P 230 524 383

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PS Form **3800**, June 1991

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3. Article Addressed to:

Mr. Chris K. Sleeper, President
D.R.E. Environmental, Inc.
P. O. Box 1386
Lake City, Florida 32056-1386

4a. Article Number

P 230 524 383

4b. Service Type

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8-11-93

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6. Signature (Agent)

Thomas Holden

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PS Form **3811**, December 1991 ☆U.S. GPO: 1992—323-402 **DOMESTIC RETURN RECEIPT**

NOTICE OF PERMIT ISSUANCE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an Application for Permit by:

DER File No. AO16-231440
Mobile Operation

Mr. Chris K. Sleeper, President
D.R.E. Environmental, Inc.
P. O. Box 1386
Lake City, Florida 32056-1386

_____/

Enclosed is permit number AO 16-231440 for a 35 TPH mobile soil thermal treatment facility that is allowed to operate throughout Florida except in Okaloosa and Hernando counties. This permit is being issued pursuant to Section(s) 403, Florida Statutes, and Florida Administrative Code Chapters 17-210 and 17-4.

A person whose substantial interests are affected by this permit may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of receipt of this Permit. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this permit. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

This permit is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition and conforms to Rule 17-103.070, F.A.C. Upon timely filing of a petition or a request for an extension of time this permit will not be effective until further Order of the Department.

When the Order (Permit) is final, any party to the Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date the Final Order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Howard L. Rhodes

Howard L. Rhodes, Director
Division of Air Resources
Management
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT ISSUANCE and all copies were mailed by certified mail before the close of business on 8-10-93 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Kuo Dobbs 8-10-93
(Clerk) (Date)

Copies furnished to:
District Air Program Administrators
County Air Program Administrators

Permit to Operate
Evaluation

D.R.E. Environmental, Inc.
P.O. Box 1386
Lake City, FL 32056-1386

35 TPH Mobile Soil Thermal Treatment Facility
Statewide Operation
(Except Okaloosa and Hernando Counties)

Unit No. 1
AO16-231440

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

August 4, 1993

Permit to Operate Evaluation

On May 18, 1993, D.R.E. Environmental, Inc. submitted an application for a permit to operate a 35 tons per hour (TPH) mobile soil thermal treatment facility throughout Florida except for Okaloosa and Hernando counties.

The construction permit allowed the facility to process up to 35 TPH of soils contaminated with petroleum products, emit 0.08 grains (gr) per dry standard cubic foot (dscf) at 50 percent excess air (EA) (based on the policy on soil thermal treatment facilities that was being followed when the application for permit to construct this facility was processed) and 7.4 pounds per hour (lbs/hr) particulate matter (PM), 8.6 lbs/hr benzene, and 22.1 lbs/hr volatile organic compounds (VOC). Since issuing this construction permit on May 10, 1991, the Department has amended its air pollution control regulations to incorporate specific requirements for soil thermal treatment facilities (F.A.C. Rule 17-296.415). These regulations require soil thermal treatment facilities to meet a PM emission standard of 0.04 gr/dscf, give a minimum temperature/residence time for the afterburner, and limit emissions from the afterburner to 5 percent opacity and 100 parts per million (ppm) carbon monoxide (CO).

The compliance test reports show that this facility has complied with these emission limits at a process rate of 20 TPH. The Department will issue an operating permit for this facility that will incorporate the requirements of F.A.C. Rule 17-296.415. The permit will also require the unit be retested when it operates at a process rate above 22 TPH (10 percent above the process rate for which compliance was demonstrated) to confirm that it is complying with the regulations at the higher process rate and that the carbon monoxide (CO) continuous emissions monitor be upgraded prior to the expiration of the permit.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
D. R. E. Environmental, Inc.
P. O. Box 1386
Lake City, Florida 32056

Permit Number: AO16-231440
Expiration Date: July 15, 1998
County: Mobile Operation
Project: 35 TPH Mobile Soil Thermal Treatment Facility

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

Authorization to operate a 35 TPH mobile soil thermal treatment facility. The facility consists of a 15 ton bin to receive contaminated soil, a 24" belt conveyer for transferring up to 35 TPH of wet petroleum contaminated soil to the kiln, a rotary kiln (5 feet diameter by 28 feet long), a Hauck BH390-8 baghouse, a Hauck afterburner operating above 1600 °F and 1 second residence time, two propane, natural gas or No. 2 fuel oil burners (23 MMBtu/hr for the kiln and 22 MMBtu/hr for the afterburner), a 200 KW diesel powered generator, instruments to measure and record the process feed rate to the kiln, the pressure drop across the baghouse, the temperature of the afterburner, the CO concentration of the flue gas leaving the afterburner, and associated controls. The facility is equipped with a stack (3 feet diameter by 30 feet high) that discharges over 36,100 acfm at 1600 °F to the atmosphere.

