Golder Associates

November 17, 2009

093-89644

DEP/DARM
Division of Air Resource Management
2600 Blair Stone Road MS 5500
Tallahassee, Florida 32399-2400

Attention: Mr. Al Linero, P.E.

RE: STANTON ENERGY CENTER, FACILITY ID NO. 0950137
MINOR SOURCE AIR CONSTRUCTION PERMIT APPLICATION
COAL ADDITIVE TEST BURN

Attached is an application for an air construction permit for a proposed trial burn of a coal additive at OUC's Stanton Energy Center (SEC). Specifically, this application is for a minor source air construction permit for SEC Units 1 and 2 to allow for a test burn of a coal additive. The additive, referred to as the Chem-Mod™ Solution, is a dual injection sorbent system in which two chemicals are injected on the coal feed belt, before the coal combustion process, to reduce emissions. This application for a minor source construction permit will allow for a trial burn as a high-level assessment that will assist OUC in the performance of a first-cut evaluation to determine if the proposed coal additive system will meet expected performance and environmental criteria. This initiative is part of OUC's ongoing efforts to reduce emissions in a responsible and cost-effective manner.

One of the driving factors in the use of this technology is the potential qualification for Section 45 tax credits. This Refined Coal Credit is available for coals that demonstrate a 20 percent reduction in NOx and a 40 percent reduction in mercury. The critical factor in obtaining approval is not only the demonstrated emission reductions, but that the Project must be "placed in service" prior to January 1, 2010. Therefore, OUC requests the Department's timely processing of this permitting request.

Enclosed are an original and three copies of the application package. OUC would appreciate your timely processing of the application, as the test burn has been tentatively scheduled for December 2009. Please contact me at (813) 287-1717 if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Scott Osbourn, PE
Associate and Senior Consultant

Enclosure

Cc: Caroline Shine, DEP Central District
Garfield Blair, OUC Director of Environmental Affairs

SO/ev

Golder Associates Inc.
5100 W. Lemon Street, Suite 114
Tampa, FL 33609 USA
Tel: (813) 287-1717 Fax: (813) 287-1716 www.golder.com

REPORT

MINOR SOURCE AIR CONSTRUCTION PERMIT APPLICATION

TEST BURN OF COAL ADDITIVE
STANTON ENERGY CENTER
ORLANDO, ORANGE COUNTY, FLORIDA

Submitted To: Florida Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Rd., MS 5500
Tallahassee, FL 32399-2400

Submitted By: Golder Associates Inc.
5100 W. Lemon Street
Suite 114
Tampa, FL 33609 USA

Distribution: 4 Copies - Department of Environmental Protection
2 Copies - OUC
2 Copies - Golder Associates Inc.

November 2009

093-89644

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Golder Associates

PART I - FDEP APPLICATION FOR AIR PERMIT

PART II - FDEP APPLICATION REPORT

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PART I

FDEP APPLICATION FOR AIR PERMIT

RECEIVED
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BUREAU OF AIR REGULATION

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit:

- For any required purpose at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air operation permit;
- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment new source review, or maximum achievable control technology (MACT);
- To assume a restriction on the potential emissions of one or more pollutants to escape a requirement such as PSD review, nonattainment new source review, MACT, or Title V; or
- To establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial, revised, or renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **Orlando Utilities Commission**	
2. Site Name: **Stanton Energy Center**	
3. Facility Identification Number: **0950137**	
4. Facility Location... **Stanton Energy Center** Street Address or Other Locator: **5100 South Alafaya Trail** City: **Orlando** County: **Orange** Zip Code: **32193**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact – Stanton Energy Center

1. Application Contact Name: **David R. Baez**
2. Application Contact Mailing Address... Organization/Firm: **Orlando Utilities Commission** Street Address: **P.O. Box 3193** City: **Orlando** State: **FL** Zip Code: **32802**
3. Application Contact Telephone Numbers... Telephone: **(407) 658 - 6444** ext. **3691** Fax: **(407) 244 - 8794**
4. Application Contact E-mail Address: **dbaez@ouc.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 11/24/09	3. PSD Number (if applicable):
2. Project Number(s): 0950137-028-AC	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

This application for air permit is being submitted to obtain: (Check one)

Air Construction Permit

[X] Air construction permit.

[ ] Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).

[ ] Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

[ ] Initial Title V air operation permit.

[ ] Title V air operation permit revision.

[ ] Title V air operation permit renewal.

[ ] Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

[ ] Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

[ ] Air construction permit and Title V permit revision, incorporating the proposed project.

[ ] Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

[ ] I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

This application is for a minor source air construction permit for SEC Units 1 and 2 to allow for a test burn of a coal additive. The additive, referred to as the Chem-Mod™ Solution, is a dual injection sorbent system in which two chemicals are injected on the coal feed belt, before the coal combustion process, to reduce emissions. Chem-Mod's emissions reduction system has been tested on both bituminous and sub-bituminous coal at five large public utility plants in the U.S. These tests indicate a reduction in emissions of mercury, sulfur dioxide (SO_2), nitrogen oxides (NOx), heavy metals such as arsenic, and chloride due to use of the sorbents.

The proposed test burn would require additional material handling systems for the additives, as well as a diesel generator to supply electrical power. These additional emission units are summarized in the attached application.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
001	Fossil Fuel Steam Generation Unit #1		
002	Fossil Fuel Steam Generation Unit #2		

Application Processing Fee

Check one: ☐ Attached - Amount: $_____ ☒ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name : **Jan C. Aspuru, Vice President of Power Resources**

2. Owner/Authorized Representative Mailing Address... **P.O. Box 3193, Orlando FL 32802**
   Organization/Firm: **Orlando Utilities Commission**
   Street Address: **Reliable Plaza, 100 West Anderson**
   City: **Orlando** State: **FL** Zip Code: **32801**

3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(407) 658-6444** ext. **3900** Fax: **(407) 275-4120**

4. Owner/Authorized Representative E-mail Address: **jaspuru@ouc.com**

5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.

Signature

11/19/09
Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):

- ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
- ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
- ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
- ☐ The designated representative at an Acid Rain source, CAIR source, or Hg Budget source.

