 40 CFR 60, Subpart Y.

Subpart Y defines affected facilities, for sources constructed after May 27, 2009 as "[t]hermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems, transfer and loading systems, and open storage piles." This definition, in effect, brings in all emissions sources at the proposed facility with the exception of fugitives associated with haulroad emissions. Based on the above, and the facility wide non-haulroad PTE of the existing facility (based on information from G10-D122A), is 50.44 TPY of total particulate matter. This emission rate defines the existing plant as a minor source.

However, RFDC is now proposing to install a thermal dryer at the facility. The installation of a thermal dryer would redefine the source as one listed under §45-14-2.43(a) - "Coal Cleaning Plants (with thermal dryers)." Pursuant to the same citation, a PTE of 100 TPY of any regulated pollutant defines a listed-source as a "major stationary source." Additionally, pursuant to §45-14-2.43(e), a listed-source must include all fugitives in determining major source applicability.

Therefore, as a result of the proposed installation of the thermal dryer, RDFC must reduce the facility-wide PTE - including fugitive emissions generated from haulroads - to below 100 TPY or the facility will be considered, upon construction, a "major stationary source" that did not receive the appropriate permit issued under 45CSR14. RDFC has proposed changes in the permit application evaluated herein to limit the post-modification PTE of the plant to below 100 TPY so as to maintain classification of the plant as a synthetic minor stationary source (see "Air Emissions and Calculation Methodologies" above).

45CSR30: Requirements for Operating Permits

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 existing Marianna Processing Plant, as limited by G10-D122A, 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 as-limited facility-wide PTE of PM_{10} (excluding haulroad and mobile source area fugitive emissions) does not exceed 100 TPY. However, as the existing facility is subject to a New Source Performance Standard (NSPS) - 40 CFR 60, Subpart Y - it is subject to Title V. Non-major sources subject to Title V, pursuant to DAQ policy, are deferred from having to submit a Title V application.

The modified facility, with a thermal dryer, will, even including haulroad and mobile source area fugitive emissions, have a PTE below 100 TPY of PM_{10}. Therefore, the facility will remain a Title V "deferred" source.

40 CFR 60, Subpart Y: Standards of Performance for Coal Preparation and Processing Plants

Subpart Y contains requirements relating to the performance of coal preparation plants. Pursuant to §60.250, affected facilities under Subpart Y include "[t]hermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems, transfer and loading systems, and open storage piles" located at "coal preparation and processing plants" that process greater than 200 tons per day. "Coal preparation and

processing plants" are defined as "any facility (excluding underground mining operations) which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning, and thermal drying." The modified Marianna Processing Plant will have the potential to prepare coal by screening, cleaning, and thermal drying and, therefore, all coal conveying, crushing, and thermal drying equipment and open storage piles are subject to the applicable sections of Subpart Y.

The substantive performance standards under Subpart Y applicable to the new and modified equipment at the Marianna Processing Plant are given in §60.252(b) and §60.254(b):

- A PM limit on the thermal dryer of 0.023 g/dscm (0.010 grains per dry standard cubic feet (gr/dscf));
- A 10% opacity limit on all emission points (including the thermal dryer); and
- Pursuant to §60.252(b)(2)(iii) and §60.252(b)(3)(iii), thermal dryers "that receive all of their thermal input from a source other than coal or residual oil" are not subject to the SO_2 and NO_x emission standards under Subpart Y.

RFDC, pursuant to the requirements of the draft permit, is required to use partial enclosures on the new refuse conveying system transfer points. The partial enclosures should allow them to meet the 10% opacity limit on the transfer points.

RDFC has stated that the particulate matter emissions from the baghouse servicing the thermal dryer shall not exceed 0.02 grains/acf. Based on the data provided by the manufacturer, the thermal dryer exhaust will contain a moisture content of approximately 43% at a temperature of 215 °F. At these values, the grain loading in dscf would be calculated at 0.009 gr/dscf - which is below the Subpart Y limit.