The facility may be used throughout the State (all counties) except that the facility shall not be operated in Okaloosa and Hernando counties or within one mile of the boundary of Hernando County.

The facility shall be constructed and operated in accordance with the permit applications, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Certificate of Completion received May 18, 1993.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a. Have access to and copy any records that must be kept under the conditions of the permit;

b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

GENERAL CONDITIONS:

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. The permittee shall comply with the following:

    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

    c. Records of monitoring information shall include:

        - the date, exact place, and time of sampling or measurements;
        - the person responsible for performing the sampling or measurements;
        - the dates analyses were performed;
        - the person responsible for performing the analyses;
        - the analytical techniques or methods used; and
        - the results of such analyses.

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

PLANT OPERATION PARAMETERS

1. The facility shall only treat petroleum contaminated soil as defined in F.A.C. Rule 17-775, (F.A.C. Rule 17-296.415).

2. Hazardous waste as defined in 40 CFR 261.3 shall not be processed by this facility (F.A.C. Rule 17-775).

3. This facility shall not treat polychlorinated biphenyls (PCBs) contaminated soil (F.A.C. Rule 17-775).

4. Based on data in the application, the input of petroleum contaminates as total recoverable petroleum hydrocarbons (TRPH) in the soil into the facility shall not exceed 1400 lbs/hr (daily avg.).

5. To avoid exceeding the Acceptable Ambient Air Concentration (AAC), the average daily concentration of benzene in the soil treated by this facility shall not exceed 7,776 parts per million (ppm).

6. The afterburner shall be operated above 1600 °F with at least a 1 second retention time (F.A.C. Rule 17-296.415).

7. The facility may operate continuously, 8760 hours per year. It shall not be operated at a site with another soil thermal treatment facility (combined emissions may make a major facility and the impact of the emissions may exceed the AAC).

8. The maximum contaminated soil charging rate to this facility shall be 35 tons per hour (TPH). The facility shall have a calibrated belt scale to monitor the charging rate to the kiln. The permittee shall demonstrate compliance with the particulate matter (PM) and visible emission standard of this permit within 45 day of initial operation at a rate above 22 TPH (compliance has not been demonstrated above this process rate).

9. Soil entering the kiln cannot be larger than 2 inches in diameter (F.A.C. Rule 17-775).

10. As proposed by the permittee, only natural gas, propane, or No. 2 fuel oil containing a maximum of 0.3% sulfur (annual average) shall be used as fuel for the kiln and afterburner. The maximum permitted fuel consumption, equivalent to 45 million British thermal units per hour (MMBtu/hr) heat input, is 45,000 cubic feet per hour (CFH) natural gas, 500 gallons per hour (GPH) propane, or 330 GPH No. 2 fuel oil. The electrical generator is allowed to burn 13.2 GPH diesel fuel (1.8 MMBtu/hr).

SPECIFIC CONDITIONS

EMISSION LIMITS

11. Particulate matter emissions from the afterburner stack shall neither exceed 0.04 grains (gr) per dry standard cubic foot (dscf), 7.4 pounds per hour (lbs/hr), nor 32.4 TPY (F.A.C. Rule 17-296.415(2)(b)).

12. Visible emissions from the facility stack shall not exceed 5 percent opacity (F.A.C. Rule 17-296.415(2)(a)).

13. Carbon monoxide emissions shall not exceed 100 parts per million by volume, dry, during any 60 consecutive minute period (F.A.C. Rule 17-296.415(1)(b)).

14. The operation of this facility shall not result in the emissions of air pollutants which cause or contribute to an objectionable odor (F.A.C. Rule 17-296.320).

15. Untreated soil removed from the ground shall be stored under waterproof covers to minimize unconfined emissions of petroleum products (F.A.C. Rule 17-296.310).

16. Reasonable precautions shall be used to minimize unconfined emissions of particulate matter generated by the operation (F.A.C. Rule 17-296.310). Reasonable precautions shall be defined as keeping the work areas wet where the soil is being removed, treated, handled, and stored or disposed of.

GENERAL REQUIREMENTS

17. The system shall be properly operated and maintained (F.A.C. Rule 17-210.300). No person shall circumvent any pollution control device or allow the emissions of air pollutants without the applicable air pollution control device operating properly (F.A.C. Rule 17-210.650). The permittee's operation of the soil thermal treatment facility in Florida is conditioned upon the baghouse, the cyclones, and the afterburner of the facility being fully operational, as demonstrated by monitoring instrumentation on the baghouse and afterburner.

18. The unit shall not be operated at a location or in a manner that may create a nuisance. The unit shall not operate in Okaloosa or Hernando counties or within one mile of the boundaries of Hernando County (Settlement Stipulation, Case No. 90-941). The permittee shall comply with all applicable county, municipal, federal or other state regulations, which may include obtaining a county permit, prior to operating at a site (F.A.C. Rule 17-4.070(7)).