3. Application Responsible Official Mailing Address...
Organization/Firm:
Street Address:
City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
Telephone: ext. Fax:

5. Application Responsible Official E-mail Address:

6. Application Responsible Official Certification:

I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

Signature Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **Scott H. Osbourn, Senior Consultant**
   Registration Number: **57557**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates, Inc.**
   Street Address: **5100 West Lemon Street, Suite 114**
   City: **Tampa** State: **FL** Zip Code: **33609**
3. Professional Engineer Telephone Numbers...
   Telephone: **(813) 287-1717** ext. Fax: **(813) 287-1716**
4. Professional Engineer E-mail Address: **sosbourn@golder.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature

Date: 11/18/09

(seal)

SCOTT OSBOURN LICENSE NO. 57557 STATE OF FLORIDA PROFESSIONAL ENGINEER

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **483.5** North (km) **3150.6**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **28° 29` 1" N** Longitude (DD/MM/SS) **81° 10` 7" W**	
3. Governmental Facility Code: **4**	4. Facility Status Code: **Active**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment :			

Facility Contact – Stanton Energy Center

1. Facility Contact Name: **David R. Baez, Project Engineer, Environmental Affairs**
2. Facility Contact Mailing Address... Organization/Firm: **Orlando Utilities Commission** Street Address: **P.O. Box 3193** City: **Orlando** State: **FL** Zip Code: **32802**
3. Facility Contact Telephone Numbers: Telephone: **(407) 658 - 6444** ext. **3691** Fax: **(407) 244 - 8794**
4. Facility Contact E-mail Address: **dbaez@ouc.com**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official E-mail Address:

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☐ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
SO2	**A**	**N**
CO	**A**	**N**
NOX	**A**	**N**
PM	**A**	**N**
PM10	**A**	**N**
VOC	**A**	**N**
HAPs	**A**	**N**

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ [X] Previously Submitted, Date: **5/21/09**

2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ [X] Previously Submitted, Date: **5/21/09**

3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID:_____ [X] Previously Submitted, Date: **5/21/09**

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location:
   ☐ Attached, Document ID:_____ [X] Not Applicable (existing permitted facility)

2. Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL):
   [X] Attached, Document ID: **See Report**

3. Rule Applicability Analysis:
   [X] Attached, Document ID: **See Report**

4. List of Exempt Emissions Units:
   ☐ Attached, Document ID:_____ [X] Not Applicable (no exempt units at facility)

5. Fugitive Emissions Identification:
   [X] Attached, Document ID: **See Report** [X] Not Applicable

6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.):
   ☐ Attached, Document ID:_____ [X] Not Applicable

7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.):
   ☐ Attached, Document ID:_____ [X] Not Applicable

8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.):
   ☐ Attached, Document ID:_____ [X] Not Applicable

9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.):
   ☐ Attached, Document ID:_____ [X] Not Applicable

10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.):
    ☐ Attached, Document ID:_____ [X] Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units:
   ☐ Attached, Document ID:_____ [X] Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities: (Required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ [X] Not Applicable (revision application)

Identification of Applicable Requirements: (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought)
☐ Attached, Document ID: NA
☐ Not Applicable (revision application with no change in applicable requirements)

3. Compliance Report and Plan: (Required for all initial/revision/renewal applications)
   ☐ Attached, Document ID: NA

   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.

4. List of Equipment/Activities Regulated under Title VI: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____
   ☐ Equipment/Activities Onsite but Not Required to be Individually Listed
   [X] Not Applicable

5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID: _____ [X] Not Applicable

6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Attached, Document ID:_____ [X] Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Facilities Subject to Acid Rain, CAIR, or Hg Budget Program

1. Acid Rain Program Forms:

   Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):

   ☐ Attached, Document ID:_____ [x] Previously Submitted, Date: 5/21/09

   ☐ Not Applicable (not an Acid Rain source)

   Phase II NO_X Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):

   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____

   [x] Not Applicable

   New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):

   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____

   [x] Not Applicable

2. CAIR Part (DEP Form No. 62-210.900(1)(b)):

   ☐ Attached, Document ID:_____ [x] Previously Submitted, Date: 5/21/09

   ☐ Not Applicable (not a CAIR source)

3. Hg Budget Part (DEP Form No. 62-210.900(1)(c)):

   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____

   [x] Not Applicable (not a Hg Budget unit)

Additional Requirements Comment

PART II

APPLICATION REPORT

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

This application is for a minor source air construction permit for SEC Units 1 and 2 to allow for a test burn of a coal additive. The additive, referred to as the Chem-Mod™ Solution, is a dual injection sorbent system in which two chemicals are injected on the coal feed belt, before the coal combustion process, to reduce emissions. This application for a minor source construction permit will allow for a trial burn as a high-level assessment that will assist OUC in the performance of a first-cut evaluation to determine if the proposed coal additive system will meet expected performance and environmental criteria. The purpose is to gather operational and emissions data to evaluate overall impacts in support of a future permanent request to use this fuel additive. This initiative is part of OUC's ongoing efforts to reduce emissions in a responsible and cost-effective manner.

One of the driving factors in the use of this technology is the potential qualification for Section 45 tax credits. This Refined Coal Credit is available for coals that demonstrate a 20 percent reduction in NOx and a 40 percent reduction in SO_2 or mercury. The critical factor in obtaining approval is not only the demonstrated emission reductions, but that the Project must be "placed in service" prior to January 1, 2010. Therefore, OUC requests the Department's timely processing of this permitting request.

The following sections provide the Project Description (Section 2.0) and the Proposed Project Approach (Section 3.0), as well as suggested air construction permit language (Section 4.0). The trial burn is proposed to begin in December 2009. Relevant specifications for the coal additives, in the form of Material Safety Data Sheets (MSDS), are provided in Appendix A to this report.

2.0 PROJECT DESCRIPTION

This application is for a minor source air construction permit for SEC Units 1 and 2 to allow for a test burn of a coal additive. The additive, referred to as the Chem-Mod™ Solution, is a dual injection sorbent system in which two chemicals are injected on the coal feed belt, before the coal combustion process, to reduce emissions. The two additives are referred to as MerSorb and S-Sorb. An MSDS for each of the proposed coal additives is provided in Appendix A to this report. Basically, the MerSorb is a halide salt solution, consisting of approximately 50 percent calcium bromide and 50 percent water. The S-Sorb contains calcium carbonate, calcium oxide (lime), calcium sulfate, alumimum oxide and iron oxide.

The proposed test burn would require additional material handling systems for the additives, as well as a diesel generator to supply electrical power. A process schematic of the proposed process, highlighting the additional process transfer points, is presented in the attached Figure 1. A flow diagram of the overall process, including additive transfer, storage and processing, is included in Figure 2. In addition, Tables 1 through 5 provide emission estimates and assumed project parameters for the additional material handling and for the required diesel generator, which will provide the necessary electrical power. The emission estimates assume continuous operation (8,760 hr/yr), even though this approval is only for a temporary trial burn. However, the estimates are instructive in demonstrating that new source review will not be triggered (i.e., PM/PM_{10} < 15 TPY increase) if the test burn demonstrates that future continuous operation is desired by OUC.

Chem-Mod's emissions reduction system has been tested on both bituminous and sub-bituminous coal at five large public utility plants in the U.S. These tests indicate a reduction in emissions of mercury, sulfur dioxide (SO_2), nitrogen oxides (NOx), heavy metals such as arsenic, and chloride due to use of the sorbents. These results reflect the maximum emissions results that were recorded during the commercial testing period and reflect a baseline reduction in mercury, sulfur dioxide (SO_2), and nitrogen oxide (NOx), which means the measured emissions reductions were attributed directly to Chem-Mod's system and not to emissions reductions that may naturally occur during the coal combustion process without assistance from a specific technology.

