



DEPARTMENT OF ENVIRONMENTAL QUALITY

KATHLEEN BABINEAUX BLANCO

GOVERNOR

MIKE D. McDANIEL, Ph.D.

SECRETARY

Certified Mail No.

Agency Interest No. 152139

Activity No.: PER20070002

Ms. C. Jean Bustard
Chief Operating Officer
ADA-ES, Inc.
8100 South Park Way, Unit B
Littleton, CO 80120

RE: Prevention of Significant Deterioration (PSD) Permit, PSD-LA-727
Red River Environmental Products, LLC
Activated Carbon Facility, Armistead, Red River Parish, Louisiana

Dear Ms. Bustard:

Enclosed is your permit, PSD-LA-727. Construction of the proposed project is not allowed until such time as the corresponding operating permit is issued.

Should you have any questions concerning the permit, contact Sam Phillips at 225-219-3114.

Chuck Carr Brown, Ph.D.
Assistant Secretary

_____ Date

CCB:slp
c: EPA Region VI

ENVIRONMENTAL SERVICES

: PO BOX 4313, BATON ROUGE, LA 70821-4313

P:225-219-3181 F:225-219-3309

WWW.DEQ.LOUISIANA.GOV

PSD-LA-727
Agency Interest No.: 152139

**AUTHORIZATION TO CONSTRUCT AND OPERATE
A MAJOR STATIONARY SOURCE
PURSUANT TO THE PREVENTION OF SIGNIFICANT DETERIORATION
REGULATIONS IN LOUISIANA ENVIRONMENTAL REGULATORY CODE,
LAC 33:III.509**

In accordance with the provisions of the Louisiana Environmental Regulatory Code, LAC 33:III.509,

Red River Environmental Products, LLC
8100 South Park Way, Unit B
Littleton, CO 80120

is authorized to construct a greenfield activated carbon (AC) manufacturing facility near

Parish Road 604
Armistead, LA 71019

subject to the emissions limitations, monitoring requirements and other conditions set forth hereinafter.

This permit and authorization to construct shall expire at midnight on _____, 2009, unless physical on site construction has begun by such date, or binding agreements or contractual obligations to undertake a program of construction of the source are entered into by such date.

Signed this _____ day of _____, 2008.

Chuck Carr Brown, Ph.D.
Assistant Secretary
Office of Environmental Services

PUBLIC NOTICE
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY (LDEQ)
RED RIVER ENVIRONMENTAL PRODUCTS, LLC
GREENFIELD ACTIVATED CARBON MANUFACTURING FACILITY

PUBLIC HEARING AND REQUEST FOR PUBLIC COMMENT
ON THE PROPOSED INITIAL PART 70 AIR OPERATING AND
PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMITS
& THE ASSOCIATED ENVIRONMENTAL ASSESSMENT STATEMENT

The LDEQ, Office of Environmental Services, will conduct a public hearing to receive comments on the Initial Part 70 Air Operating and Prevention of Significant Deterioration (PSD) Permits and the Associated Environmental Assessment Statement (EAS) for Red River Environmental Products, LLC a subsidiary of ADA-ES, Inc., 8100 South Park Way, Unit B, Littleton, CO 80120 for the Activated Carbon Manufacturing Facility. The facility is to be located approximately one-half mile west of Armistead on the south side of Parish Road 604, Armistead, Red River Parish.

The hearing will be held on Tuesday, January 22, 2008, beginning at 6:00 p.m., at the Coushatta City Hall Council Meeting Room, 1211 East Carroll Street, Coushatta, LA 71019. During the hearing, all interested persons will have an opportunity to comment on the proposed permits and the Associated Environmental Assessment Statement (EAS).

Red River Environmental Products, LLC requested an Initial Part 70 Air Operating Permit and a Prevention of Significant Deterioration (PSD) Permit for their Greenfield Red River Environmental Products Activated Carbon Manufacturing Facility.

Red River Environmental Products, LLC will be a major source under the PSD program, LAC 33:III.509. The construction of the Greenfield Activated Carbon Manufacturing Facility will result in significant emissions of the following pollutants: particulate matter (PM/PM10), sulfur dioxide (SO2), nitrogen oxides, (NOx), carbon monoxide (CO), volatile organic compounds (VOC), and sulfuric acid mist (H2SO4). Therefore PSD requirements, including best available control technology (BACT) apply. The selection of BACT was based on a top down approach; a more thorough discussion of the BACT selection process can be found in the proposed permit PSD-LA-727.

Per 40 CFR 60.6(f) and LAC 33:III.507.I, permit shields have been determined for the proposed permit. Compliance with the PSD-LA-727 permit and NSPS, 40 CFR Part 60, Subpart Db, including the monitoring, recordkeeping and reporting requirements of Subpart Db, constitutes compliance with LAC 33:III.Ch.15, including operations during periods of startup, shutdown, and malfunction. Both the PSD permit and the NSPS requirements are federally applicable requirements that are more stringent and overlapping with the Ch. 15 requirements. Compliance with the PSD limits ensures that the unit achieves Best Available Control Technology ("BACT") and New Source Standards which are more stringent than the Reasonably Available Control Technology requirements of Ch. 15.

This permit was processed as an expedited permit in accordance with LAC 33:I.Chapter 18.

Estimated emissions in tons per year are as follows:

<u>Pollutant</u>	<u>Emissions in tons per year</u>
PM ₁₀	423.9
SO ₂	638.2
NO _x	677.2
CO	329.8
VOC ¹	314.7
¹ Toxic VOC included in Totals	0.033
Toxic Non-VOC compounds	35.22

Toxic compounds include the following compounds that are above the Minimum Emission Rate (MER) listed in LAC 33:III Chapter 51. Table 51.1: Barium & barium compounds - 0.785 tpy, Chromium VI & chromium VI compounds - 0.048 tpy, Copper & copper

compounds – 0.024 tpy, Manganese & manganese compounds – 0.145 tpy, Mercury & mercury compounds – 0.022 tpy, Nickel & nickel compounds – 0.025 tpy.

A technical review of the working draft of the proposed permit was submitted to the facility representative and the LDEQ Surveillance Division. Any remarks received during the technical review will be addressed in the "Worksheet for Technical Review of Working Draft of Proposed Permit". All remarks received by LDEQ are included in the record that is available for public review.

All interested persons will be afforded the opportunity to comment on the proposed Initial Part 70 Air Operating Permit, Initial Prevention of Significant Deterioration (PSD) Permit, Statement of Basis and the EAS.

The EAS submitted by the applicant addresses avoidance of potential and real environmental effects, balancing of social and economic benefits against environmental impact costs, and alternative sites, projects, and mitigative measures.

Written comments or written requests for notification of the final permit decision regarding this permit action may also be submitted to Ms. Soumaya Ghosn at LDEQ, Public Participation Group, P.O. Box 4313, Baton Rouge, LA 70821-4313. **Written comments and/or written requests for notification must be received by 12:30 p.m., Monday, January 28, 2008.** Written comments will be considered prior to a final permit decision.

LDEQ will send notification of the final permit decision to the applicant and to each person who has submitted written comments or a written request for notification of the final decision.

The Initial Part 70 Air Operating and Prevention of Significant Deterioration (PSD) Permits and Statement of Basis are available for review at the LDEQ, Public Records Center, Room 127, 602 North 5th Street, Baton Rouge, LA. Viewing hours are from 8:00 a.m. to 4:30 p.m., Monday through Friday (except holidays). **The available information can also be accessed electronically on the Electronic Document Management System (EDMS) on the DEQ public website at www.deq.louisiana.gov.**

An additional copy may be reviewed at the Red River Parish Library, 2022 Alonzo Carroll, Coushatta, LA 71019.

Previous notices have been published in the Coushatta Citizen on Thursday, August 16, 2007.

Individuals with a disability, who need an accommodation in order to participate in the public hearing, should contact Ms. Laura Ambeau at the above address or by phone at (225) 219-3277.

Inquiries or requests for additional information regarding this permit action should be directed to Mr. Sam Phillips, LDEQ, Air Permits Division, P.O. Box 4313, Baton Rouge, LA 70821-4313, phone (225) 219-3114.

Persons wishing to be included on the LDEQ permit public notice mailing list or for other public participation related questions should contact the Public Participation Group in writing at LDEQ, P.O. Box 4313, Baton Rouge, LA 70821-4313, by email at deqmailrequest@la.gov or contact the LDEQ Customer Service Center at (225) 219-LDEQ (219-5337).

Permit public notices including electronic access to the proposed permit and statement of basis can be viewed at the LDEQ permits public notice webpage at <http://www.deq.louisiana.gov/apps/pubNotice/default.asp> and general information related to the public participation in permitting activities can be viewed at www.deq.louisiana.gov/portal/tabid/2198/Default.aspx.

Alternatively, individuals may elect to receive the permit public notices via email by subscribing to the LDEQ permits public notice List Server at www.doa.louisiana.gov/oes/listservpage/ldeq_pn_listserv.htm.

**All correspondence should specify AI Number 152139:
Permit Numbers: 2420-00027-V0 and Activity Number PER20070001
PSD-LA-727 and Activity Number PER20070002.**

Scheduled Publication Date: December 13, 2007

BRIEFING SHEET

RED RIVER ENVIRONMENTAL PRODUCTS, LLC
AGENCY INTEREST NO.: 152139
ARMISTEAD, RED RIVER PARISH, LOUISIANA
PSD-LA-727

PURPOSE

To construct a greenfield facility dedicated to the production of activated carbon.

RECOMMENDATION

Approval of the proposed construction and issuance of a permit.

REVIEWING AGENCY

Louisiana Department of Environmental Quality, Office of Environmental Services, Air Permits Division.

PROJECT DESCRIPTION

Red River Environmental Products, LLC (RREP), a subsidiary of ADA-ES, Inc., is proposing to construct a greenfield facility dedicated to the production of activated carbon (AC), to enable the power generation industry to meet their impending mercury emission control requirements. The facility will use coal as a feedstock in the AC manufacturing process. The proposed site is adjacent to an active coal mine. The facility will consist of dual production lines; each line will have a production capability of roughly 175 million pounds of AC per year.

Carbon is typically activated by either steam or chemical treatment; RREP will be employing the steam activation process for the proposed project. Steam activation involves two steps: carbonization and activation. Carbonization involves the conversion of the raw material (such as coal) into a disordered carbon structure with a very low volatile content. Carbonization (removing the coal volatiles) begins occurring at approximately 400 °F and continues to about 1,300 °F. Once the volatiles are driven off, activation begins to occur in the presence of steam between 1,300 and 1,800 °F. As steam reacts with the carbon in the coal to form hydrogen and CO, a highly porous, AC structure is developed. Controlled amounts of air are added to burn the by-product hydrogen and CO gases, resulting in a net exothermic and self-sustaining process.