Pursuant to R13-2902, RFDC will be required to comply with all applicable monitoring, testing, reporting, and record-keeping requirements in Subpart Y (as the potential annual emissions of PM are below 28 TPY, a bag leak detection system pursuant §60.256(b)(1) is not required).

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the modified Marianna Processing Plant 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 (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Sulfur Dioxide (SO_2). 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 were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The thermal dryer will have the potential to emit trace amounts of various compounds designated as Hazardous Air Pollutants (HAPs) under Section 112(b).

Emissions of HAPs from natural gas combustion can be generally estimated using emission factors provided by AP-42, Section 1.4. The compound with the highest emission factor, and that has a rating of better than "E" (emission factors are rated from "A" to "E" with "E" representing an unreliable emission factor), is formaldehyde. Using an emission factor provided by AP-42, Section 1.4 (7.35×10^{-6} lb/mmBtu), the thermal dryer will have the potential to emit 3.34 *pounds* of formaldehyde per year - less than 0.01 pounds per day. The carcinogenic risk associated with formaldehyde (as based on analysis provided in the Integrated Risk Information System (IRIS)), is given as B1 - Probable Human Carcinogen.

The compound with the highest emission rate and a factor rating of "E" is hexane. Using the emission factor provided by AP-42, Section 1.4 (1.76×10^{-3} lb/mmBtu), the thermal dryer will have the potential to emit 0.40 tons of hexane per year. IRIS states there is "inadequate information to assess carcinogenic potential" of hexane.

Full toxicity reports of the above HAPs can be viewed on the IRIS database, located at: *http://www.epa.gov/IRIS/*.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the as-modified facility are less than applicability thresholds that would define the as-modified facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed modifications, modeling 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:

- For the purposes of demonstrating continuous compliance with maximum design capacities set forth in Table 1.0 of the proposed permit, RFDC shall be required to, upon request, provide documentation or evidence of the maximum design capacity of each piece of equipment.

- For the purposes of demonstrating continuous compliance with maximum annual throughput limitations set forth in 4.1.2(b) of the proposed permit, RFDC shall be required to monitor and record the monthly and rolling twelve month hours of operation of the thermal dryer.

- For the purposes of demonstrating continuous compliance with maximum annual throughput limitations set forth in Table 4.1.3 of the proposed permit, RFDC shall be required to monitor and record the monthly and rolling twelve month throughput of each material specified.

- For the purposes of determining compliance with water truck usage set forth in 4.1.5(c) of the proposed permit, RFDC shall be required to monitor and record when the chemical dust suppressant is applied to the haulroads and mobile work areas.

- For the purpose of determining continuous compliance with the opacity limits of 45CSR5 and 40 CFR 60 Subpart Y, RFDC shall be required to conduct visible emission checks and/or opacity monitoring and recordkeeping for all emission sources subject to an opacity limit. Pursuant to the standard boilerplate visibility monitoring language.

- The permittee shall meet all other applicable monitoring, compliance demonstration, record-keeping and reporting requirements as given under 45CSR5 and 40 CFR 60, Subpart Y.

PERFORMANCE TESTING OF OPERATIONS

Performance testing at the Marianna Processing Plant is driven by the requirements under 40 CFR 60, Subpart Y. The substantive performance testing requirements under Subpart Y applicable to the new and modified equipment at the Marianna Processing Plant are given in §60.255(b)(1) and §60.255(b)(2):

- An initial performance test according to the requirements of §60.8 to determine compliance with the thermal dryer PM standard. Additional performance tests are required based on the results of the initial performance test; and

- For each "affected facility" subject to an opacity standard, an initial performance test must be performed.

The permit contains no additional specific post-issuance performance testing beyond the Subpart Y requirements listed above.

CHANGES TO PERMIT G10-D122A

The proposed permit is presented in the standard permitting boilerplate and is completely different from the G10-D Coal General Permit.

RECOMMENDATION TO DIRECTOR

The information provided in permit application R13-2902 indicates that compliance with all applicable regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R13-2902 to Road Fork Development Company, Inc. for the modification of the Marianna Raw Coal Processing Plant located in Marianna, Wyoming County, WV.

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Joe Kessler, PE
Engineer

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Date