Chem-Mod's emissions reduction system also offers the following additional environmental benefits: 1) reduces mercury, sulfur, arsenic, other heavy metals, and chloride emissions from coal-fired power plants; 2) reduces landfill waste through the sale of high-quality, environmentally-safe fly ash for use in making concrete; 3) reduces carbon dioxide emissions created by concrete production through the use of Chem-Mod's fly ash as a partial replacement for Portland cement; and 4) increases furnace efficiency at power plants leading to reduced amounts of coal burned through decreased slagging in the boiler tubes.

3.0 PROPOSED PROJECT APPROACH

As the process flow diagram provided in Figure 2 illustrates, storage and application systems are to be installed for each of the two types of proposed additives or sorbents (see the MSDS sheets in Appendix A). The design application rate of the MerSorb additive is estimated at approximately 0.20 percent by weight and for the S-Sorb, the application rate is estimated at approximately 0.65 percent by weight. These percent by weight feed rates assume a coal feed rate of approximately 900 tons per hour. Various application rates will be tested. The purpose is to gather operational and emissions data to evaluate overall impacts in support of a future permanent request to use this fuel additive.

Chem-Mod's emissions reduction system has been tested on both bituminous and sub-bituminous coal at five large public utility plants in the U.S. However, these tests were conducted on boilers rated at 30 MW to 190 MW, with stoker, cyclone and T-fired configurations, firing PRB and Northern Appalachian coals. By, comparison, the OUC Stanton coal units are dry bottom wall-fired units, rated at approximately 468 MW, firing bituminous coal and equipped with SCR (unit 2) and FGD systems. Hence, the necessity for the test program, to gather the data specific to the Stanton coal units. OUC anticipates the following effects on pollutants of concern:

- Mercury emissions should be significantly reduced (up to 40 percent from baseline levels);
- NOx emissions should be reduced (up to 20 percent from baseline levels);
- SO_2 emissions should be comparable to baseline levels (to be confirmed through testing);
- CO/VOC emissions and opacity should be comparable to baseline levels (to be confirmed through testing); and
- PM/PM_{10} emissions will increase slightly due to the additional project equipment, but may be reduced overall due to the fuel additive (to be determined by testing).

All conditions of the existing permit related to air pollution emission limits and control equipment will remain in force during the trial burn. For the designated steam unit(s), CEMS data will be recorded and analyzed for the duration of the trial burn for SO_2, NOx, CO and opacity. CO CEMS data should serve as a representative surrogate for anticipated effects on VOC emissions. An emission test will also be conducted and results reported for PM emissions (EPA Method 5); however, testing will also need to be conducted for the baseline condition. Daily records (i.e., mass fuel feed rates and heat input) of the boiler operations will be maintained and reported.

Section 4.0 of this application serves to provide suggested permit language to address the coal additive test burn and more fully defines the project approach in terms of:

- TEMPORARY AUTHORIZATION AND RESTRICTIONS;
- EMISSIONS LIMITING AND PERFORMANCE STANDARDS;
- MONITORING AND TESTING; and

- RECORDS AND REPORTS.

Performance testing will cease as soon as possible if the test boiler operations are not in accordance with current permit conditions or this protocol. Performance testing with these fuel additives will not resume until appropriate measures to correct the problem have been implemented. A test report will be submitted to the Department within 60 days of completion of the trial burn.

4.0 PROPOSED PERMIT LANGUAGE

This section of the application serves to provide suggested permit language to address the coal additive test burn for the following emissions units.

EU No.	Emission Unit Description
001	Unit 1 is a fossil fuel-fired, electric utility steam generator.
002	Unit 2 is a fossil fuel-fired, electric utility steam generator.

TEMPORARY AUTHORIZATION AND RESTRICTIONS

1. Fuel Additive: For Units 1 and 2, the permittee is temporarily authorized to apply fuel additives (Chem-Mod, Inc.) to currently authorized coal blends (bituminous coal). The preliminary schedule is to install the required equipment and commence the trial before the end of calendar year 2009. The purpose of the trial period is to evaluate the impact of the fuel additive on unit performance, slagging, emissions levels, and loss on ignition (LOI). The preliminary design is to spray the fuel additive on the coal prior to combustion. Various applications rates will be tested. The purpose is to gather operational and emissions data to evaluate overall impacts in support of a future permanent request to use this fuel additive. *{Permitting Note: The vendor expects up to a 20% reduction in NOx emissions, and up to a 40% reduction in mercury.}* [Application No. 0950137-028-AC; Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

2. Trial Test Burn Duration: The fuel additive shall only be applied to coal fired in the existing units. The permittee shall provide at least a one-day advance notice (by phone, fax, or email) to the Compliance Authority prior to the initial application of the fuel additive. Once the fuel additive is initially applied, the permittee shall complete all trial burns within 90 calendar days. Within five calendar days of completing the trial burn period, the permittee shall notify the Compliance Authority (by phone, fax, or email) that the trial burn period has been completed. [Application No. 0950137-028-AC; Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS LIMITING AND PERFORMANCE STANDARDS

3. Performance Requirements: The permittee shall provide the Compliance Authority with a preliminary schedule for conducting trial burns and performance tests and shall update this schedule as necessary. During each trial burn, the permittee shall comply with all terms and conditions in the current Title V air operation permit. If a trial burn results in operation that is not in accordance with the conditions of the Title V permit or the test protocol, the trial burn shall cease as soon as possible. The permittee shall immediately notify the Compliance Authority (by phone, fax, or email) of any non-compliance issue. The trial burn shall not resume until appropriate actions have been taken to correct the problem. [Application No. 0950137-028-AC; Rule 62-4.070(3), F.A.C.]

MONITORING AND TESTING

4. Emissions - Baseline: Baseline emissions shall be determined by the continuous monitoring systems for opacity, NOx, CO and SO_2 emissions when firing representative coal fuel blends at permitted capacity. For each boiler that will fire coal with the fuel additive, the permittee shall conduct EPA Method 5 PM emissions tests at permitted capacity to document baseline PM emissions. Permitted capacity is defined as 90 to 100 percent of the maximum heat input rate allowed by the permit (4,286 mmBtu/hour based on a 24-hour average). Test results shall be reported in units of lb/mmBtu and lb/hour. [Rule 62-4.070(3), F.A.C.]

5. Emissions with Fuel Additive: Emissions shall be determined by the continuous monitoring systems for opacity, NOx, CO and SO_2 emissions when firing coal blends with fuel additive at permitted capacity. For each boiler that will fire coal with the fuel additive, the permittee shall conduct EPA Method 5 PM emissions tests at permitted capacity to document emissions of particulate matter (PM). Permitted capacity is defined as 90 to 100 percent of the maximum heat input rate allowed by the permit. Test results shall be reported in units of lb/mmBtu and lb/hour. [Rule 62-4.070(3), F.A.C.]