The proposed process is continuous and centers on the activation furnaces where the coal is dried, pyrolyzed, and activated with steam. The coal is fed into the top of each furnace onto the first hearth where it meets hot gases exiting the second hearth. The water vapor emitted from the coal on the top hearth mixes with the gases coming from the second hearth and exits at the top of the furnace. The partially dried coal moves towards the perimeter of the first hearth by a continuous rotating system of rabble or rake arms, and then falls by gravity through drop holes onto the second hearth. The second hearth rabble arms move the material toward the center of the second hearth, where it falls through a

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drop hole to the third hearth and continues through the subsequent hearths in this manner. Concurrently, the gases and water vapor emitted from the coal move vertically upward from hearth to hearth mixing with the gases on the hearth above until the by-product/waste gas exits at the top of the multi-hearth furnace (MHF). As it drops through the hearths, the coal continues to dry and pyrolyze to a char, then is activated by the injection of steam to produce the AC product.

Natural gas is used as supplemental fuel in each MHF. During normal operation, a small quantity of natural gas is used to help control the process temperature, but the majority of the heat comes from the activation process itself.

As a whole, the activation process is exothermic, producing more heat than it consumes. The waste heat from the process will be used to generate steam. The by-product/waste gas from the MHFs will be routed to an afterburner. The gases exiting the afterburner will pass through an unfired waste heat recovery boiler and economizer to make steam. A portion of this steam is routed to the MHF steam injection system to drive the activation process. The balance of this steam is used to drive steam turbine generators to make electrical energy. Excess power (less than 20 MW net per production line) will be exported to the utility transmission system. The steam loop will generate no air pollutant emissions.

A greenfield facility is subject to review under the Prevention of Significant Deterioration (PSD) program if it meets the definition of a "major source." The major source threshold for an activated carbon manufacturing facility (with an SIC Code of 2819) is 100 tons per year. If the potential emissions of at least one regulated pollutant exceed that threshold, other PSD-regulated pollutants are subject to PSD review if their emissions exceed specified "significant" emission rates. The projected emissions and the corresponding PSD significant emissions levels are as follows:

<u>Pollutant</u>	<u>Emissions in Tons per Year</u>	<u>PSD Significant Levels</u>	<u>PSD Review Required</u>
PM ₁₀	423.9	15	Yes
SO ₂	638.2	40	Yes
NO _x	677.2	40	Yes
CO	329.8	100	Yes
VOC	314.7	40	Yes
Sulfuric acid	9.78	7	Yes

TYPE OF REVIEW

PM₁₀, NO_x, CO, SO₂, VOC, and sulfuric acid emission rates are above the PSD significant

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emissions levels. Therefore, the requested permit was reviewed in accordance with PSD regulations for PM₁₀, NO_x, CO, SO₂, VOC, and sulfuric acid emissions. The selection of control technology based on the Best Available Control Technology (BACT) analysis included consideration of control of toxic materials.

BEST AVAILABLE CONTROL TECHNOLOGY

PM₁₀, NO_x, CO, SO₂, VOC, and sulfuric acid emissions are above PSD de minimis levels and must undergo PSD analysis. Control of PM₁₀, NO_x, CO, SO₂, VOC, and sulfuric acid emissions were analyzed using a "top down" approach.

Based on the calculation of potential emissions associated with the RREP AC production process, the proposed project emission sources will be subject to PSD review for the following pollutants:

Multi-hearth Furnaces (MHFs):

CO, VOC, NO_x, SO₂, H₂SO₄, and PM₁₀

Material handling equipment (including truck-generated fugitive dust):

PM₁₀

Cooling towers:

PM₁₀

Emergency fire water pump:

CO, VOC, NO_x, SO₂, and PM₁₀

Based on the RBLC search and analyses presented in the application, the proposed BACT for the project emission sources is summarized as follows:

MHFs

For the MHFs, the suite of controls and associated emission rates proposed as BACT are summarized in the following table. An activated carbon manufacturing facility is unlike a combustion source or utility boiler. Coal is a process feedstock, not a source of heat input to a combustion or boiler unit. Heat input-based emission limitations (e.g., lb/MMBtu) would not be appropriate for this type of manufacturing facility. As such, emission limitations are given in units of mass rate (e.g., lb/hr).

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BACT analysis summary for MHFs

Pollutant	BACT*	Description of Control Technology	Compliance Method
CO	37.6 lb/hr (3-hr avg.)	Afterburner and good combustion practices	Stack test
VOC	35.9 lb/hr (3-hr avg.)	Afterburner and good combustion practices	Stack test
NO _x	77.3 lb/hr (12-mo. rolling)	Combustion controls (including low-NO _x burners) and SNCR	CEMS; stack test
SO ₂	101.2 lb/hr (30-day rolling)	Spray Dryer Absorber (SDA) system	CEMS; stack test
H ₂ SO ₄	1.55 lb/hr (3-hr avg.)	SDA system and fabric filter baghouse	Stack test
PM/PM ₁₀ **	FPM: 10.2 lb/hr FPM + CPM: 48.3 lb/hr (3-hr avg.)	Cyclone, afterburner, SDA system and fabric filter baghouse	Stack test

* Rates given are per production line.

** FPM = filterable particulate matter; CPM = condensable particulate matter

Note: Although not specifically subject to BACT, RREP will voluntarily use AC injection for mercury control.

Material Handling Equipment/Haul Roads

The proposed BACT for the material handling sources is enclosures and/or dust collectors. The proposed BACT for minimizing fugitive dust generation from truck traffic is to pave all facility haul roads.

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Cooling Towers

The proposed BACT for the cooling towers is design with drift eliminators to minimize PM₁₀ emissions.

Fire Water Pump

The proposed BACT for the fire water pump diesel engine is good engine design, low-sulfur diesel fuel, and an annual operating limit of 100 hours per year.

AIR QUALITY IMPACT ANALYSIS

Prevention of Significant Deterioration (PSD) regulations requires an analysis of existing air quality for those pollutants emitted in significant amounts from a proposed major source.

Screening dispersion modeling indicates maximum ground level concentrations of CO are below the ambient significant impact levels and preconstruction monitoring exemption level. No preconstruction monitoring or refined modeling is required for CO. Screening dispersion modeling indicates maximum ground level concentrations of PM₁₀, SO₂, and NO₂ are above their respective ambient significant impact levels. Refined modeling for these pollutants is required. The maximum ground level concentrations of PM₁₀ and NO₂ are below preconstruction monitoring exemption levels. In lieu of SO₂ preconstruction monitoring, RREP used data from LDEQ's existing Shreveport monitoring station as background concentrations for refined modeling. This approach was approved by the Office of Environmental Assessment, Air Quality Assessment Division.

Dispersion modeling indicates the impacts of PM₁₀, SO₂, and NO₂ are below their respective National Ambient Air Quality Standards (NAAQS) and within the allowable increment consumption limits of these pollutants.

ADDITIONAL IMPACTS

Soils, vegetation, and visibility will not be adversely impacted by the proposed facility, nor will any Class I area be affected. Approximately 75 new permanent jobs will be created.

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**RED RIVER ENVIRONMENTAL PRODUCTS, LLC
AGENCY INTEREST NO.: 152139
ARMISTEAD, RED RIVER PARISH, LOUISIANA
PSD-LA-727**

PROCESSING TIME

Application Dated:	July 30, 2007
Application Received:	August 2, 2007
Additional Information Received:	August 20, 2007
	October 3, 2007
	November 2, 2007
Effective Completeness:	November 21, 2007

PUBLIC NOTICE

A notice requesting public comment on the permit was published in The Advocate, Baton Rouge, Louisiana, on Month XX, 2007; and in the <LOCAL NEWSPAPER>, <NEAREST CITY>, Louisiana, on Month XX, 2007. The proposed permit was also submitted to US EPA Region VI. A copy of the public notice was mailed to concerned citizens listed in the Office of Environmental Services Public Notice Mailing List on <date>. All comments will be considered prior to the final permit decision.

PRELIMINARY DETERMINATION SUMMARY

RED RIVER ENVIRONMENTAL PRODUCTS, LLC
AGENCY INTEREST NO.: 152139
ARMISTEAD, RED RIVER PARISH, LOUISIANA
PSD-LA-727
NOVEMBER 21, 2007

I. APPLICANT

Red River Environmental Products, LLC
8100 South Park Way, Unit B
Littleton, CO 80120

II. LOCATION

Red River Environmental Products, LLC will be located at Parish Road 604, Armistead, Louisiana. Approximate UTM coordinates are 657.57 kilometers East and 3394.44 kilometers North, Zone 15.

III. PROJECT DESCRIPTION

The scope of this project will be to build a greenfield Activated Carbon manufacturing facility. Some of the major components are:

- Feedstock Handling and Storage
- Multi-Hearth Furnaces (MHFs)
- Activated Carbon Handling, Milling and Shipping
- Waste Heat Recovery and Power Generation
- Air Emission Control Systems
- Ancillary Facility Operations

Estimated emissions in tons per year are as follows:

<u>Pollutant</u>	<u>Emissions in Tons per Year</u>	<u>PSD Significant Levels</u>
PM ₁₀	423.9	15
SO ₂	638.2	40
NO _x	677.2	40
CO	329.8	100
VOC	314.7	40
Sulfuric acid	9.78	7

IV. SOURCE IMPACT ANALYSIS

As a new major source, RREP is subject to review under PSD regulations, LAC 33:III.509. PSD permit reviews of proposed new or modified major stationary sources require the following analyses:

- A. A determination of the Best Available Control Technology (BACT);

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- B. Analysis of the existing air quality and a determination of whether or not preconstruction or postconstruction monitoring will be required;
- C. An analysis of the source's impact on total air quality to ensure compliance with the National Ambient Air Quality Standards (NAAQS);
- D. An analysis of the PSD increment consumption;
- E. An analysis of the source related growth impacts;
- F. An analysis of source related impacts on soils, vegetation, and visibility;
- G. A Class I Area impact analysis; and
- H. An analysis of the impact of toxic compound emissions.

BEST AVAILABLE CONTROL TECHNOLOGY

Under current PSD regulations, an analysis of "top down" BACT is required for the control of each regulated pollutant emitted from a major source in excess of the specified significant emission rates. The top down approach to the BACT process involves determining the most stringent control technique available for a similar or identical source. If it can be shown that this level of control is infeasible based on technical, environmental, energy, and/or cost considerations, then it is rejected and the next most stringent level of control is determined and similarly evaluated. This process continues until a control level is arrived at which cannot be eliminated for any technical, environmental, or economic reason. A technically feasible control strategy is one that has been demonstrated to function efficiently on identical or similar processes.