SPECIFIC CONDITIONS

EMISSION TESTING REQUIREMENTS

19. This facility shall be tested (EPA test methods are specified in 40 CFR 60, Appendix A, revised July 1, 1990) at 90 - 100 percent of its permitted process rate for visible emissions during startup at each new site it is operated at and annually for:

(A) Particulate matter (PM) emissions by EPA Methods 1, 2, 3, 4, and 5.

(B) Visible emissions by EPA Method 9.

(C) Carbon monoxide (CO) emissions by averaging each hour of the readings from the CO continuous emission monitor during the PM test period.

(D) Afterburner temperature by averaging each hour of the temperature readings from the continuous temperature monitor during the PM test.

(E) Afterburner residence time using the test data collected by EPA Methods 1 and 2.

(F) Fuel oil sulfur limits based on analysis referenced in 40 CFR 60.17 or other methods after Department approval. A certified analysis by the fuel oil supplier will be acceptable.

(G) Contaminated soil analysis for volatile organic aromatics (VOA), total recoverable petroleum hydrocarbons (TRPH), polynuclear aromatic hydrocarbons (PAH), volatile organic halocarbons (VOH), and metals as required by F.A.C. Rule 17-775 of the soil being treated during the particulate matter compliance test.

20. This facility must be tested for particulate matter and visible emissions within 30 days of exceeding a process input rate of 22 TPH. All compliance tests shall meet the requirements listed in F.A.C. Rule 17-297. The facility shall not operate above the maximum permitted process rate of 35 TPH.

21. When the Department, after investigation, has good reason (such as complaints, increased visible emissions, or questionable maintenance of control equipment) to believe that any applicable emission standard contained in F.A.C. Rule 17-296.415 or in this permit is being violated, it may require the owner or operator of the unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department (F.A.C. Rule 17-297.340(2)).

SPECIFIC CONDITIONS

RECORD KEEPING REQUIREMENTS

22. Pressure drop across the baghouse, temperature of the afterburner, and CO emissions shall be recorded continuously during operations. The CO continuous emission monitor shall be replaced with one having a span of approximately 0 to 200 ppm CO prior to the expiration of this permit. The instruments used to obtain these measurements shall be properly calibrated, maintained, and in operation any time the facility is in service.

23. The permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements, all continuous monitoring system performance evaluations, all continuous monitoring system or monitoring device calibration checks, adjustments and maintenance performed on these systems or devices, all soil analysis required by F.A.C. Rule 17-775 and all other information required by rules and this permit, recorded in a permanent form suitable for inspection. The file shall be retained for at least 3 years following the date of such measurements, maintenance, reports, and records.

24. The permittee shall maintain a daily log that shows the date, location, operation time, pressure drop across the PM control device, processing rate, type and quantity of fuel consumption in the dryer and afterburner, and any operation problems. These records shall be maintained for a minimum of 3 years.

ADMINISTRATIVE REQUIREMENTS

25. The Bureau of Air Regulation (BAR) shall be notified in writing at least 15 days in advance of any scheduled compliance test to be conducted on this facility (F.A.C. Rule 17-297.340(1)(i)).

26. Compliance test results shall be submitted to the BAR and the District that the tests were conducted in within 45 days of the test (F.A.C. Rule 17-297.570(2)).

27. The permittee for a mobile unit shall notify the BAR, local government (city and/or county) and the Department District office by registered mail at least 5 days prior to moving to a new operating site. The notification shall provide the permit number of the facility, a copy of the last stack test results, the date of the proposed move, the new work site address for the facility, the amount of contaminated soil at the new site, and the locations and contamination levels of the soils to be treated. The Department will notify the permittee of any new restrictions for the facility that will apply while it is operating at the new site (F.A.C. Rule 17-775.700(1)).

SPECIFIC CONDITIONS

28. The permittee shall submit to the BAR each calendar year, on or before March 1, an Annual Operation Report DER Form 17-1.202(c) for this facility for the preceding calendar year containing at least the following information pursuant to Subsection 403.061(13), F.S.:

(A) Annual amount of material and/or fuels utilized.

(B) Annual emissions in TPY (note calculation basis).

(C) Annual hours of operation.

(D) Any changes in the information contained in the application.

(E) All compliance tests reports for the preceding year.

(F) Temperature and CO exceedance reports for the year.

29. An application for an operating permit must be submitted to the BAR at least 90 days prior to the expiration date of this permit. To apply for an operation permit, the applicant shall submit the appropriate application form, fee, a report on any physical change or major maintenance to the facility, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 9 day
of August, 1993

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Howard L. Rhodes, Director
Division of Air Resources Management

Memorandum

Florida Department of
Environmental Protection

TO: Howard L. Rhodes

FROM: C. H. Fancy

DATE: August 10, 1993

SUBJ: Permit to Operate
D.R.E. Environmental, Inc.

Attached for your approval and signature is a permit to operate a mobile soil thermal treatment facility. The facility is authorized to operate in every District.

I recommend your approval and signature.