6. Monitoring of Operations: For each trial, the permittee shall conduct the following monitoring: the type, amount, and heat input of fuel fired; flue gas oxygen levels, and electrical outputs; the fuel additive injection rates and fuel additive concentrations; LOI; and continuously monitor and record opacity, NOx, CO and SO_2 with the existing COMS and CEMS. For comparison purposes, the permittee shall identify the current corresponding baseline monitoring values for bituminous coal firing or collect baseline data during the trial burn period. [Rule 62-4.070(3), F.A.C.]

7. Notifications: The permittee shall provide the Compliance Authority with a written preliminary schedule for conducting any emissions tests (by letter, fax, or email). The preliminary schedule shall be updated as necessary. The permittee shall provide the Compliance Authority with at least 5 days advance notice (by phone, fax, or email) prior to conducting any emissions tests. [Rule 62-4.070(3), F.A.C.]

RECORDS AND REPORTS

8. Trial Burn Report: Within 60 days of completing the trial burn, the permittee shall submit a final report summarizing the trial burn to the Bureau of Air Regulation and the Compliance Authority. The final report shall provide the following: the actual schedule and overall description of the trial burn; any operational issues related to the fuel additive; a comparison of baseline operation versus operation with the fuel additive; an evaluation of equipment compatibility with fuel additive; a summary and comparison of continuous emissions and opacity monitoring data; a summary and comparison of the specified operational parameters; a summary and comparison of emissions test results; a comparison of continuously monitored emissions; a discussion of the impacts on LOI; and a discussion of emissions

changes as described in Appendix C of 40 CFR 60. [Rules 62-4.070(3), 62-210.200(PTE) and 62-212.400, F.A.C.]

ATTACHMENT 1

TABLE 1
SUMMARY OF PM EMISSIONS FROM THE MATERIAL HANDLING SYSTEM AND EMERGENCY GENERATOR
Project: OUC Chem-Mod Proposed Coal Handling System

Operation Scenario	PM Emission Rate Annual (TPY)	PM_{10} Emission Rate Annual (TPY)	$PM_{2.5}$ Emission Rate Annual (TPY)
Truck Traffic on Paved Roads			
Truck Traffic	0.11	0.02	0.003
Material Handling Operations			
Transfer Operations	10.3	0.05	0.007
Bin Vent Fabric Filter Vents	0.09	0.09	0.01
Emergency Generator	0.97	0.97	0.97
Total Emissions	11.5	1.1	1.0

Source: Golder, 2009

TABLE 2

ESTIMATION OF PM EMISSION FACTORS AND RATES FOR THE COAL HANDLING SYSTEM FROM DROP OPERATIONS AT TRANSFER POINTS

Project: OUC Chem-Mod Proposed Coal Handling System

		Chem-Mod Operations*			
Parameters		Transfer from Existing Feed Conveyor to Pug Mill Feed Conveyor	Transfer from Pug Mill Feed Conveyor to Pug Mill	Transfer from Pug Mill to Refined Coal Return Conveyor	Transfer from Refined Coal return Conveyor to Existing Conveyor
Emission Point/Area		T1	T2	T3	T4
Operational Data					
Activity, hours	Daily	12	12	12	12
days	Annual	365	365	365	365
Material Handling Data					
Material type		Coal	Coal	Coal & Sorbent	Coal & Sorbent
Material throughput, ton/hr (design)	Hourly	900	900	908	908
ton/day	Daily	10,800	10,800	10,892	10,892
ton/yr	Annual	3,942,000	3,942,000	3,975,507	3,975,507
Moisture content (M), % (nominal)		6.5	6.5	6.5	6.5
Number of transfers		1	1	1	1
General/ Site Characteristics					
Mean wind speed, mph	Daily	6.52	6.52	6.52	6.52
	Annual	3.26	3.26	3.26	3.26
Particle size multiplier, PM (k)		74.00	74.00	74.00	74.00
Particle size multiplier, PM10 (k)		0.35	0.35	0.35	0.35
Particle size multiplier, PM2.5 (k)		0.053	0.053	0.053	0.053
Emission Control Data					
Emission control method		Enclosed	Enclosed	Enclosed	Enclosed
Emission control removal efficiency, %		95	95	95	95
Emission Factor (EF) Equations					
Uncontrolled EF (UEF) Equation	UEF (lb/ton) = k x (0.0032) x $(U / 5)^{1.3}$/[$(M / 2)^{1.4}$]				
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]				
Calculated PM Emission Factor (EF)					
Uncontrolled EF, lb/ton	Short term	0.06421	0.06421	0.06421	0.06421
	Annual	0.02608	0.02608	0.02608	0.02608
Controlled EF, lb/ton	Short term	0.003211	0.003211	0.003211	0.003211
	Annual	0.001304	0.001304	0.001304	0.001304
Calculated PM10 Emission Factor (EF)					
Uncontrolled EF, lb/ton	Short term	0.00030	0.00030	0.00030	0.00030
	Annual	0.00012	0.00012	0.00012	0.00012
Controlled EF, lb/ton	Short term	0.000015	0.000015	0.000015	0.000015
	Annual	0.000006	0.000006	0.000006	0.000006
Estimated Emission Rate (ER)					
PM ER lb/hr (daily basis)		2.889	2.889	2.914	2.914
TPY		2.5699	2.5699	2.5918	2.5918
PM10 ER lb/hr (daily basis)		0.01367	0.01367	0.01378	0.01378
TPY		0.01216	0.01216	0.01226	0.01226
PM2.5 ER lb/hr (daily basis)		0.00207	0.00207	0.00209	0.00209
TPY		0.00184	0.00184	0.00186	0.00186

Source: USEPA, 2006; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

* ChemMod sorbent is added at a max rate of 7.65 tons per hour.
0.2% by weight + 0.65% by weight = 0.85% by weight
900 ton/hr coal x (0.85/100) = 7.65 tons per hour

TABLE 3
BIN VENT FABRIC FILTER VENTS ASSOCIATED WITH THE CHEM-MOD PROJECT
Project: OUC Chem-Mod Proposed Coal Handling System

Material	Units	Silo 1 Chem-Mod	Day Bin* Chem-Mod	Total
Air Flow	scfm	3,000	3,000	
Controlled Emissions	grain/scf	0.01	0.01	
PM/PM_{10} Emission Rate	lb/hr	0.26	0.26	0.51
	TPY	**0.032**	**0.063**	**0.09**
$PM_{2.5}$ Emission Rate[a]	lb/hr	0.04	0.04	0.08
	TPY	**0.005**	**0.010**	**0.01**

$PM_{2.5}$ Emission Rate was based on the different particle size multipliers from EPA's batch drop equation.