Red River Environmental Products, LLC proposes to construct a greenfield activated carbon (AC) manufacturing facility in Red River Parish along with the associated material handling and storage equipment. PM₁₀, NO_x, CO, SO₂, VOC, and sulfuric acid emissions from this project will be above PSD de minimis levels. A BACT analysis is required for these PSD regulated pollutants.

BACT ANALYSES FOR MHFs/AFTERBURNER

The AC production process is a continuous process; the heart of the AC manufacturing process is the set of MHFs. Measured quantities of steam and air will be injected into each MHF to react with the coal and maintain the proper reaction temperature. Small quantities of natural gas will be burned to help control temperatures in the individual hearths. A by-product of the carbonization reaction is a

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significant volume of hot, low-Btu waste gas. Some of the gas is combusted in the furnace, sustaining the carbonization process. The balance of the gas is drawn through cyclone type dust collectors into an afterburner.

Note that each MHF will be equipped with its own vent (opening directly to the atmosphere). These vents will remain closed during normal operations. In a start-up condition, the afterburner and MHFs will be warmed up using natural gas, and the air pollution control equipment will be started up before any feed is introduced to the MHFs. The shutdown process will begin by stopping the feed to the MHF, while continuing to operate so that the material remaining within the MHF can be processed and the emissions controlled. After a sufficient amount of time to produce AC product from the residual material within the MHF and for the remaining gases in the MHF to be routed to the air pollution control equipment, the MHF vent will be opened to the atmosphere. An MHF vent will only be opened when that MHF has been shut down or when safety interlocks require it to open in emergency situations.

The following sections describe the BACT evaluation for the pollutants generated in the MHF and afterburner. The structure of each section generally follows the top-down BACT process. First potential control options are identified. Next, the technical feasibility and evaluation of the various control options are discussed, including their energy, environmental, and economic impacts, as appropriate. Finally, BACT is selected.

CO AND VOC EMISSIONS

Various components of the feed volatilize as VOC in the MHF. In addition, the exothermic, partial combustion of the pyrolysis gas with air in the MHF forms CO, carbon dioxide (CO₂), and water vapor.

POTENTIAL CONTROL OPTIONS

Thermal Oxidation: Thermal oxidation is a widely-used add-on control for VOC, CO, and condensable particulate matter. A thermal oxidizer oxidizes the gas stream, destroying VOC and soot particles and converting CO to CO₂. The destruction efficiency depends on chamber temperature, residence time, degree of mixing, inlet speciation, and inlet concentration. Typical thermal oxidizer destruction efficiencies range from 98% to 99.99%. According to EPA guidance, usually a chamber temperature of 1,600°F, a residence time of 0.75 seconds, and good mixing are adequate to meet the high destruction efficiencies.

VOC and CO control will be accomplished with the use of thermal oxidation using an afterburner. The by-product/waste gas from the MHF is routed to the afterburner. Air is introduced for combustion. Natural gas is used as a supplemental fuel in the afterburner to provide a pilot flame

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and maintain adequate flame temperature to ensure complete oxidation of the by-product/waste. The afterburner is designed for a temperature ranging from 1,600°F to 1,800°F, and a residence time of at least 0.75 seconds. The afterburner chamber design temperature, residence time, and mixing are such that the VOC and CO destruction efficiencies are 99%. Oxygen is monitored to ensure that good combustion is maintained.

FEASIBILITY AND EVALUATION OF CONTROL OPTIONS

The afterburner is a technically feasible VOC and CO emissions control option.

ENVIRONMENTAL AND ENERGY IMPACTS

Some supplemental fuel will be burned to provide a pilot flame and maintain adequate flame temperature to ensure complete oxidation of the by-product/waste gas. Burning this fuel will add an additional small quantity of emissions; however, the supplemental natural gas has an overall environmental benefit because it helps to maintain the required flame temperature to ensure oxidation of the CO and VOC emissions.

ECONOMIC IMPACTS

No economic evaluation is necessary.

BACT

BACT for this application is an afterburner to control VOC and CO emissions to levels of 35.9 lb/hr (3-hr avg.) and 37.6 lb/hr (3-hr avg.), respectively, as demonstrated by Reference Test Methods.

NO_x EMISSIONS

NO_x is formed during combustion within the MHF and the afterburner. The use of a low-NO_x burner for the afterburner minimizes NO_x emissions. The primary NO_x formation mechanism is via the oxidation of nitrogen compounds present in the MHF by-product/waste gas (fuel NO_x formation). Thermal NO_x formation, the high temperature oxidation of molecular nitrogen in the combustion air, is relatively minor as a result of the lower flame temperature and low-NO_x design of the afterburner. Low-NO_x burner design with combustion controls is the only NO_x control technology that has been commercially demonstrated or permitted on a MHF for AC production. The following sections present a top-down analysis to establish the appropriate technology.

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POTENTIAL CONTROL OPTIONS

Selective Catalytic Reduction (SCR): The use of SCR has been carefully considered for this project. SCR is a post-combustion NO_x control technology that uses ammonia in the presence of a catalyst to selectively reduce NO_x (that is, the sum of NO and NO₂) to molecular nitrogen and water. Side reactions also occur that form undesirable products such as N₂O and SO₃. In addition, some unreacted ammonia, or ammonia slip, is produced, which is undesirable at higher levels.

The SCR process involves injecting ammonia (typically), usually diluted with air or steam, into hot flue gases. The flue gases are then passed through a catalyst bed where NO_x is reduced to N₂ gas and water. The SCR reactor is sized, based on exhaust gas parameters, to provide a certain gas velocity and residence time in the catalyst bed. The optimum temperature for SCR depends on the catalyst, but is usually between 300°C and 450°C (570°F and 840°F).

In suitable applications and in properly designed systems, SCR generally has been found to produce NO_x removal efficiencies in the range of 70% to 90%. The initial NO_x removal efficiency generally depends upon the temperature, the inlet concentration, NH₃:NO_x molar ratio, and the flue gas residence time (or the space velocity) used in the catalyst bed. The SCR reactor system can be designed for a desired NO_x reduction using appropriate reagent ratio, catalyst bed volume, and operating conditions. However, the suitability of SCR and its effectiveness is very site specific. The characteristics of the exhaust stream, as well as the design and operation of the SCR system, greatly affect whether SCR can be effective, and if effective, the ultimate performance of the system.

There can be significant technical, design, and operational issues associated with installing and operating a SCR system that impact the effectiveness of the system. These include issues related to catalyst formulation and cleaning, physical and chemical catalyst deactivation (rendering it less effective for NO_x reduction and shortening its life), and SO₂ oxidation (potentially causing opacity issues and operational problems from its reaction with other compounds to form sticky deposits in downstream equipment). These issues are discussed below.

The specific catalyst formulation must be customized for each application's design and operating parameters. For applications beyond a catalyst supplier's experience, experimental laboratory and pilot-scale testing may be needed to identify the optimal catalyst formulation for that particular application. Historically, developing an SCR system for a new flue gas source (such as an AC MHF) is a lengthy process involving laboratory and pilot-scale testing, data analysis, and possibly additional testing for each new type of application or significant variant. This testing is a prerequisite for commercial availability.

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When a catalyst's ability to convert NO_x to elemental nitrogen is adversely affected by physical or chemical damage, it is referred to as "deactivation." When the SCR catalyst is deactivated, the design NO_x removal efficiency cannot be achieved and a portion of the NH₃ passes through the SCR catalyst without reacting. In general, there are five causes of SCR catalyst deactivation; the following discusses these briefly:

Thermal sintering

Thermal sintering is permanent catalyst deactivation due to exposure to excessive temperatures. Specifically, the surface area of the catalyst is decreased, which reduces its activity. A bypass must be incorporated into the design of the system to use during temperature excursions to prevent sintering of the catalyst. When routed through the bypass, the NO_x emissions are uncontrolled.

Erosion

Erosion is the permanent loss of catalyst activity due to the physical abrasion caused by impinging dust. Erosion is usually limited to the leading edge of the catalyst and the first layer of the catalyst within the reactor. This is a major catalyst deactivation issue with high-dust SCR systems.

Catalyst poisoning

Poisoning is a catalyst deactivation process resulting from a chemical reaction between a "poison" in the gas stream and a catalyst active site which leaves the active site inert. Alkaline metals (such as sodium and potassium) are strong catalyst poisons. Oxides of alkaline metals, arsenic, lead, phosphorus, and chlorides of alkaline metals are weaker catalyst poisons.

Surface fouling

Surface fouling is a process where particulates deposit on the catalyst surface or pores, physically blocking the active sites. This is a major catalyst deactivation issue with high dust-SCR systems. It is important to select an appropriate catalyst configuration and pitch size (center-to-center distance between channels), and to provide uniform, even flow distribution at the catalyst and adequate catalyst cleaning (i.e., soot blower systems).

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Pore plugging and masking

Pore plugging and masking are catalyst deactivation processes resulting from the microscopic blocking of an active site caused by chemical or physical deposition within a catalyst pore. For example, when ammonia and SO_3 and H_2SO_4 are present, pore masking can result from the condensation of ammonium salts in the pore at lower temperatures. Another example is catalyst deactivation when exposed to fly ash high in sodium or calcium. When deposited in the pores, the sodium and/or calcium react with SO_3 in the gas phase causing pore plugging and masking.

Also, an undesirable effect of SCR catalysts is the catalytic oxidation of SO_2 (to SO_3). Once formed, SO_3 can react with excess ammonia exiting the catalyst (i.e., ammonia slip) and water to form ammonium salts downstream of the SCR. These by-product salts can form a fine aerosol and sticky deposits that can lead to corrosion, plugging of downstream equipment, and blinding of a downstream fabric filter.

Selective non-catalytic reduction (SNCR): SNCR is a post-combustion NO_x control technology. SNCR involves complex gas-phase reactions at high temperature, without the use of catalysts, between radicals produced by a nitrogen-containing reagent and NO to form nitrogen gas (N_2). SNCR is installed at hundreds of combustion sources including power boilers, industrial boilers, municipal and hazardous waste combustors, and other fuel-burning installations. The amount of NO_x reduction with SNCR depends on the specific application as well as site-specific operating conditions.