CHF/WH/bjb

Attachments

8/9
Patty
This one signed
by Howard

2.0 SUMMARY OF RESULTS

Results of the particulate matter emission measurements conducted on the mobile soil remediation unit on February 7, 1992 are summarized in Table 1. During the test period, the contaminated soil input rate to the dryer averaged 22.2 tons per hour, compared with a maximum permitted rate of 35 tons per hour. The permit for the soil remediation unit limits the mass emission rate of particulate matter to 2.4 pounds per hour.

The particulate matter concentration in the stack gas during the three tests averaged 0.1746 grains per dry standard cubic foot, at stack conditions, and the mass emission rate averaged 13.02 pounds per hour. The particulate matter concentration averaged 0.1708 grains per dry standard cubic foot when corrected to 50 percent excess air, and averaged 0.1753 grains per dry standard cubic foot when corrected to seven percent oxygen. The stack gas flow rate averaged 8664 SCFMD, the stack gas temperature averaged 1626°F and the stack gas moisture averaged 31.0 percent.

Results of the total hydrocarbon (THC) emission measurements are summarized in Table 2. The THC concentration in the stack gas during the three tests averaged less than 1.0 ppm (as propane) and the mass emission rate averaged less than 0.1 pound per hour. The permit limits the mass emission rate of THC to 14.0 pounds per hour. The THC in the waste feed treated during the three test runs averaged 44 mg/kg. This is equivalent

to a feed rate of hydrocarbons to the kiln of 2.0 pounds per hour. Based on the hydrocarbon feed rate and the stack gas discharge rate, a destruction-removal efficiency of 98.3 percent was achieved.

During the two 30-minute observation periods, no visible emissions were noted. The permit limits visible emissions from the baghouse/afterburner exhaust stack to five percent opacity and limits visible emissions from the conveying and soil handling operation to 10 percent opacity.

TABLE 2

TOTAL HYDROCARBON EMISSION MEASUREMENTS

DRE ENVIRONMENTAL, INC.
QUANTICO, VIRGINIA

FEBRUARY 7, 1992

Run No.	Stack Gas Flow Rate (SCFMD)	Stack Gas Concentration (ppm)	Emission Rate (lbs/hr)
1	9076	0	BDL
2	9316	1-2	0.1
3	7600	0	BDL
Avg	8664	0.67	<0.1

Calculations:

(conc. ppm) x ft^3/min x 60 min/hr x 44/385 x 10^{-6} = lbs/hr

TABLE 3

DESTRUCTION REMOVAL EFFICIENCY

DRE ENVIRONMENTAL, INC.
QUANTICO, VIRGINIA

FEBRUARY 7, 1992

Run No.	Contaminated Soil Feed Rate (tons/hr)	TRPH Conc. in Feed (mg/kg)	TRPH Conc. in Feed (lb/hr)	THC Conc. in Stack Gas (ppm)	THC Conc. in Stack Gas (lb/hr)	DRE (%)
1	20.3	40.7	1.65	0	BDL	
2	23.2	11.7	0.54	2	0.1	
3	23.1	79.5	3.67	0	BDL	
Avg.	22.2	44.0	1.96	0.67	<0.1	98.3

Calculations:

TRPH in feed = Feed Rate (lb/hr) x Feed Conc. (mg/kg) x 10^{-6}

TRPH in stack gas from Table 2

DRE = (TPHC in feed - THC in stack gas) x 100/TPHC in feed

1.0 INTRODUCTION

On May 21, 1991, Koogler & Associates Environmental Services conducted emission measurements for particulate matter, metals, volatile organic compounds, total petroleum hydrocarbons and carbon monoxide on a mobile soil remediation unit for D.R.E. Environmental, Inc., at Malone, Florida.

Particulate matter emission measurements were made in accordance with EPA Method 5 and in conjunction with the multi-metals train described in EPA publication PB91-120-006. The particulate matter emission measurements ranged from 4.15 to 5.91 pounds per hour and averaged 4.95 pounds per hour. A summary of the particulate matter emissions, gas flow and stack parameters is presented in Table 1.

Volatile organic compounds emission measurements were made with the Volatile Organic Sampling Train (VOST) by EPA Method SW846 0030. Benzene averaged 1.1×10^{-4} pounds per hour for the three runs while toluene averaged 3.9×10^{-4} pounds per hour; ethylbenzene averaged 1.9×10^{-4} pounds per hour; and xylene averaged 13.0×10^{-4} pounds per hour. A summary of the BTEX emission measurements is presented in Table 2.

Total hydrocarbon (THC) emission measurements were made with a FID by EPA Method 25A. The emissions ranged from 0.022 to 0.105 pounds per hour and averaged 0.060 pounds per hour (calculated as propane). Carbon monoxide emissions measured with a continuous emission monitor by EPA Method 10A ranged from 0.24 to 0.29 pounds per hour and averaged 0.27 pounds per hour

4.0 SUMMARY OF RESULTS

Particulate matter concentrations in the stack gas during the three tests averaged 0.0593 grains per dry standard cubic foot and the mass emission rate averaged 4.95 pounds per hour. This compares to the allowable 0.08 grains per dry standard cubic foot and 28.3 pounds per hour, per FAC Rule 17-2.610(1)(b).