Particle size multiplier, PM10 (k)	0.35
Particle size multiplier, PM2.5 (k)	0.053

*Day Bin based on same annual average filling time as silos (i.e., either continuous, lower airflow transfering to daybin, or same high air flow with only part time transfer)
Each silo is only filled for half of the total amount of unloading time per year (split evenly)

TABLE 4
ESTIMATION OF PM EMISSION FACTORS AND RATES FROM PAVED ROADS ASSOCIATED WITH CHEM-MOD
Project: OUC Chem-Mod Proposed Coal Handling System

Parameters	Other- Paved Roads (Trucks)[a]	
Emission Point/Area	T5	
Scenario		
PM(TSP)	Data	Units/Comments
$E=[k \times (sl/2)^a \times (w/3)^b - C] \times (1-1.2P/N)$ where a = 0.65 and b = 1.5, k = 0.082 for TSP	1.257	round trip lb/VMT (average empty/full truck)
C = 0.00047	0.50	round trip miles per truck (estimated)
sl = 1 based on Golder 2001 Port Transportation Study	2.69	Truck trips per day - Annual Average
w = 37.5 tons full truck, 12.5 tons empty truck	616.46	lb/year
P = 122 days/yr	0.31	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-P/(4 x365)) and watering (60% control)	0.11	tons/year controlled with rainfall and watering
PM_{10}		
$E=[k \times (sl/2)^a \times (w/3)^b] \times (1-1.2P/N)$ where a = 0.65 and b= 1.5, k = 0.016 for PM10	0.245	round trip lb/VMT (average empty/full truck)
C = 0.00047	0.50	round trip miles per truck (estimated)
sl = 1 based on Golder 2001 Port Transportation Study	2.69	Truck trips per day - Annual Average
w = 37.5 tons full truck, 12.5 tons empty truck	120.10	lb/year
P = 122 days/yr	0.06	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-P/(4 x365)) and watering (60% control)	0.02	tons/year controlled with rainfall and watering
$PM_{2.5}$		
$E=[k \times (sl/2)^a \times (w/3)^b] \times (1-1.2P/N)$ where a = 0.65 and b= 1.5, k = 0.0024 for PM10	0.036	round trip lb/VMT (average empty/full truck)
C = 0.00036	0.50	round trip miles per truck (estimated)
sl = 1 based on Golder 2001 Port Transportation Study	2.69	Truck trips per day - Annual Average
w = 37.5 tons full truck, 12.5 tons empty truck	17.87	lb/year
P = 122 days/yr	0.01	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-P/(4 x365)) and watering (60% control)	0.003	tons/year controlled with rainfall and watering

Source: USEPA, 2006; AP-42, Section 13.2.1.3 for Paved Roads.

TABLE 5
PERFORMANCE AND EMISSION DATA
FOR EMERGENCY GENERATOR
Project: OUC Chem-Mod Proposed Coal Handling System

Parameter		Value
Performance		
Number of Units		1
Rating (kW)		500
Rating (hp)		671
Fuel		Diesel
Fuel Heat content (Btu/lb) (HHV)		19,300
Fuel density (lb/gal)		7.1
Heat input (MMBtu/hr) (HHV)		5.0
Fuel usage (gallons/hr)		36.6
Maximum operation (hours)		8,760
Maximum fuel usage (gallons/yr)		320,616
Emissions		
SO_2 -	Basis (%S)	0.0015%
	Conversion of S to SO_2	100
	Molecular weight SO_2/ S (64/32)	2
	Emission rate (lb/hr)	0.01
	(TPY)	0.03
NO_x -	Basis (g/hp-hr)	2.68
	Emission rate (lb/hr)	4.0
	(TPY)	17.4
CO -	Basis (g/hp-hr)	2.6
	Emission rate (lb/hr)	3.8
	(TPY)	16.8
VOC -	Basis (g/hp-hr)	0.32
	Emission rate (lb/hr)	0.5
	(TPY)	2.1
PM/PM_{10}/PM2.5 - Basis (g/hp-hr)		0.15
	Emission rate (lb/hr)	0.2
	(TPY)	1.0

Source: Golder, 2009; 40 CFR Part 60, Subpart IIII, 40 CFR 89.112, EPA AP-42 .

DIESEL GENERATOR SET

CATERPILLAR

Image shown may not reflect actual package.

STANDBY
500 ekW 625 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY
- EPA Tier 2 and Low Emissions

DESIGN CRITERIA
- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

UL 2200
- UL 2200 listed packages available. Certain restrictions may apply. Consult with your Caterpillar Dealer.

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER
- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Caterpillar® dealers provide extensive post sale support including maintenance and repair agreements
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- The Cat® S·O·S℠ program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT® C15 ATAAC DIESEL ENGINE
- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

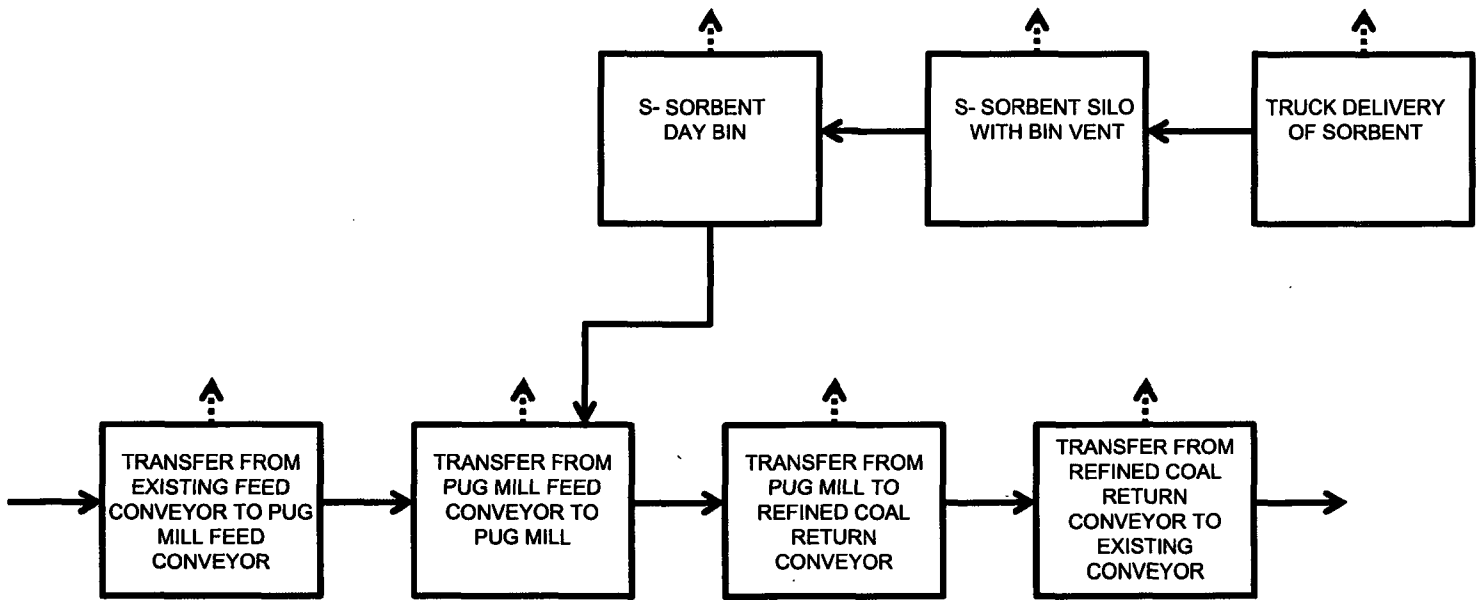
CAT GENERATOR
- Matched to the performance and output characteristics of Caterpillar engines
- Load adjustment module provides engine relief upon load impact and improves load acceptance and recovery time
- UL 1446 Recognized Class H insulation