Relatively high temperatures within a limited range are required for the SNCR reactions to proceed productively. The appropriate temperature range, or temperature window, for SNCR is approximately 1,600°F to 2,000°F (870°C to 1,090°C). The amine-based reagent (generally ammonia or urea) is injected and rapidly decomposes by reaction with radicals (such as OH and O) to NH_2 . It is the amine radical, NH_2 , that actually causes the reduction of NO_x in SNCR.

The effectiveness of SNCR depends on many factors. The reagent (and products of decomposition) and NO_x must be well mixed and within the optimal temperature window for an ample amount of time. At temperatures below the optimal temperature window, reaction rates are low, resulting in low NO_x reduction and unreacted reagent (leading to unwanted ammonia emissions referred to as ammonia slip). At temperatures above the temperature window, the reagent oxidizes to form NO , increasing NO_x emissions. The specific temperature window depends on such things as the reagent used (ammonia or urea), the amount of mixing, residence time, and CO concentration. Mixing allows for better contact among reactants and creates more homogeneous conditions of temperature, flow, and concentration. Reaction times are finite, so reductions are more effective with ample

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residence time at the optimal temperature. Effective NO_x reduction requires excellent mixing combined with a minimum residence time of about a half a second. The presence of CO shifts the temperature window to lower temperatures and can reduce the effectiveness of SNCR.

In addition to temperature, amount of mixing, and residence time, the effectiveness of SNCR depends on such variables as the amount of reagent used, the inlet NO_x concentration, water concentration, and CO concentration. The chemical kinetics of the reduction reactions are such that the reaction rates are dependent on the inlet NO_x concentration; the higher the NO_x concentration, the more productive the NO_x reduction. Reagent usage is usually described in terms of a molar ratio (or Normalized Stoichiometric Ratio, NSR) of ammonia (or other reagent) to NO. Theoretically, 1 mole of NH_3 could remove 1 mole of NO. However, due to inhomogeneities and other conditions leading to inefficient reagent utilization, rarely is the theoretical removal efficiency realized. Experience under actual conditions using SNCR for various applications has shown a much lower NO_x reduction at an NSR of 1 (i.e., a NO reduction of about 50% is more common at an NSR of 1). Increasing reagent usage usually increases NO_x reduction. However, ammonia slip is an issue at the higher reagent usage rates. Also, CO competes with NH_3 for the OH radicals (that convert NH_3 to NH_2 which, in turn, reduces NO), negatively affecting the efficiency of NO_x reduction.

The most common SNCR reagents are aqueous ammonia 19% solution and urea solution. The 19% aqueous ammonia is popular since it is a less hazardous substance, as indicated by being less than the Risk Management Program (RMP) threshold (20%) for ammonia. Urea is available as a solution, usually 40% to 50%, by weight, and as a pure dry product. Both ammonia and urea are manufactured from natural gas, so the costs of these reagents follow the cost of natural gas.

The performance of an SNCR system is quite variable and depends on the factors mentioned above as well as, for example, the exhaust makeup (e.g., moisture content), the operating conditions, the location(s) of reagent injection, and the number of injectors. Also, performance, as in % reduction, is not a very satisfactory indicator since it greatly depends on the uncontrolled NO_x level.

SNCR can be an effective NO_x control technology. However, as with every technology, there are operational and environmental issues. Some issues that have occurred during testing and operation of SNCR include:

- ammonia slip;
- ammonium salt formation (leading to downstream buildup plugging and baghouse fouling, and fine particulate emissions and visible plumes);
- CO emissions;

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- N₂O emissions (a greenhouse gas) (N₂O emissions are more likely when using urea as a reagent); and
- poor actual NO_x control.

Of course, more ammonia slip is expected as the injection rate of reagent increases, if there is less mixing, or if the temperature is below the optimum operating window. Ammonium salt formation, such as ammonium bisulfate and ammonium bisulfite, depends on the amount of unreacted ammonia as well as the amount of SO₃/H₂SO₄ resulting from sulfur in the exhaust. Also, ammonia slip can react with HCl in the exhaust to form ammonium chloride.

Combustion Control; The formation of thermal and fuel NO_x in a combustion system can be controlled to some extent by modification of combustion conditions. Low-NO_x burners are designed to incorporate NO_x control combustion techniques. Staging the combustion air produces a fuel-rich combustion zone where NO_x emissions are reduced due to the substoichiometric combustion conditions. The remainder of the air is injected downstream where combustion is completed. The NO_x in this downstream combustion zone is reduced due to reduced flame temperature. Air staging reduces both thermal NO_x and fuel NO_x.

FEASIBILITY AND EVALUATION OF CONTROL OPTIONS

Selective Catalytic Reduction (SCR): There are no MHF systems that use SCR. In fact, SCR is not currently commercially applied to any lignite coal-based process in the U.S., either combustion or gasification. The processes present challenges that have not yet been overcome. The discussion below presents the technical issues.

Studies have shown that SCR catalyst deactivation is a very real concern using lignite and other low-rank coals. When low-rank coal (subbituminous or lignite) is combusted, organically bound alkali and alkaline earth metals (Na, K, Ca, Mg) can vaporize and condense; some portion of these elements forms submicron particles from nucleation of the vapors as the gases cool. The submicron ash particles also form sulfates as the gas cools. In the processes tested at the pilot scale, all of which are coal-fired power plants, the negative effect on catalyst efficiency due to the alkali and alkaline earth elements was clear.

In one study of the effects of low-rank flue gas on a slipstream SCR catalyst, the pressure drop across the catalyst was most significant for the coal-fired plant. There were significant accumulations of ash on the catalyst, on both the macroscopic and microscopic levels. On the macroscopic level, ash accumulations plugged the entrance and exits of the catalyst sections. On the microscopic level, ash materials filled catalyst pores and, in many cases, completely masked the pores within four months.

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The deposits on the surfaces and within the pores mainly consisted of sulfated alkali and alkaline-earth elements. The formation mechanism of the sulfate materials involves the formation of very small particles rich in alkali and alkaline-earth elements in the flame, the transport of the particles to the surface of the catalyst, and the reactions with SO₂/SO₃ to form sulfates.

The author of this study concluded that the "most significant problem that limits the successful application of SCR catalysts to lignite coal is the formation of low-temperature sodium-calcium-magnesium sulfates, phosphates and possible carbonates that will form on the surfaces of the catalyst and the carryover of deposits that will plug the catalyst openings, resulting in increased pressure drop and decreased efficiency."

These same concerns, especially catalyst deactivation by sodium sulfate poisoning, would apply to SCR on subbituminous and coal-based MHF systems. Since no SCR systems are used on MHF plants or on coal-fired combustion sources, there are no available data to allay these concerns. Because there is no experience with SCR on this application, SCR manufacturers perceive significant risks in designing and guaranteeing a first-of-a-kind system with unknown performance history. These technical and performance concerns demonstrate that SCR is not technically feasible. Therefore, SCR is eliminated from applicability to the MHF AC plant at this time.

Selective Non-Catalytic Reduction (SNCR): SNCR is a technically feasible NO_x emissions control option. For this application, when used in combination with combustion controls, additional NO_x control may be achievable. The effectiveness of an SNCR system is site specific. For example, the ability to control the afterburner exhaust temperature (within some range) and the constant-temperature environment between the afterburner and the inlet to the heat-recovery steam generator are conducive to the design of an effective SNCR system, but the high water vapor and the presence of CO in the low-rank MHF system would most likely limit the effectiveness of SNCR relative to a coal-fired combustion system. In addition, the temperature of the flue gas may not always be optimal for SNCR. Potential consequences of this particular application are impaired NO_x reduction resulting from ammonia taking chemical pathways other than NO_x reduction and the narrowing of the temperature window for effective NO_x reduction with acceptable ammonia slip.

Environmental Impacts

The use of SNCR will result in some excess ammonia emissions, or ammonia slip. The levels of ammonia slip are expected to be at or below 10 ppmvd.

Storage of ammonia solution on-site can create the potential for accidents and an ammonia release.

Energy Impacts

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Operation of an SNCR system requires some power consumption for the reagent pumping and injecting systems.

Economic Impacts

The annual operating costs, especially the cost of the reagent, are the controlling costs for an SNCR system. Operational costs, such as bag life, may be affected by SNCR, but are not expected to be significant.

Combustion Modifications: Low-NO_x burners are technically feasible controls for the afterburner and are the most effective control techniques available.

Environmental and Energy Impacts

Some supplemental fuel will be burned to provide a pilot flame and maintain adequate flame temperature to ensure complete oxidation of the by-product/waste gas. Burning additional fuel will enable the high destruction efficiencies for CO and VOC, but will also result in a small increase of emissions due to the higher firing rate.

Economic Impacts

The afterburner is part of the process design, so no economic evaluation is necessary.

BACT

Low-NO_x burners within the afterburner and SNCR downstream of the afterburner will be used to control NO_x emissions to a level of 77.3 lb/hr (12-mo rolling) in the exhaust gas, with an ammonia slip concentration of 10 ppmvd or less. This is the first MHF for AC production that is proposing the combination of combustion controls and SNCR.

SO₂ EMISSIONS

SO₂ is produced in the afterburner as a result of the oxidation of the sulfur in the fuel. As described in the process description, the fuel being burned in the afterburner is the by-product/waste gas that exits the MHFs, along with a small amount of natural gas to provide a pilot flame and adequate flame temperature. Unlike coal combustion in a conventional utility boiler, all of the sulfur in the coal that is fed to the MHFs is not oxidized to SO₂. Rather, during the activation process, some of the sulfur from the coal goes into the product (AC), and the balance of the sulfur is in the by-

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product/waste gas that is burned in the afterburner. There is also a trace amount of sulfur in natural gas that is burned in the afterburner which will be oxidized.

POTENTIAL CONTROL OPTIONS

By far, the most common, commercially-demonstrated type of SO₂ control from combustion equipment is flue gas desulfurization (FGD) systems. FGD systems (also called scrubbers) are mature post-combustion control technologies that are efficient and reliable. FGD systems rely on chemical reactions within the control equipment to remove SO₂ from combustion flue gas streams. There are a variety of FGD systems, including wet scrubbers and dry scrubbers.

In general, the wet scrubbing process uses either lime (calcium oxide, CaO) or limestone slurry as the scrubbing liquid. The slurry is prepared on-site and sprayed into the absorber to react with the SO₂. Calcium sulfite (CaSO₃) and calcium sulfate (CaSO₄) solids are formed in the scrubber and are removed as a wet solid waste by-product. The waste by-product must be dewatered prior to disposal. Solid waste by-products from wet lime scrubbing are typically managed in dewatering ponds and landfills.