Total hydrocarbon emissions averaged 0.060 pounds per hour, compared to the allowable of 22.1 pounds per hour. The emission rates averaged 1.1 x 10^{-4} pounds per hour for benzene; 3.9 x 10^{-4} pounds per hour for toluene; 1.9 x 10^{-4} pounds per hour for ethylbenzene; and 13.0 x 10^{-4} pounds per hour for xylene. Benzene, which is regulated by the permit, was well below the maximum emission limit of 8.6 pounds per hour.

Total hydrocarbons in the stack gas averaged 0.060 pounds per hour as propane (0.049 lb/hr as carbon) during the three tests. When compared to the average feed rate of petroleum hydrocarbons of 15.36 pounds per hour (11.94 lb/hr as carbon), the resulting destruction efficiency is 99.6 percent.

Carbon monoxide emissions averaged 0.27 pounds per hour during the three tests. The allowable CO emissions are 2.5 pounds per hour.

Metals emissions were all quite low with five of ten metals at or below the detection limit of the analysis.

(13.9 ppm at 7.0 percent oxygen). A summary of the THC and CO emissions is presented in Table 3.

A comparison of the total hydrocarbons from the stack and in the soil feed is presented in Table 4 and shows an average destruction efficiency of 99.6 percent.

Metals emissions ranged from less than 6×10^{-5} pounds per hour for cadmium to 1.39×10^{-3} pounds per hour for selenium. Arsenic, cadmium, lead, nickel, silver and selenium were found at or below the detection limits. A summary of the metals emission rates is presented in Table 5.

TABLE 1

SUMMARY OF SOURCE EMISSION TEST DATA

D.R.E. Environmental
Baghouse / Afterburner
May 21, 1991

Run No.	Process Weight Rate (Tons/Hr)	Stack Gas Flow Rate (SCFMD)	Stack Gas Temperature (°F)	Stack Gas Moisture (%)	Particulate Matter	
					Conc. (gr/dscf)	Emission Rate (Lbs/Hr)
1	26.0	9133	1623.0	29.1	0.0755	5.91
2	28.0	10687	1654.0	27.7	0.0453	4.15
3	30.0	9831	1636.0	32.6	0.0570	4.80
Average	28.0	9884	1637.7	29.8	0.0593	4.95

Allowable Particulate Matter Emission Rate = 28.3 Lbs/hr
As per F.A.C. Rule 17-2.610(1)(b)

TABLE 3

SUMMARY OF TOTAL HYDROCARBONS AND
CARBON MONOXIDE EMISSION MEASUREMENTS

	POUNDS PER HOUR			
	Run 1	Run 2	Run 3	Average
THC	0.105	0.052	0.022	0.060
	(1.7 ppm)	(0.7 ppm)	(0.3 ppm)	(0.90 ppm, stack cond)
CO	0.29	0.28	0.24	0.27
	(7.2 ppm)	(6.0 ppm)	(5.6 ppm)	(6.3 ppm, stack cond)
	(16.4 ppm)	(14.0 ppm)	(11.4 ppm)	(13.9 ppm, 7.0% O_2)

TABLE 4

COMPARISON OF TPHC IN FEED AND STACK TO
DETERMINE DESTRUCTION EFFICIENCY (DRE)

Run	Feed (lbs/hr)		Stack (lbs/hr)		DRE* (%)
	as TPHC	as Carbon	as Propane	as Carbon	
1	22.00	17.09	0.105	0.086	99.5
2	8.74	6.79	0.052	0.043	99.4
3	15.36	11.93	0.022	0.018	99.8
Average	15.36	11.94	0.060	0.049	99.6

* Based on carbon.

→ P 4/16

Check Sheet

Company Name: DRE Environmental
Permit Number: AO 16-231440, ~~FAC 18~~
PSD Number:
County:
Permit Engineer:
Others involved:

Application:
- [x] Initial Application
- [ ] Incompleteness Letters
- [ ] Responses
- [ ] Final Application (if applicable)
- [ ] Waiver of Department Action
- [ ] Department Response

Intent:
- [ ] Intent to Issue
- [ ] Notice to Public
- [ ] Technical Evaluation
- [ ] BACT Determination
- [ ] Unsigned Permit

  Attachments:
  - [ ]
  - [ ]
  - [ ]
- [ ] Correspondence with:
  - [ ] EPA
  - [ ] Park Services
  - [ ] County
  - [ ] Other
- [ ] Proof of Publication
- [ ] Petitions - (Related to extensions, hearings, etc.)