CAT EMCP 3 SERIES CONTROL PANELS
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

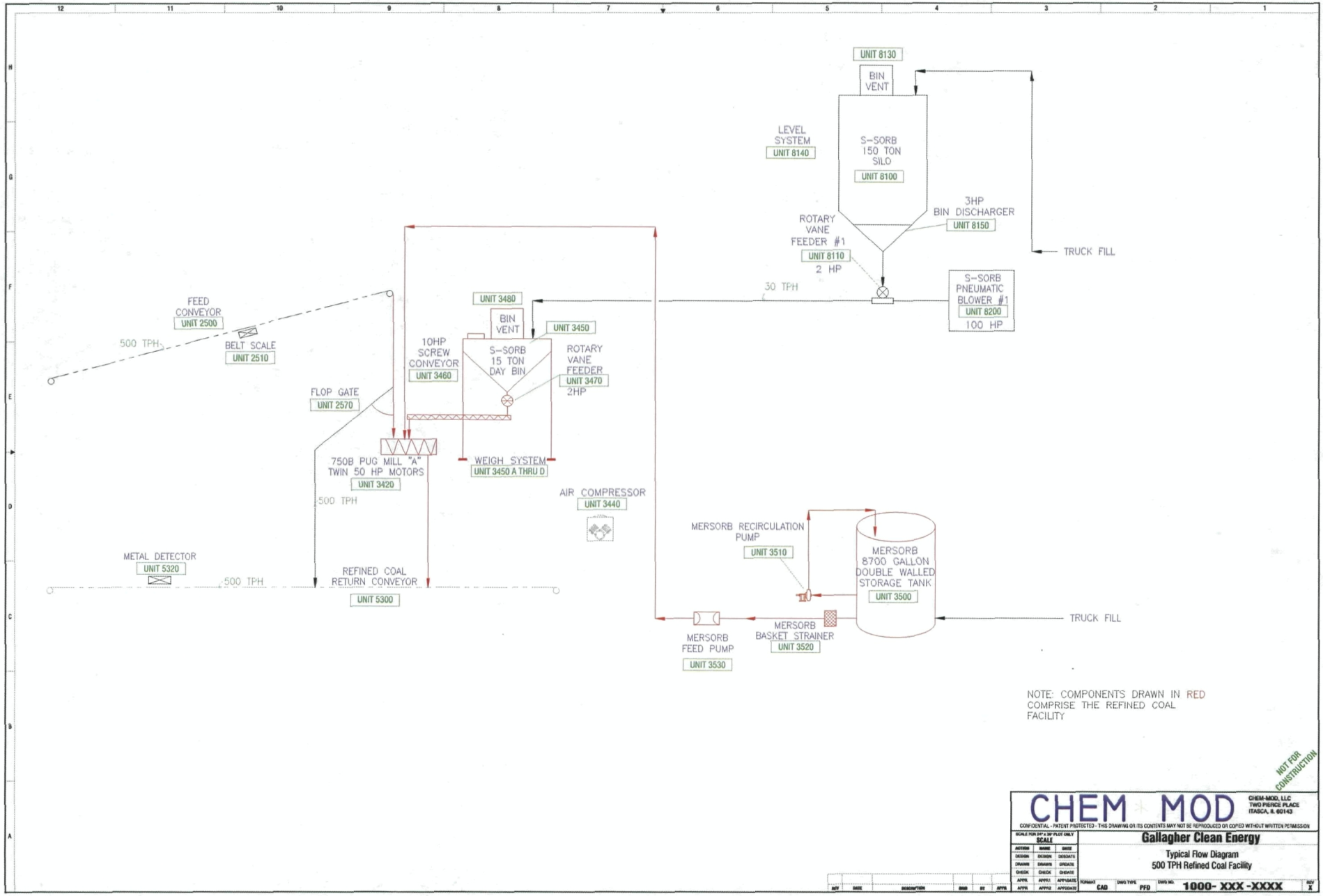
Stack Parameters

3842.2 cfm
942.1 deg F
0.5 diamter (ft)

fuel consumption
36.6 gal/hr



CLIENT/PROJECT **ORLANDO UTILITIES COMMISSION** **TEST BURN OF COAL ADDITIVE** **STANTON ENERGY CENTER** **ORLANDO, FL**			TAMPA, FLORIDA Golder Associates				TITLE **Figure 1** **Material Handling Emission Points**			
DRAWN	CHECKED	REVIEWED	DATE 11/6/2009	NOT TO SCALE	FILE NO.	Job No. 093-89644	DWG NO.	SUBTITLE	REV. NO.	



NOTE: COMPONENTS DRAWN IN RED COMPRISE THE REFINED COAL FACILITY

NOT FOR CONSTRUCTION

CHEM MOD

CHEM-MOD, LLC
TWO PIERCE PLACE
ITASCA, IL 60143

SCALE FOR 24"x 36" PLOT ONLY
SCALE

ACTION	NAME	DATE
DESIGN	DESIGN	DESDATE
DRAWN	DRAWN	DRDATE
CHECK	CHECK	CHKDATE
APPR.	APPR1	APP1DATE
	APPR2	APP2DATE

NO	DATE	DESCRIPTION	BY	APPD

Gallagher Clean Energy

Typical Flow Diagram
500 TPH Refined Coal Facility

FORMAT	DWG TYPE	DWG NO.	REV
CAD	PFD	1000- XXX -XXXX	X

APPENDIX A
MSDS SPECIFICATIONS

Chem-Mod [redacted]

MATERIAL SAFETY DATA SHEET – MERSORB

1. Product and Company Identification

Supplier
Chem-Mod LLC
2 Pierce Place
Itasca, IL 44224
Telephone: 630-285-3463

Manufacturer
Various

Supplier & Manufacturer Emergency Contacts & Telephone Number:
Chem-Mod, LLC – Telephone: 630-285-3463

Issue Date: 1/01/2009
Product: MerSorb
Chemical Family – Halide Salt Solution

2. Composition/Information of Ingredients

INGREDIENT NAME	CAS No.	%	EXPOSURE LIMITS
Calcium bromide	7789415	> or = 51.5	Y (Hazardous) 15 mg/m3 (PNOR) (OSHA PEL TWA) Not established (OSHA PEL STEL) Not established (OSHA PEL CEIL) 10 mg/m3 (PNOS) (ACGIH TLV TWA) Not established (ACGIH TLV STEL) Not established (ACGIH TLV CEIL)
Water	7732185	< or = 48.5	N (Hazardous) Not established (OSHA PEL TWA) Not established (OSHA PEL STEL) Not established (OSHA PEL CEIL) Not established (ACGIH TLV TWA) Not established (ACGIH TLV STEL) Not established (ACGIH TLV CEIL)

3. Hazards Identification

Eye Hazards: Prolonged exposure to elevated concentrations of this material is corrosive to the eyes. Direct contact with the solid or aqueous solutions may cause conjunctival edema and corneal damage. Prolonged contact to concentrated solutions may cause conjunctivitis.