The dry scrubbing process involves the introduction of dry or hydrated lime slurry into a reaction tower where it reacts with SO₂ in the flue gas to form CaSO₃ and CaSO₄ solids. Dry scrubbing includes a separate lime preparation system and reaction tower. Unlike wet scrubbers, the flue gas leaving the absorber is not saturated, and as a result produces a dry product that is removed with the ash in the particulate control equipment. Therefore, dry scrubbers must be located upstream of the particulate control device (usually a baghouse) to remove the reaction products.

A proven type of dry scrubber is a spray dryer absorber (SDA). The reagent is prepared by combining the lime and water in a "slaker" so that the lime and water react to form Ca(OH)₂. Excess water is added to control the slurry concentration to the desired range, typically 20% solids. Slurry is discharged from the slaker into a storage tank equipped with an agitator to keep the Ca(OH)₂ in suspension until it is pumped to the atomizer nozzle assemblies.

The lime slurry is atomized into the hot flue gas to create a fine droplet spray that produces the surface area necessary to contact the SO₂ with the lime so that it can react to produce CaSO₃ and CaSO₄. As the hot flue gas mixes with the atomized slurry, water from the slurry is evaporated. The dry waste product consists of fly ash, calcium/sulfur reaction products, excess lime, and lime inert materials that are collected in the downstream particulate control equipment. The collected waste product can be disposed or recycled to the slurry. In some cases, it can be sold as a by-product.

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FEASIBILITY AND EVALUATION OF CONTROL OPTIONS

Both wet scrubbers and dry scrubbers are technically feasible control technologies. There are a number of advantages of the SDA system (dry scrubber), particularly for this application. In general SDAs involve simpler designs than other FGD systems. For example, the receipt and handling equipment associated with preparing the reagent for an SDA is much less complex than that required for a wet scrubber.

Environmental Impacts

From an environmental perspective, an SDA has several favorable aspects compared to other types of FGD systems. Water requirements, for example, are much less for an SDA than a wet scrubber. In addition, a wet FGD system produces a wastewater stream that must be treated and discharged. A wet FGD system also can result in higher levels of PM emissions. Because wet FGD systems must be located downstream of the unit's particulate control device, dissolved solids from the wet FGD system are emitted with the wet FGD moisture plume. In addition, any remaining SO₃ in the flue gas could react with moisture in the wet FGD to generate H₂SO₄, which is a condensable particulate.

Energy Impacts

Although all types of FGD systems require some electricity, operation of an SDA requires significantly less power than a wet system. For a wet FGD, electric motor-driven equipment is needed to run the slurry feed pumps, recirculating pumps, waste dewatering pumps, and reagent preparation equipment and fans.

Economic Impacts

It has been well-documented through numerous analyses that wet FGD systems are more costly than dry ones, such as an SDA.

BACT

The method of SO₂ control proposed as BACT for the waste gas treatment is an SDA followed by a baghouse. This is the type of FGD system (with a control efficiency of 90%) proposed for the recently-permitted AC production line at the NORIT Americas, Marshall, Texas facility. For this application, the design control efficiency is 92% SO₂ removal, resulting in a maximum emission rate of 101.2 lb/hr, based on a 30-day rolling average. An SDA is a mature, proven, reliable SO₂ control technology and has favorable environmental, energy, and economic impacts compared to other types of FGD systems. Compliance with the SO₂ emission limit will be demonstrated using a CEMS.

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H₂SO₄ EMISSIONS

BACT must be evaluated for certain "acid gases" (H₂SO₄, in particular) in the flue gas. Acid gases essentially comprise the inorganic portion of the condensable PM emissions in the exhaust gases. Therefore, BACT for acid gas emissions will also serve as BACT for condensable PM emissions.

Most of the sulfur in the coal is converted to SO₂ as a product of the combustion. However, a small portion of the SO₂ is oxidized to sulfur trioxide (SO₃) in the MHF or afterburner. The amount of H₂SO₄ formed is dependent upon the amount of SO₃ and water vapor present and the temperature of the flue gas. For this analysis, RREP assumes that 1% of the SO₂ is oxidized to SO₃, and 100% of the SO₃ is converted to H₂SO₄.

Potential Control Options

Control options for H₂SO₄ also include wet and dry scrubbing, followed by a fabric filter baghouse.

Feasibility and Evaluation of Control Options

Like SO₂, both wet and dry scrubbing are technically feasible control options. The environmental, energy, and economic impacts of the two types of scrubbers are described in the section of this Preliminary Determination Summary that discusses BACT for SO₂.

BACT

Assuming that the SDA-based control efficiency that applies to SO₂ emissions – 92% – also applies to H₂SO₄ emissions and the maximum uncontrolled H₂SO₄ emission rate is 19.4 lb/hr (assuming coal S content of 0.9%) for each production line, controlled H₂SO₄ emissions of 1.55 lb/hr should be achievable. 1.55 lb/hr is the BACT limit on a 3-hr average basis. These control technologies and associated emission limit will also serve as BACT for condensable PM emissions.

PM/PM₁₀ EMISSIONS

Particulate matter (PM) is the general term for a mixture of solid particles and liquid droplets (aerosols) present in the flue gas stream. Particles that are equal to or smaller than 10 microns in diameter are referenced as PM₁₀. PM/PM₁₀ will be emitted from the process production line stack as a result of the ash and other inorganic and organic constituents contained in the flue gas exhaust. PM can be classified as either "filterable" or "condensable." Basically, the filterable portion is composed of solids that can be captured on a filter media. The condensable portion is defined by EPA as material that is a gas at the stack temperature of the sampling location that condenses into a

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solid or liquid within a few seconds of leaving the stack. Acid gases such as H_2SO_4 , HCl, and HF and some organic compounds are examples of condensable PM. The terms “filterable” and “condensable” describe how the particulate matter is captured in the sampling train. Filterable PM is captured in the filtering media located in the front-half of the sampling train. Condensable PM passes through the filter media and is captured in the impinger solution located in the back-half of the sampling train.

This BACT analysis addresses control technologies primarily designed to capture filterable PM. These technologies may also remove condensable PM. For example, some sulfate compounds will be removed from the flue gas as the gas passes through the filter cake in a fabric filter baghouse. Similarly, condensable PM may be removed in a source’s SO_2 control system.

Potential Control Options

Filterable PM emissions can be controlled using well-established add-on abatement technologies. The two primary types of technically feasible add-on equipment are fabric filters (sometimes referred to as baghouses) and electrostatic precipitators (ESPs). Fabric filters and ESPs are approximately equivalent in their PM/PM_{10} emissions removal efficiency. However, ESPs are more sensitive to variations in ash and by-product/waste gas quality, and PM removal performance can vary with the characteristics of the by-product/waste gas. In general, fabric filters have better removal efficiencies for the smaller size category of PM (i.e., PM_{10}).

A fabric filter baghouse removes particles and condensed materials from the flue gas by drawing dust-laden flue gas through a bank of fabric filter bags or tubes suspended in a large compartment. Particles are captured by inertial impaction, direct interception (sieving), and diffusion. Most of the particles are captured by impaction and sieving on already collected particles which are present as a dust layer (“filter cake”) on the dirty side of the bag. Electrostatic attraction can also contribute to particle capture in the dust layer and in the fabric itself. Periodically, the cake is removed through physical mechanisms (e.g., blast of compressed air from the clean side of the bag, mechanical shaking of the bags), which cause the cake to fall into a collection hopper. Fabric filters are capable of collection efficiencies greater than 99% when appropriately sized and operated, although some exhaust characteristics, such as a high moisture content, can pose challenges.

The ESP collects PM based on the mutual attraction between particles of one electrical charge and a collecting electrode of opposite polarity. The most common type of industrial ESP is the single-stage unit. In this unit, discharge (wire) electrodes are placed between grounded (parallel plate) electrodes spaced 8-12 inches apart, resulting in simultaneous charging and migration to, and collection on, the plates. Particles collected on the plates are periodically removed by mechanical rapping.

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The effectiveness of an ESP is dependent on a number of gas stream and particle characteristics. One important characteristic is the particle size, which determines the mechanism by which charging occurs. Particle charging is least effective in the size range of 0.1 to 1.0 μm . Another parameter that impacts effectiveness in an ESP is particle resistivity. Particle resistivity determines how effectively a particle retains its charge and is affected by particle composition and surface deposits and by gas stream temperature and moisture content. Finally, ESP performance is affected by both gas velocity through the collector and by the total gas flow.

Feasibility and Evaluation of Control Options

Both fabric filter baghouses and ESPs are technically feasible control options.

Environmental Impacts

There are no environmental considerations that apply to the proposed configuration.

Energy Impacts

Operation of a cyclone and baghouse will entail some minor level of power consumption to operate a fan to overcome the pressure drop through the PM collection equipment. However, this energy requirement would not preclude the proposed configuration for the control of PM/PM₁₀ emissions for the project.

Economic Impacts

The proposed cyclone, afterburner and baghouse for control of PM/PM₁₀ emissions will achieve the most stringent PM/PM₁₀ emissions control (i.e., the lowest PM/PM₁₀ emission rate); therefore, no economic evaluation of alternative PM/PM₁₀ emissions control systems is necessary.

BACT

Based on the factors discussed above, a fabric filter baghouse has been selected as BACT for MHF PM/PM₁₀ (filterable) emissions. The effectiveness of this control technology will be enhanced with the use of a mechanical collector or cyclone located just downstream of each MHF and upstream of the fabric filter baghouse. The resulting BACT-based emission limitation for PM/PM₁₀ (filterable) emissions is 10.2 lb/hr, based on an outlet grain loading of 0.015 gr/scfd for the fabric filter baghouse. This grain loading value is equivalent to that used for the NORIT Americas baghouse-controlled PM/PM₁₀ emissions from the MHF. This is the only other BACT-based PM/PM₁₀

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emission limit found in the literature for carbon activation process MHF emissions.

The afterburner (VOC and CO emissions control) and SDA (SO₂ emissions control) will provide a measure of control for condensable PM emissions from the MHFs. Therefore a total PM/PM₁₀ (filterable plus condensable) emission rate of 48.3 lb/hr using a cyclone/afterburner/baghouse combination is BACT for the MHF PM/PM₁₀ emissions. Compliance with the PM/PM₁₀ emission limit will be demonstrated using EPA Method 5 (for the filterable fraction) and Method 202 (for the condensable fraction).

BACT ANALYSIS FOR MATERIAL HANDLING EQUIPMENT – PM/PM₁₀ EMISSIONS

Particulate matter emissions are generated as raw materials (coal and lime), waste materials (ash), and product (AC) are moved and transferred from one point to the next through the proposed facility. No uncovered storage piles are located at the proposed facility. All material conveyors/transfer points are fully enclosed.