Final Determination:
- [x] Final Determination
- [ ] Signed Permit
- [ ] BACT Determination

Post Permit Correspondence:
- [ ] Extensions
- [ ] Amendments/Modifications
- [ ] Response from EPA
- [ ] Response from County
- [ ] Response from Park Services

D. R. E.
ENVIRONMENTAL INC.

PH. (904) 758-3164 **FAX (904) 755-5430**

" Destruction Removal Efficiencies "

April 29, 1993

RECEIVED
MAY 18 1993
Division of Air
Resources Management

Bureau of Air Regulations
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. Willard Hanks

RE: Air Operating Permit Application for DRE Environmental AC 16-187650

Dear Mr. Hanks:

DRE Environmental, Inc. has now completed its stack emission requirements for its mobile soil remediation unit and hereby submits the certificate of completion for your review and approval. Enclosed please find the permit fee in the amount of $1,500.00 for this unit.

DRE requests that the operating permit be amended to reflect the departments current updated regulations for soil thermal treatment units regarding testing requirements and soil analysis.

DRE has made several modifications to our unit since we first submitted our application to construct in 1990. The changes are listed below and are incorporated into our enclosed application to operate an air pollution source.

1. The primary fan impeller was replaced with a less efficient unit with a wider operating fan curve for better damper control by the operator.

2. The original cyclones proved to be ineffective due to high moisture in the soils; we replaced them with a large knock out box and also improved the breaching so the air enters the baghouse at a reduced velocity. The end results showed a much better dust removal efficiency and a reduction in the overall pressure drop of the system.

3. The baghouse/afterburner trailer has been reduced from 79' to 67' in length.

4. The 20 HP air compressor was upgraded to a 30 HP unit in order to provide more air for operation and maintance tasks.

POST OFFICE BOX 1386, LAKE CITY, FLORIDA 32056-1386

5. We have included calculations for No. 2 fuel oil as an additional alternative fuel source.

6. DRE modified its steam vent line from the rear of the drum and has installed a munters mist eliminator and 2 HP fan for dust control on the discharge auger.

DRE performed its stack test at this site at 20 tons per hour because of wet soil conditions, instead of our permit limit of 35 tons per hour. Results of the soil analysis and strip charts for the CO Monitor are provided for your review.

It is our understanding that we cannot exceed 110% of the tested rate until we submit data to the state showing compliane at the higher feed rate. The BAR will be notified in advance of any future testing of the unit.

If you have need of additional technical information please call 904-758-3164.

Sincerely,

DRE ENVIRONMENTAL, INC

Chris K. Sleeper
President

CKS/dln

$1500 pd.
5-18-93
Rec'd. #180859

A016-231440

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AIR POLLUTION SOURCES
CERTIFICATE OF COMPLETION OF CONSTRUCTION*

PERMIT NO. AC16-187650 DATE: May 9, 1993

Company Name: DRE Environmental, Inc. County: Portable

Source Identification(s): Soil Remediation Incinerator (Portable)

Actual costs of serving pollution control purpose: $ 350,000

Operating Rates: 35 tph Design Capacity: 35 tph

Expected Normal 30 tph During Compliance Test 20 tph

Date of Compliance Test: Feb. 25-26, 1993 (Attach detailed test report)

Test Results:

Pollutant	Actual Discharge	Allowed Discharge
Particulate	.03566 grains/dscf	.04 grains/dscf
VOC	.10 lbs/hr	22.8 lbs/hr

Date plant placed in operation: in Florida Feb 15, 1993

This is to certify that, with the exception of deviations noted**, the construction of the project has been completed in accordance with the application to construct and Construction Permit No. AC16-187650 dated _____.

A. Applicant:

Chris Sleeper, President — Name of Person Signing (Type)

Chris N. Sleeper — Signature of Owner or Authorized Representative and Title

Date: May 11, 1993 Telephone: (904) 758-3164

B. Professional Engineer:

Dole J. Kelley, Jr., P.E. — Name of Person Signing (Type)

Dole J. Kelley Jr. — Signature of Professional Engineer

Dole J. Kelley, Consulting Engineer — Company Name

Florida Registration No. 6519

Date: 5-11-93

DOLE J. KELLEY JR. CERTIFICATE No. 6519 STATE OF FLORIDA REGISTERED ENGINEER (Seal)

P.O. Box 10428 Jacksonville, FL. 32207 — Mailing Address

(904) 731-7760 — Telephone Number

*This form, satisfactorily completed, submitted in conjunction with an existing application to construct permit and payment of application processing fee will be accepted in lieu of an application to operate.

**As built, if not built as indicated include process flow sketch, plot plan sketch, and updates of applicable pages of application form.

#1500 pd.
5-14-93
Rcpt.#180457

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

AO16-231440

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: _____ [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [ ] Construction [X] Operation [ ] Modification

COMPANY NAME: DRE Environmental, Inc. COUNTY: Portable

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Soil Remediation Incinerator

SOURCE LOCATION: Street Portable City _____

UTM: East _____ North _____

Latitude ____° ____' ____"N Longitude ____° ____' ____"W

APPLICANT NAME AND TITLE: Chris Sleeper, President

APPLICANT ADDRESS: P.O. Box 1386, Lake City, FL 32056

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of DRE Environmental, Inc.