Skin Hazards: Prolonged exposure to elevated concentrations of this material is corrosive to the skin. During prolonged skin contact, this material can penetrate the unprotected skin slowly. The extent of damage depends on duration of contact. Chronic dermatitis may follow repeated contact at elevated concentrations

Ingestion Hazards: Prolonged exposure to elevated concentrations of this material may be corrosive to the digestive tract.

Inhalation Hazards: Injection of this material may be corrosive to the respiratory system. Injection of low concentrations may cause sore throat, coughing, choking, difficulty in breathing, and symptoms of headache. Chronic exposure may lead to bronchial irritation with chronic cough.

Conditions Aggravated By Exposure: Respiratory disorders, dermatitis or other skin disorders.

4. First Aid Measures

Eye: Wash eyes immediately with large amounts of water lifting upper and lower eyelids until no evidence of chemical remains, usually 15-20 minutes or more. Obtain qualified medical attention immediately. Administration of drugs, ointment, or other treatments to the eyes must be done by qualified medical personnel

Skin: Remove contaminated clothing and shoes. Wash affected area with soap or mild detergent and large amounts of water for approximately 15-20 minutes. In the event of mild chemical irritation, cover the affected area with sterile dry dressing. Bandage securely but not tightly. Seek medical attention.

Ingestion: If ingested, consult a physician immediately.

5. Fire Fighting Measures

Flash Point: None °F
Flammability Class: Not Applicable
Lower Exposure Limit: Not Applicable

Fire And Explosion Hazards: Not applicable as this material is non-combustible.

Extinguishing Media: For fires involving materials surrounding or containing this product, use dry chemical or flooding quantities of water as spray or foam. DO NOT use carbon dioxide or halogenated extinguishing agents.

6. Accidental Release Measurers

Do not touch spilled material. Stop leak if possible and safe to do so.

For small liquid spills, take up with absorbent material and place into containers for later disposal. Move containers from spilled area. For large spills, dike far ahead of spill for later disposal. Spill must not be flushed to surface waters or sewers.

7. Handling and Storage Precautions

Handling And Storage Precautions: Solutions of this product may have high pH and be corrosive to unprotected skin and eyes. Wear tight fitting goggles and gloves, boots, and other personal protective equipment to prevent skin and eye contact. PPE must be resistant to permeation and penetration by lime water.

Work/Hygienic Practices: After working with this material, workers should shower with soap and water. Launder all clothing before reuse.

8. Exposure Controls/Personal Protection

Engineering Controls: Enclose all fugitive release areas; use local exhaust ventilation that is vented to the outside.

Eye/Face Protection: Wear tight fitting chemical goggles.

Skin Protection: Use gauntlet-type work gloves. Long sleeved shirts and long pants should be worn. Protective barrier creams may be used on exposed skin surfaces.

Ingredient(s) – Exposure Limits
Calcium Bromide - CaBr2
OSHA PEL: Not yet established

9. Physical Appearance and Chemical Properties

Appearance: White, gray, tan, or brown powder or clear liquid.

Odor: Normally odorless but may have faint "earth" odor.

Chemical Type: Mixture
Physical State: Liquid
Melting Point: N/A
Boiling Point: >246 °F
Specific Gravity: >1.68

10. Stability and Reactivity

Stability: Stable as supplied
Hazardous Polymerization: Will not occur

Conditions To Avoid (Stability) CaBr2 reacts rapidly with water (in powder form) to produce heat and an alkaline solution or suspension.

Incompatible Materials: May react violently and incandescently with boric oxide, hydrogen fluoride, phosphorus pentoxide, chlorine trifluoride, and fluorine. Reaction with halogenated compounds may cause ignition. May also be incompatible with acids, ammonium salts, and aluminum metal.

Hazardous Decomposition Products: None Known

11. Toxicological Information

No Information on toxicological information is available. No known testing of this material for toxicological effects is known at this time.

12. Ecological Information

No ecological information or effects are known at this time.

13. Disposal Considerations

Dispose in accordance with local, state and federal requirements. Spills must not be flushed to surface waters or sewers.

RCRA Information: This material, if discarded as produced, is not a RCRA "listed" hazardous waste. Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. It is the responsibility of the generator to fully characterize for toxicity and other RCRA parameters prior to disposal (40 CFR 261).

14. Transport Information

CAS NO. 7789-41-5

Hazard Class: Not applicable

DOT Identification Number: Not a DOT controlled material (United States)

DOT Shipping Label: Not applicable

Packaging Exceptions: Not applicable

Packaging Requirements: 49 CFR 173.212, 49 CFR 173.240

15. Regulatory Information

U.S. Regulatory Information: Stratospheric Ozone Depletion Statement: This product neither contains nor is directly manufactured with any controlled ozone depleting substances, Class 1 and 11.

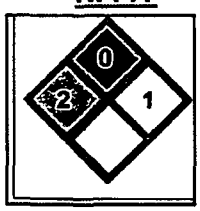
SARA Title III Section 313 Toxic Release reporting: This product is not listed or subject to the release reporting requirements of Section 313.

SARA Hazard Classes:
Acute Health Hazard

Canadian Regulatory Information: Not controlled under WHMIS (Canada)

15. Regulatory Information – Continued

NFPA



WHMIS

HEALTH	2
FLAMMABILITY	0
REACTIVITY	1
PERSONAL PROTECTION	H,X

15. Regulatory Information – Continued

Precautionary Label

WARNING - Corrosive Material

Reference Documentation

The following were the primary references including internet websites used in the creation of this MSDS: Information and material safety data sheets on similar materials from Ash Grove Cement Company, Lehigh Portland Cement Company, the National Institute for Occupational Safety and Health (NIOSH), Wikipedia, Peters Chemical Company, US Department of Transportation Federal Highway Administration, Perfect Earth, and California Earth Minerals.

Disclaimer

SELLER MAKES NO WARRANTY. EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THERE OF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY CHEM-MOD LLC OR GALLAGHER CLEAN ENERGY.

Chem-Mod

MATERIAL SAFETY DATA SHEET – S-SORB III

1. Product and Company Identification

Supplier: Chem-Mod LLC
Address: Two Pierce Place
Itasca, IL
Telephone: 630-285-3463

Emergency Contact Information-630-285-3463

Issue Date: 1/01/2009
Product: S-Sorb III
Chemical Family: A mineral composite of calcium silicate components and other calcium compounds containing iron and aluminum make up the majority of this chemical compound.