Transfer points at the site include:

- Truck loading and unloading;
- Rail loading;
- Conveyor-to-conveyor drop; and
- Material transfers from/to conveyors, hoppers or bins, and storage silos.

Particulate emissions will be generated as the material drops through the transfer point. The potential to generate emissions at a transfer point is a function of the rate at which the material flows through the transfer point, exposure to the wind (if applicable), and the material's particle size and moisture content.

The principle techniques for PM₁₀ control associated with material handling are:

- Totally enclosed conveyors and transfer points;
- Enclosed transfer points with fabric filters dust collectors; and
- Spray dust suppression systems.

Locating transfer points within an enclosed building or having totally enclosed process equipment will significantly reduce or eliminate particulate emissions. Dust generated will be contained, and, depending upon air movement and particle size, dust will either settle out within the enclosure or be emitted from the enclosure's exhaust system. Emission points equipped with a dust collection device (i.e., baghouse, bin vent filter, or blower filter) can reduce particulate emissions by 99.9% or greater on a consistent basis.

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RREP proposes to use a combination of enclosures and dust collectors, including baghouses, bin vent filters and blower filters, to control particulate matter emissions from material handling transfer points. All dust collectors will be designed with a maximum outlet emission rate of 0.005 gr/dscf. It is estimated that the proposed combination of control systems will reduce potential particulate emissions from the transfer points by approximately 99.9%. There are no environmental, energy, or economic considerations that would preclude the use of this control technique.

BACT ANALYSIS FOR HAUL ROADS

Fugitive emissions are generated by trucks hauling process materials on plant haul roads. When a vehicle travels an unpaved road, the force the wheels exert on the road pulverizes the surface material. The wheels then lift these particles, which become entrained in air currents flowing above the surface, resulting in fugitive dust. Similarly, but to a much lesser degree, particulate emissions occur on paved surfaces.

For the proposed project, all haul roads at the facility will be paved. This represents BACT for controlling fugitive dust.

BACT ANALYSIS FOR COOLING TOWERS

The two proposed two-cell wet mechanical draft cooling towers will support operations of the steam turbine generators for the two production lines. The cooling tower process involves direct contact cooling between air and the cooling water. As the air passes the water, some liquid droplets can become entrained in the air stream exiting the cooling tower, which is referred to as drift. These aqueous aerosol "drift" particles evaporate in the atmosphere to leave crystallized solid particles that are considered PM₁₀ emissions.

The only feasible control technology to reduce PM₁₀ emissions associated with drift aerosols from wet cooling towers is the use of drift elimination systems. The drift rates from these systems typically range from 0.0005% to 0.005% (of total circulating water), depending on the size and type of cooling tower. For the proposed project, the design cooling tower drift – 0.005% – is within this range of drift values

A drift elimination system is the only technically feasible control technology identified for the proposed cooling towers, and this technology historically has been selected as BACT for other projects. Therefore, a drift elimination system is selected as BACT for the proposed cooling towers. The proposed cooling towers will be designed with drift elimination systems to minimize short-term PM and PM₁₀ emissions to 1.88 lb/hr and 0.41 lb/hr, respectively.

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BACT ANALYSIS FOR EMERGENCY FIRE WATER PUMP (DIESEL ENGINE)

The 300-hp diesel-fired fire water pump will only be used in case of an emergency and for periodic (once-a-month) readiness testing. It is expected that the fire water pump will be operated no more than 100 hours per year. Limiting the annual operation of the pump to a maximum of 100 hours per year will significantly reduce potential annual emissions of NO_x , PM/PM_{10} , SO_2 , CO and VOC from this source. This pump engine will be certified by the manufacturer to comply with applicable U.S. EPA standards, depending on the model year of the actual engine installed. Additional post-combustion emission control systems (assuming they are technically feasible) would be expensive and provide only minimal incremental reductions in potential annual emissions. Therefore, manufacturer-certified engine design, low-sulfur diesel fuel, and an annual operating limit of 100 hours per year comprise BACT for the emergency fire water pump.

B. ANALYSIS OF EXISTING AIR QUALITY

PSD regulations require an analysis of existing air quality for those pollutant emissions that increase significantly from a proposed major new source or modification. PM_{10} , NO_x , CO , SO_2 , and VOC are pollutants of concern in this case. Modeling was conducted following the protocol approved on May 24, 2007.

Screening dispersion modeling of PM_{10} emissions from the proposed project indicates the 24-hour average maximum off-site ground level concentration is $9.32 \mu\text{g}/\text{m}^3$. This concentration exceeds the modeling significance impact level of $5 \mu\text{g}/\text{m}^3$. Since the maximum-modeled PM_{10} impact exceeds the applicable modeling significant impact level, a full impact analysis is required for PM_{10} . A full impact analysis shows that the background concentration is $59 \mu\text{g}/\text{m}^3$. When combined with the maximum modeled concentration of $16.53 \mu\text{g}/\text{m}^3$, the combined impact is found to be $75.53 \mu\text{g}/\text{m}^3$. This concentration does not exceed the NAAQS standard of $150 \mu\text{g}/\text{m}^3$.

The 24-hour average maximum off-site ground level concentration for PM_{10} does not exceed the preconstruction monitoring threshold of $10 \mu\text{g}/\text{m}^3$. Therefore, no preconstruction monitoring is required.

Screening dispersion modeling of NO_x emissions from the proposed project indicates the annual average maximum off-site ground level concentration is $2.07 \mu\text{g}/\text{m}^3$. This concentration exceeds the modeling significance impact level of $1 \mu\text{g}/\text{m}^3$. Since the maximum-modeled NO_2 impact exceeds the applicable modeling significant impact level, a full impact analysis is required for NO_2 . A full impact analysis shows that the background concentration is $9.41 \mu\text{g}/\text{m}^3$. When combined with the maximum modeled concentration of $3.90 \mu\text{g}/\text{m}^3$, the combined impact is found to be $13.31 \mu\text{g}/\text{m}^3$. This concentration does not exceed the NAAQS standard of $100 \mu\text{g}/\text{m}^3$.

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The annual average maximum off-site ground level concentration for NO₂ does not exceed the preconstruction monitoring threshold of 14 µg/m³. Therefore, no preconstruction monitoring is required.

Screening dispersion modeling of CO emissions from the proposed project indicates the 1-hour average and 8-hour average maximum off-site ground level concentrations are 22.67 µg/m³ and 14.57 µg/m³, respectively. These concentrations do not exceed the modeling significance impact levels of 2,000 µg/m³ and 500 µg/m³, respectively. Since the maximum-modeled CO impacts do not exceed the applicable modeling significant impact levels, a full impact analysis is not required for CO.

The 8-hour average maximum off-site ground level concentration for CO does not exceed the preconstruction monitoring threshold of 575 µg/m³. Therefore, no preconstruction monitoring is required.

Screening dispersion modeling of SO₂ emissions from the proposed project indicates the 3-hour, 24-hour, and annual average maximum off-site ground level concentrations are 49.68 µg/m³, 18.48 µg/m³, and 2.72 µg/m³, respectively. These concentrations exceed the modeling significance impact levels of 25 µg/m³ for the 3-hour average, 5 µg/m³ for the 24-hour average, and 1 µg/m³ for the annual average. Since the maximum-modeled SO₂ impacts exceed the applicable modeling significant impact levels, a full impact analysis is required for SO₂. A full impact analysis shows that the background concentrations for the 3-hour, 24-hour, and annual averages are 70.69 µg/m³, 20.94 µg/m³, and 7.85 µg/m³, respectively. When combined with the maximum modeled concentrations of 237.76 µg/m³ for the 3-hour average, 43.54 µg/m³ for the 24-hour average, and 4.43 µg/m³ for the annual average, the combined impact is found to be 308.45 µg/m³, 64.48 µg/m³, and 12.28 µg/m³, respectively. These concentrations do not exceed the NAAQS standards of 1,300 µg/m³, 365 µg/m³, and 80 µg/m³, respectively.

The 24-hour average maximum off-site ground level concentration for SO₂ exceeds the preconstruction monitoring threshold of 13 µg/m³. In lieu of SO₂ preconstruction monitoring, RREP used data from LDEQ's existing Shreveport monitoring station as background concentrations for refined modeling. This approach was approved by the Office of Environmental Assessment, Air Quality Assessment Division.

C. NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) ANALYSIS

Because AERMOD modeling analyses indicated concentrations of CO would be below its PSD ambient significant impact level, refined NAAQS modeling for this pollutant was not required.

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Because the maximum modeled SO₂, NO₂, and PM₁₀ impacts exceeded their respective PSD significant impact levels, refined NAAQS modeling was required. Refined modeling demonstrates NAAQS compliance for SO₂, NO₂, and PM₁₀.

D. PSD INCREMENT ANALYSIS

PSD increment modeling was conducted for PM₁₀ (24-hour averaging period), SO₂ (3-hour, 24-hour and annual averaging periods), and NO₂ (annual averaging period). The modeling predicted concentrations will be compliant with PSD increments. PSD limits were not exceeded.

E. SOURCE RELATED GROWTH IMPACTS

Operation of this facility is not expected to have any significant effect on residential growth or industrial/commercial development in the area of the facility. No significant net change in employment, population, or housing will be associated with the project. As a result, there will not be any significant increases in pollutant emissions indirectly associated with Red River Environmental Products, LLC's proposal. Secondary growth effects will include temporary construction related jobs and approximately seventy-five permanent jobs.

F. SOILS, VEGETATION, AND VISIBILITY IMPACTS

There will be no significant impact on area soils, vegetation, or visibility.

G. CLASS I AREA IMPACTS

A Class I area impact analysis was performed to determine the affect of this proposed project on the Caney Creek Wilderness Area, which is the nearest Class I area. This Class I area is located approximately 269 kilometers from the Red River Environmental Products, LLC Facility. Modeling was conducted following the approved protocol, which incorporated comments made by the FLM.

The Class I area impact analysis included air quality impact, deposition impact, and visibility impairment analyses. The results of these analyses showed an insignificant impact on air quality. None of the modeled pollutants exceeded their respective significance impact levels. The deposition flux was estimated to be below significant threshold levels for both nitrogen and sulfur. The visibility impairment was modeled to be less than five (5) percent in all 24-hour periods. As a result of this analysis, there was no predicted adverse impact on air quality or visibility and no adverse impact as a result of deposition.