I certify that the statements made in this application for a Operating permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Chris N. Sleeper

Chris Sleeper, President
Name and Title (Please Type)

Date: _____ Telephone No. (904) 758-3164

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed Dole J. Kelley, Jr.

Dole J. Kelley, Jr., P.E.
Name (Please Type)

Dole J. Kelley, Consulting Engineer
Company Name (Please Type)

P.O. Box 10428, Jacksonville, FL 32207
Mailing Address (Please Type)

DOLE J. KELLEY, JR. CERTIFICATE NO. 6519 STATE OF FLORIDA REGISTERED ENGINEER

Florida Registration No. 6519 Date: 5-11-93 Telephone No. (904) 731-7760

SECTION II: GENERAL PROJECT INFORMATION

A. Deacribe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attsch additional sheet if necessary.

Portable facility for the decontamination of soil which contains virgin and non-virgin (used) oil which is within specifications. Treatment shall be in a rotary drier at 500°-700°F followed by a knock out box, a baghouse and afterburner. This portable system will operate normally 2-3 months at each site. Highly efficient pollution control equipment will result in total compliance with air pollution regulations.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N.A. Completion of Construction N.A.

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Afterburner $150,000

Baghouse $200,000

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AC 16-187650

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr 8760 ; if seasonal, describe: _____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? YES

   a. If yes, has "offset" been applied? NO

   b. If yes, has "Lowest Achievable Emission Rate" been applied? NO

   c. If yes, list non-attainment pollutants. SO_2, Ozone, Particulates

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. NO

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? YES

   a. If yes, for what pollutants? Particulates

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

No applicable VOC standard exist.
Particlates emission will be less than .04 grains/dscf.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Petroleum contaminated soil	Particulates	100%	70,000	A
	VOC	varies		

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 70,000

2. Product Weight (lbs/hr): <70,000 depending on moisture content

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Controlled Emission[1] Estimate		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Uncontrolled Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Particulates	4.61	20.19	.04 gr/dscf	4.61	199.88	873.1	B
CO	2.50	10.93			2.50	10.93	B
NO_x	10.01	43.73			10.01	43.73	B
SO_2	14.02	61.23			14.02	61.23	B
VOC	21.49	94.15			1400.75	6135.30	B

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency Predicted	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Hauck BH390-8 Baghouse	Particulate	99.7%	0-1000 microns	manufacturer
Hauck Afterburner	VOC	99.0%	N.A.	manufacturer
* The baghouse is rated for 15,073 ACFM (inlet) @ 400° F. It has 3840 sq.				ft. cloth
and a 3.92:1.0 air to cloth ratio.				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Propane Gas (drier)*		257.69 gal/hr	23 MMBTU/hr req'd @ 35tph
Propane Gas (afterburner)*		240.43 gal/hr	22 MMBTU/hr
#1 Diesel Fuel (generator)		13.16 gal/hr	1.8 MMBTU?hr
* alternate fuels for drier and afterburner will be natural gas and #2 fuel oil.			

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: <.5% Percent Ash: 0

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: 91,500 BTU/gal BTU/lb _____ BTU/gal
Propane 2523 BTU/cubic ft

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N.A. Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Dust from the knock out box and baghouse is added to finished product.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 30 feet ft. Stack Diameter: 2'9" 2.75 feet ft.

Gas Flow Rate: 36,077 ACFM _____ DSCFM Gas Exit Temperature: 1,600 °F.

Water Vapor Content: Varies % Velocity: 101.23 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid snd liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^2* _____ Wind spd/dir

Period of Monitoring _____/____/_____ to _____/____/_____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	_____ grams/sec
SO^2	_____ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

CALCULATIONS
April 28, 1993

All calculations are based upon the expected worst case soil conditions and maximum expected operating hours per year.

I. Soil Conditions (for the purpose of this application we have set the soil conditions to be worse than those we encountered in previous work we've done)

* Feed rate = 35 tons per hour
* Ambient temperature = 60
* Moisture content = 8.0% by wt.
* Hydrocarbon content = 2.0% by wt.
* Bulk density = 100 Lb/cu ft

II. Plant Operating Hours

* 24 Hr/Day
* 7 Days/Wk
* 365 Days/Yr
* 8,760 Hr/Yr

III. Fuel Consumption

Primary Fuel: Propane Gas.