2. Composition/Information of Ingredients

Hazardous Ingredients

Component (%)	CAS No.	OSHA PEL (8 hour TWA)	ACGI H-TLV
Calcium carbonate (10-80)	1317-65-3	See Nuisance Dust PEL	See Nuisance Dust
Calcium oxide (lime) (5-30)	1305-78-8	5mg/m^3	2mg/m^3
Calcium sulfate (0-8)	------	5mg/m^3	2mg/m^3
Aluminum oxide (0-5)	1344-28-1	See Nuisance Dust	See Nuisance Dust
Iron oxide (0-5)	1309-37-1	5mg/m^3	5mg/m^3
Magnesium oxide (0-2)	1309-48-4	10mg/m^3	10mg/m^3
Nuisance dusts (various)	13397-245	15mg/m^3 total dust	10mg/m^3
Crystalline silica (quartz)	14808-607	10mg/m^3	10mg/m^3
		30mg total dust/m^3/percent silica	0.10mg/m^3

Trace constituents: S-Sorb III is made from materials mined form the earth and is processed using energy provided by fuels. Small amounts of naturally occurring, but potentially harmful, chemical compounds might be detected during chemical analysis. These trace compounds might include free crystalline silica, potassium and sodium compounds; heavy metals including cadmium, chromium, nickel and lead; and organic compounds.

3. Hazards Identification

Emergency Overview

S-Sorb III is a light gray powder that poses little immediate hazard. A single, short-term inhalation exposure to the dry powder is not likely to cause serious harm. However, exposure to wet S-Sorb III can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns or an allegoric reaction.

Potential Health Effects

Relevant Routes of Exposure: Eye contact, skin contact, inhalation, and ingestion.

Effects resulting from eye contact: Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact with larger amounts of dry powder or splashes of wet S-Sorb III may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (see section IV) and medical attention to prevent significant damage to the eye.

Effects resulting from skin contact: Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet S-Sorb III. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Some individuals may exhibit an allergic response (e.g. allergic contact dermatitis) upon exposure to S-Sorb III possible due to trace amounts of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with the product.

Effects resulting from inhalation: Dry S-Sorb III may contain small amounts of free crystalline silica. Prolonged exposure to reparable free crystalline silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease and/or other diseases.

Effects resulting from ingestion: Although small amounts of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. S-Sorb III should not be eaten.

Medical conditions which may be aggravated by inhalation:

1. Pre-existing upper respiratory and lung diseases
2. Unusual (hyper) sensitivity to hexavalent chromium (chromium^{+6}) salts.

4. First Aid Measures

Eyes: Immediately flush eyes thoroughly with water. Continue flushing eyes for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.
Skin: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, wet cement mixtures, wet concrete liquids from fresh cement products, or prolonged wet skin exposure to dry cement.
Inhalation of Airborne Dust: Remove to fresh air. Seek medical help if coughing or other symptoms do not subside. (Inhalation of gross amounts of S-Sorb III requires immediate medical attention).
Ingestion: Do mot induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

5. Fire Fighting Measures

Flash point:	None	Auto ignition temperature:	Not combustible
Lower explosion limit:	None	Upper explosive limit:	None
Extinguishing media:	Not Combustible		

Hazardous combustion products: None
Special fire fighting procedures: None (Although S-Sorb III poses not fire-related hazards, a self-contained breathing apparatus is recommended to limit exposure to combustion products when fighting any fire).

6. Accidental Release Measurers

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment. Scrape up wet material and place in an appropriate container. Allow material to "dry" before disposal. Do not attempt to wash S-Sorb III down drains.
Dispose of waste material according to federal, state and local guidelines.

7. Handling and Storage Precautions

Keep S-Sorb III dry. Normal temperatures and pressures do not affect the material. Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust.

8. Exposure Controls/Personal Protection

Skin Protection: Prevention is essential to avoiding potentially severe skin injury. Avoid contact with wet S-Sorb III. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposures to S-Sorb III might occur, wear impervious clothing and gloves to prevent skin contact. Where required, wear sturdy boots that are impervious to water to eliminate foot and ankle exposure. Do not rely on barrier creams; barrier creams should not be used in place of impervious gloves and clothing.
Respiratory protection: Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits. Use NIOSH approved respirators in poorly ventilated areas.
Ventilation: Use local exhaust or general dilution ventilation to control exposure with applicable limits.
Eye protection: In conditions where user may be exposed to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty or unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with S-Sorb III.

9. Physical Appearance and Chemical Properties

Appearance: Gray or white powder
Odor: No distinct odor
Physical state: Solid (powder)
pH (in water): 10 to 13
Solubility in water: 2 – 20%

Vapor Exposure: N/A
Vapor density: N/A
Boiling point: N/A
Melting point: N/A
Specific gravity: 2.6 – 2.8

10. Stability and Reactivity

Stability: Stable, but reacts with water
Incompatibility: S-Sorb III is alkaline. As such it is incompatible with acids, ammonium salts, and aluminum metal.
Conditions to avoid: Unintentional contact with water
Hazardous decomposition: Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide as a result of hydration
Hazardous polymerization: Will not occur.

11. Toxicological Information

Ecotoxicity: No recognized unusual toxicity to plants or animals.
Relevant physical and chemical properties: See Section IX & X

12. Ecological Information

No ecological information or effects are known at this time.

13. Disposal Information

Dispose of waste material according to federal, state and local regulations. (Since S-Sorb III is stable, uncontaminated material may be saved for future use). Dispose of bags in an approved landfill or incinerator.

14. Transport Information

Hazardous materials description/ proper shipping name: Portland cement is not hazardous under U.S. Department of Transportation (DOT) regulations.
Hazardous class: N/A
Identification class: N/A
Required label text: N/A
Hazardous substances/reportable quantities (RQ): N/A

15. Regulatory Information

Status under USDOL-OSHA Hazard Communication Rule: Some constituents of S-Sorb III may be considered "hazardous chemicals" under this regulation, and should be part of any hazard communication program.
Hazardous Category under SARA (Title III) Sections 311 & 312: S-Sorb III qualifies as a "hazardous substance" with delayed health effects.
Status Under SARA (Title III) Section 313: Not subject to reporting requirements under section 313.
Status under TSCA (as of May 1997): Some substances in S-Sorb III are on the TSCA inventory list.
S-Sorb III is a "hazardous substance" subject to statutes promulgated under the subject act.
Status under California Proposition 65: WARNING: This product contains chemicals known the State of California to cause cancer and birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do exist.
Workplace Hazardous Material Information System (Canada): S-Sorb III is considered to be a hazardous material under the Hazardous Product Act as defined by the Controlled Products Regulations (Class E – Corrosive Material) and is therefore subject to labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).

16. Other Information

Other important information: S-Sorb III should only be used by knowledgeable persons. While the information provided in the material safety data sheet is believed to provide a useful summary of the hazards of S-Sorb III as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

The data furnished in this sheet do not address hazards that may be posed by other materials mixed with S-Sorb III. Users should review other relevant material safety data sheets before working with this product.

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