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H. TOXIC IMPACT

The selection of control technology based on the BACT analysis included consideration of control of toxic emissions. None of the predicted toxic air pollutant (TAPs) impacts are above their applicable Ambient Air Standards (AAS) established by LAC 33:III. Chapter 51.

V. CONCLUSION

The Air Permits Division has made a preliminary determination to approve the construction of the Red River Environmental Products, LLC, activated carbon (AC) manufacturing facility, to be located near Armistead, Red River Parish, Louisiana, subject to the attached specific and general conditions. In the event of a discrepancy in the provisions found in the application and those in the Preliminary Determination Summary, the Preliminary Determination Summary shall prevail.

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1. The permittee is authorized to operate in conformity with the specifications submitted to the Louisiana Department of Environmental Quality (LDEQ) as analyzed in LDEQ's document entitled "Preliminary Determination Summary" dated November 21, 2007, and subject to the following emissions limitations and other specified conditions. Specifications submitted are contained in the application and Emission Inventory Questionnaire dated July 30, 2007, along with supplemental information received August 20, 2007, October 3, 2007, and November 1, 2007.
2. Conduct a performance/emissions test: Due within 180 days after initial startup (or restart-up after modification), or within 60 days after achieving normal production rate or end of the shakedown period, whichever is earliest. The stack test's purpose is to demonstrate compliance with the emission limits of this permit. Test methods and procedures shall be in accordance with New Source Performance Standards, 40 CFR 60, Appendix A, Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources, and Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources. Use alternate stack test methods only with the prior approval of the Office of Environmental Assessment, Environmental Technology Division, Engineering Services. As required by LAC 33:III.913, provide necessary sampling ports in stacks or ducts and such other safe and proper sampling and testing facilities for proper determination of the emission limits. For pollutants requiring a stack test, the result of the stack test will be the average value of the runs conducted for the test.
3. Operate NOx continuous monitoring systems and record data during all times that the pollutant-specific emissions unit is operating, except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments). Do not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities for data averages or calculations, or for fulfilling a minimum data availability requirement, if applicable. Use all the data collected during all other periods in assessing the operation of the control device and associated control system.

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MAXIMUM ALLOWABLE EMISSIONS RATES

ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 1	EP - 101 Production Line No. 1	lb/hr	57.96	121.44	92.76	45.12	43.08	1.86
		TPY	209.7	319.10	338.40	164.80	157.30	4.89
EQT 2	EP - 201 Production Line No. 2	lb/hr	57.96	121.44	92.76	45.12	43.08	1.86
		TPY	209.7	319.10	338.40	164.80	157.30	4.89
EQT 3	EP - 106 Cooling Tower No. 1	lb/hr	0.41	-	-	-	-	-
		TPY	1.48	-	-	-	-	-
EQT 14	EP-107 MHF Product Blower	lb/hr	0.02	-	-	-	-	-
		TPY	0.05	-	-	-	-	-
EQT 36	GAC Screening and Transfer	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 37	Mill Area	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 38	Product Day Silo 1A Bin Vent	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 39	Product Day Silo 1B Bin Vent	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 40	Product Day Silo 1C Bin Vent	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 41	GAC Rail Storage Transfer	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 42	Rail Product Storage Silo 1A receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 43	Rail Product Storage Silo 1B Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 44	Rail Product Storage Silo 1C Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 45	Rail Product Storage Silo 1D Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 46	Rail Product Storage Silo 1E Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 47	Rail Product Storage Silo 1F Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 48	Rail Product Storage Silo 1G Receiver	lb/hr	0.02	-	-	-	-	-
		TPY	0.04	-	-	-	-	-
EQT 49	Rail Product Storage Silo 1A Bin Vent	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-
EQT 50	Rail Product Storage Silo 1B Bin Vent	lb/hr	<0.01	-	-	-	-	-
		TPY	<0.01	-	-	-	-	-

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ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 51	Rail Product Storage Silo 1C Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 54	Rail Product Storage Silo Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 53	Rail Product Storage Silo 1E Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 54	Rail Product Storage Silo 1F Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 55	Rail Product Storage Silo 1G Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 56	Railcar Loading from Storage Silo 1A	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 57	Railcar Loading from Storage Silo 1B	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 58	Railcar Loading from Storage Silo 1C	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 59	Railcar Loading from Storage Silo 1D	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 60	Railcar Loading from Storage Silo 1E	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 61	Railcar Loading from Storage Silo 1F	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 62	Railcar Loading from Storage Silo 1G	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 63	GAC Truck Storage Transfer	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 64	Truck Product Storage Silo 1A Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 65	Truck Product Storage Silo 1B Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 66	Truck Product Storage Silo 1C Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 67	Truck Product Storage Silo 1D Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 68	Truck Product Storage Silo 1E Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 69	Truck Product Storage Silo 1F Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-

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ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 70	Truck Product Storage Silo 1G Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 71	Truck Product Storage Silo 1A Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 72	Truck Product Storage Silo 1B Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 73	Truck Product Storage Silo 1C Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 74	Truck Product Storage Silo 1D Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 75	Truck Product Storage Silo 1E Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 76	Truck Product Storage Silo 1F Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 77	Truck Product Storage Silo 1G Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 78	Truck Loading From Storage Silo 1A	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 79	Truck Loading From Storage Silo 1B	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 80	Truck Loading From Storage Silo 1C	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 81	Truck Loading from Storage silo 1D	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 82	Truck Loading from Storage Silo 1E	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 83	Truck Loading from Storage Silo 1F	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 84	Truck Loading form Storage Silo 1G	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 85	Coal Day Silo Transfers	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 86	Recycle Solids Blower	lb/hr TPY	<0.01 0.02	-	-	-	-	-
EQT 87	Recycle Solids Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 88	Lime Storage Silo Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 89	Solids Storage Silo Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-

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ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 90	Solids Blower	lb/hr TPY	<0.01 0.02	-	-	-	-	-
EQT 91	Truck Loading from Solids Silo	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 92	MHF Product Mechanical Conveyance	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 93	Lime Storage Silo Receiver	lb/hr TPY	0.06 <0.01	-	-	-	-	-
EQT 94	Screened MHF Product Blower	lb/hr TPY	<0.01 0.01	-	-	-	-	-
EQT 95	Cooling Tower (2-cell) No. 2	lb/hr TPY	0.41 1.48	-	-	-	-	-
EQT 96	MHF Product Blower	lb/hr TPY	0.02 0.05	-	-	-	-	-
EQT 97	GAC Screening and Transfer	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 98	Mill Area	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 99	Product Day Silo 2A Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 100	Product Day Silo 2B Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 101	Product Day Silo 2C Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 102	GAC Rail Storage Transfer	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 103	Rail Product Storage Silo 2A Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 104	Rail Product Storage Silo 2B Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 105	Rail Product Storage Silo 2C Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 106	Rail Product Storage Silo 2D Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 107	Rail Product Storage Silo 2E Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 108	Rail Product Storage Silo 2F Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 109	Rail Product Storage Silo 2G Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-

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ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 110	Rail Product Storage Silo 2A Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 111	Rail Product Storage Silo 2B Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 112	Rail Product Storage Silo 2C Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 113	Rail Product Storage Silo 2D Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 114	Rail Product Storage Silo 2E Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 115	Rail Product Storage Silo 2F Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 116	Rail Product Storage Silo 2G Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 117	Railcar Loading from Storage Silo 2A	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 118	Railcar Loading from Storage Silo 2B	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 119	Railcar Loading from Storage Silo 2C	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 120	Railcar Loading from Storage Silo 2D	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 121	Railcar Loading from Storage Silo 2E	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 122	Railcar Loading from Storage Silo 2F	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 123	Railcar Loading form Storage Silo 2G	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 124	GAC Truck Storage Transfer	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 125	Truck Product Storage Silo 2A Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 126	Truck Product Storage Silo 2B Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 127	Truck Product Storage Silo 2C Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 128	Truck Product Storage Silo 2D Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 129	Truck Product Storage Silo 2E Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-

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ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 130	Truck Product Storage Silo 2F Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 131	Truck Product Storage Silo 2G Receiver	lb/hr TPY	0.02 0.04	-	-	-	-	-
EQT 132	Truck Product Storage Silo 2A Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 134	Truck Product Storage Silo 2C Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 135	Truck Product Storage Silo 2B Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 136	Truck Product Storage Silo 2D Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 137	Truck Product Storage Silo 2E Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 138	Truck Product Storage Silo 2F Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 139	Truck Product Storage Silo 2G Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 140	Truck Loading from Storage Silo 2A	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 141	Truck Loading from Storage Silo 2B	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 142	Truck Loading from Storage Silo 2C	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 143	Truck Loading from Storage Silo 2D	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 144	Truck Loading from Storage Silo 2E	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 145	Truck Loading from Storage Silo 2F	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 146	Truck Loading from Storage Silo 2G	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 147	Coal day Silo Transfers	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 148	Recycle Solids Blower	lb/hr TPY	<0.01 0.02	-	-	-	-	-
EQT 149	Recycle Solids Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-

SPECIFIC CONDITIONS

RED RIVER ENVIRONMENTAL PRODUCTS, LLC
AGENCY INTEREST NO.: 152139
ARMISTEAD, RED RIVER PARISH, LOUISIANA
PSD-LA-727

ID No.	Description		PM ₁₀	SO ₂	NO _x	CO	VOC	H ₂ SO ₄
EQT 150	Lime Storage Silo Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 151	Solids Storage Silo Bin Vent	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 152	Solids Blower	lb/hr TPY	<0.01 0.02	-	-	-	-	-
EQT 153	Truck Loading from Solids Silo	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 154	MHF Product Mechanical Conveyance	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 155	Lime Storage Receiver	lb/hr TPY	0.06 <0.01	-	-	-	-	-
EQT 156	Screened MHF Product Blower	lb/hr TPY	<0.01 0.01	-	-	-	-	-
EQT 157	Coal Unloading Area	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 158	Coal Crusher Area	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 159	Coal Storage	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 160	EP-157 AC Hg Adsorption System	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 161	EP-257 AC Hg Adsorption System	lb/hr TPY	<0.01 <0.01	-	-	-	-	-
EQT 162	EP-904 Emergency Fire Water Pump	lb/hr TPY	0.79 0.03	0.74 0.03	11.16 0.47	2.40 0.10	0.89 0.04	-
FUG 1	FS-001 Plant Haul Roads	lb/hr TPY	1.14 1.24	-	-	-	-	-

**LOUISIANA AIR EMISSION PERMIT
GENERAL CONDITIONS**

- I. This permit is issued on the basis of the emissions reported in the application for approval of emissions and in no way guarantees that the design scheme presented will be capable of controlling the emissions to the type and quantities stated. Failure to install, properly operate and/or maintain all proposed control measures and/or equipment as specified in the application and supplemental information shall be considered a violation of the permit and LAC 33:III.501. If the emissions are determined to be greater than those allowed by the permit (e.g. during the shakedown period for new or modified equipment) or if proposed control measures and/or equipment are not installed or do not perform according to design efficiency, an application to modify the permit must be submitted. All terms and conditions of this permit shall remain in effect unless and until revised by the permitting authority.
- II. The permittee is subject to all applicable provisions of the Louisiana Air Quality Regulations. Violation of the terms and conditions of the permit constitutes a violation of these regulations.
- III. The Emission Rates for Criteria Pollutants, Emission Rates for TAP/HAP & Other Pollutants, and Specific Requirements sections or, where included, Emission Inventory Questionnaire sheets establish the emission limitations and are a part of the permit. Any operating limitations are noted in the Specific Requirements or, where included, Tables 2 and 3 of the permit. The synopsis is based on the application and Emission Inventory Questionnaire received August 2, 2007 along with supplemental information received August 20, 2007, October 3, 2007, and November 2, 2007.
- IV. This permit shall become invalid, for the sources not constructed, if:
- A. Construction is not commenced, or binding agreements or contractual obligations to undertake a program of construction of the project are not entered into, within two (2) years (18 months for PSD permits) after issuance of this permit, or;
 - B. If construction is discontinued for a period of two (2) years (18 months for PSD permits) or more.
- The administrative authority may extend this time period upon a satisfactory showing that an extension is justified.
- This provision does not apply to the time period between construction of the approved phases of a phased construction project. However, each phase must commence construction within two (2) years (18 months for PSD permits) of its projected and approved commencement date.
- V. The permittee shall submit semiannual reports of progress outlining the status of construction, noting any design changes, modifications or alterations in the construction schedule which have or may have an effect on the emission rates or ambient air quality levels. These reports shall continue to be submitted until such time as construction is certified as being complete. Furthermore, for any significant change in the design, prior approval shall be obtained from the Office of Environmental Services, Air Permits Division.
- VI. The permittee shall notify the Department of Environmental Quality, Office of Environmental Services, Air Permits Division within ten (10) calendar days from the date that construction is certified as complete and the estimated date of start-up of operation. The appropriate Regional Office shall also be so notified within the same time frame.
- VII. Any emissions testing performed for purposes of demonstrating compliance with the limitations set forth in paragraph III shall be conducted in accordance with the methods described in the Specific Conditions and, where included, Tables 1, 2, 3, 4, and 5 of this permit. Any deviation

LOUISIANA AIR EMISSION PERMIT GENERAL CONDITIONS

from or modification of the methods used for testing shall have prior approval from the Office of Environmental Assessment, Air Quality Assessment Division.

- VIII. The emission testing described in paragraph VII above, or established in the specific conditions of this permit, shall be conducted within sixty (60) days after achieving normal production rate or after the end of the shakedown period, but in no event later than 180 days after initial start-up (or restart-up after modification). The Office of Environmental Assessment, Air Quality Assessment Division shall be notified at least (30) days prior to testing and shall be given the opportunity to conduct a pretest meeting and observe the emission testing. The test results shall be submitted to the Air Quality Assessment Division within sixty (60) days after the completion of testing. As required by LAC 33:III.913, the permittee shall provide necessary sampling ports in stacks or ducts and such other safe and proper sampling and testing facilities for proper determination of the emission limits.

- IX. The permittee shall, within 180 days after start-up and shakedown of each project or unit, report to the Office of Environmental Compliance, Enforcement Division any significant difference in operating emission rates as compared to those limitations specified in paragraph III. This report shall also include, but not be limited to, malfunctions and upsets. A permit modification shall be submitted, if necessary, as required in Condition I.

- X. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of at least five (5) years.

- XI. If for any reason the permittee does not comply with, or will not be able to comply with, the emission limitations specified in this permit, the permittee shall provide the Office of Environmental Compliance, Enforcement Division with a written report as specified below.
 - A. A written report shall be submitted within 7 days of any emission in excess of permit requirements by an amount greater than the Reportable Quantity established for that pollutant in LAC 33.I.Chapter 39.
 - B. A written report shall be submitted within 7 days of the initial occurrence of any emission in excess of permit requirements, regardless of the amount, where such emission occurs over a period of seven days or longer.
 - C. A written report shall be submitted quarterly to address all emission limitation exceedances not included in paragraphs A or B above. The schedule for submittal of quarterly reports shall be no later than the dates specified below for any emission limitation exceedances occurring during the corresponding specified calendar quarter:
 - 1. Report by June 30 to cover January through March
 - 2. Report by September 30 to cover April through June
 - 3. Report by December 31 to cover July through September
 - 4. Report by March 31 to cover October through December
 - D. Each report submitted in accordance with this condition shall contain the following information:
 - 1. Description of noncomplying emission(s);
 - 2. Cause of noncompliance;
 - 3. Anticipated time the noncompliance is expected to continue, or if corrected, the duration of the period of noncompliance;

**LOUISIANA AIR EMISSION PERMIT
GENERAL CONDITIONS**

4. Steps taken by the permittee to reduce and eliminate the noncomplying emissions;
and
 5. Steps taken by the permittee to prevent recurrences of the noncomplying emissions.
- E. Any written report submitted in advance of the timeframes specified above, in accordance with an applicable regulation, may serve to meet the reporting requirements of this condition provided all information specified above is included. For Part 70 sources, reports submitted in accordance with Part 70 General Condition R shall serve to meet the requirements of this condition provided all specified information is included. Reporting under this condition does not relieve the permittee from the reporting requirements of any applicable regulation, including LAC 33.I.Chapter 39, LAC 33.III.Chapter 9, and LAC 33.III.5107.
- XII. Permittee shall allow the authorized officers and employees of the Department of Environmental Quality, at all reasonable times and upon presentation of identification, to:
- A. Enter upon the permittee's premises where regulated facilities are located, regulated activities are conducted or where records required under this permit are kept;
 - B. Have access to and copy any records that are required to be kept under the terms and conditions of this permit, the Louisiana Air Quality Regulations, or the Act;
 - C. Inspect any facilities, equipment (including monitoring methods and an operation and maintenance inspection), or operations regulated under this permit; and
 - D. Sample or monitor, for the purpose of assuring compliance with this permit or as otherwise authorized by the Act or regulations adopted thereunder, any substances or parameters at any location.
- XIII. If samples are taken under Section XII.D. above, the officer or employee obtaining such samples shall give the owner, operator or agent in charge a receipt describing the sample obtained. If requested prior to leaving the premises, a portion of each sample equal in volume or weight to the portion retained shall be given to the owner, operator or agent in charge. If an analysis is made of such samples, a copy of the analysis shall be furnished promptly to the owner, operator or agency in charge.
- XIV. The permittee shall allow authorized officers and employees of the Department of Environmental Quality, upon presentation of identification, to enter upon the permittee's premises to investigate potential or alleged violations of the Act or the rules and regulations adopted thereunder. In such investigations, the permittee shall be notified at the time entrance is requested of the nature of the suspected violation. Inspections under this subsection shall be limited to the aspects of alleged violations. However, this shall not in any way preclude prosecution of all violations found.
- XV. The permittee shall comply with the reporting requirements specified under LAC 33:III.919 as well as notification requirements specified under LAC 33:III.927.
- XVI. In the event of any change in ownership of the source described in this permit, the permittee and the succeeding owner shall notify the Office of Environmental Services, Air Permits Division, within ninety (90) days after the event, to amend this permit.
- XVII. Very small emissions to the air resulting from routine operations, that are predictable, expected,

LOUISIANA AIR EMISSION PERMIT GENERAL CONDITIONS

periodic, and quantifiable and that are submitted by the permitted facility and approved by the Air Permits Division are considered authorized discharges. Approved activities are noted in the General Condition XVII Activities List of this permit. To be approved as an authorized discharge, these very small releases must:

1. Generally be less than 5 TPY
2. Be less than the minimum emission rate (MER)
3. Be scheduled daily, weekly, monthly, etc., or
4. Be necessary prior to plant startup or after shutdown [line or compressor pressuring/depressuring for example]

These releases are not included in the permit totals because they are small and will have an insignificant impact on air quality. This general condition does not authorize the maintenance of a nuisance, or a danger to public health and safety. The permitted facility must comply with all applicable requirements, including release reporting under LAC 33:I.3901.

XVIII. Provisions of this permit may be appealed in writing pursuant to La. R.S. 30:2024(A) within 30 days from receipt of the permit. Only those provisions specifically appealed will be suspended by a request for hearing, unless the secretary or the assistant secretary elects to suspend other provisions as well. Construction cannot proceed except as specifically approved by the secretary or assistant secretary. A request for hearing must be sent to the following:

Attention: Office of the Secretary, Legal Services Division
La. Dept. of Environmental Quality
Post Office Box 4302
Baton Rouge, Louisiana 70821-4302

XIX. Certain Part 70 general conditions may duplicate or conflict with state general conditions. To the extent that any Part 70 conditions conflict with state general conditions, then the Part 70 general conditions control. To the extent that any Part 70 general conditions duplicate any state general conditions, then such state and Part 70 provisions will be enforced as if there is only one condition rather than two conditions.

TABLE II
AIR QUALITY ANALYSIS SUMMARY
RED RIVER ENVIRONMENTAL PRODUCTS, LLC
AGENCY INTEREST NO.: 152139
ADA-ES, INC.
ARMISTEAD, RED RIVER PARISH, LOUISIANA
PSD-LA-727

Pollutant	Averaging Period	Preliminary Screening Concentration (µg/m³)	Level of Significant Impact (µg/m³)	Significant Monitoring Concentration (µg/m³)	Background (µg/m³)	Maximum Modeled Concentration (µg/m³)	Modeled + Background Concentration (µg/m³)	NAAQS (µg/m³)	Modeled PSD Increment Consumption (µg/m³)	Allowable Class II PSD Increment (µg/m³)
PM ₁₀	24-hour	9.32	5	10	59	16.53	75.53	150	16.53	30
SO ₂	3-hour	49.68	25	-	70.69	237.76	308.45	1300	235.68	512
	24-hour	18.48	5	13	20.94	43.54	64.48	365	43.18	91
NO ₂	Annual	2.72	1	-	7.85	4.43	12.28	80	4.37	20
	Annual	2.07	1	14	9.41	3.90	13.31	100	2.99	25
CO	1-hour	22.67	2000	-	NR	NR	NR	40,000	NR	-
	8-hour	14.57	500	575	NR	NR	NR	10,000	NR	-

NR = Not required