* Propane gas having 91,500 BTU's/gal, 2523 BTU/ft3
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 9345 cfh or 257.69 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 8,719 cfh or 240.43 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 18,064 cfh or 158.24 MM cfy
  = 498.12 gal/hr or 4,363,531 gal/yr propane

First Alternate Fuel: Natural Gas

* Natural gas having 1,000 BTU's/ft^3,
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 23,578.4 cfh
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 22,000 cfh
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 45,578 cfh or 399.26 MM cfy Natural Gas

Second Alternate Fuel: No. 2 Fuel Oil

* No. 2 Fuel Oil having 19,850 BTU's/lb, 144,865 BTU/gal (7.298 lbs/gal)
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 1,187.83 lbs/hr or 162.76 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 1,108.31 lbs/hr or 151.86 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 2296 lbs/hr or 20.11 MM lbs/yr
  = 314.6 gal/hr or 2.75 MMgal/yr
  No. 2 Fuel Oil

IV Emissions Factors

A. Rotary Drier
* Contaminated soil = raw material
* Emissions factor = 40 LB oil/ton of soil based on 2.0% oil by wt.
* Emissions factor = 5.7 lbs particulate will emerge from the drier per ton of soil processed. (ref. AP-42 8.18-1)

B. Soil Contaminate Is No. 2 Fuel Oil (Density 7.3 lbs per gallon which when burned has the following emissions)
* Particulates uncontrolled = 2.0 lb/1,000 gal
* Sulfur content of fuel = 0.5% by wt.
* Sulfur dioxide = 2.0 lb per 1%/100 lbs oil
* Nitrogen oxide = 20 lb/1,000 gal
* Carbon monoxide = 5 lb/1,000 gal

C. Total Uncontrolled Emissions from Rotary Drier Due to Soil and Oil Contaminate

Assumption: The raw material with 8% moisture and 2.0% HC's is processed at 35 tph. All HC's in the soil are treated like additional fuel in the afterburner.

1. Particulate emissions from Rotary Drier from soil:
   (AP-42 says approximately 5.7 lb/ton)
   (5.7 lb/ton) x (35 TPH) = 199.5 lb/hr

2. Hydrocarbon (VOC) emissions from oil in soil:
   * VOC = (2.0%) x (35 TPH) x (2,000 lb/ton) = 1,400 lb/hr
   * VOC fuel conversion
     = (1,400 lb/hr)/(7.3 lb/gal) = 191.78 gal/hr
   * Particulates = (2 lb/1000 gal) x (191.78 gal/hr)
     due to fuel oil = .3836 lb/hr
   * Sulfur Dioxide = 2.0 x .5 x 1,400/100 = 14 lb/hr
   * Nitrogen Oxide = (191.78 gal/hr) x 20 lb/1000 gal) = 3.835 lb/hr
   * Carbon Monoxide = (191.78 gal/hr) x (5.0 lb/1000 gal) = 0.958 lb/hr

3. Total Solid Uncontrolled Emissions (Particulates) from Rotary Drier
(Soil Emissions) + (HC Emissions) = Total
199.5 lb/hr + 0.3836 lb/hr = 199.8836 (plus .1134 lbs/hr from combustion of propane gas in Rotary Drier)

4. Uncontrolled Emissions from combustion of Propane Gas (AP-42 Table 1.5-1)
Natural gas is considered the same except for SO_2 which is slightly lower (.0114 lbs.hr)

Rotary Drier = 257.69 gal/hr
Afterburner = 240.43 gal/hr
TOTAL = 498.12 gal/hr

Particulate	.09 to .44 lbs per 1000 gal	= .0447 lbs/hr to .2191 lbs/hr
SO2	.0378 lbs per 1000 gal	= .0188 lbs/hr
NOx	12.4 lbs per 1000 gal	= 6.1766 lbs/hr
CO	3.1 lbs per 1000 gal	= 1.544 lbs/hr
VOC	.52 lbs per 1000 gal	= .2589 bs/hr

5. Total Uncontrolled Emissions (Non-Particulate) due to combustion of propane and soil contaminent oil.

SO2	14 lbs/hr + .0188 lbs/hr	= 14.0188 lbs/hr
NOx	3.835 lbs/hr + 6.1766 lbs/hr	= 10.0116 lbs/hr
CO	0.958 lbs/hr + 1.544 lbs/hr	= 2.5020 lbs/hr
VOC	1,400 lbs/hr + .2589 lbs/hr	= 1400.2589 lbs/hr

D. Total Controlled Emissions of Solids

1. Exhaust gas conversion to SCFM
Baghouse capacity = 15,073 acfm @ 400°F

* Temperature correction factor $= \frac{(70 + 460)}{(400 + 460)} = \frac{530}{860} = 0.616$

* SCFM = (0.616) X (15,073 acfm) = 9,284 scfm baghouse design flow

2. Baghouse Efficiency
* The following calculations show what the baghouse efficiency would have to be to meet the state regulations allowing maximum particulate emissions from incinerators to be .04 grains per dscf.

CALCULATIONS OF DSCF PRODUCTS OF COMBUSTION

The following calculations will show the products of combustion: (Theoretically based on 40% excess air which is the amount we plan to use)

Combustion of Propane Gas (C_3H_8)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$C_3H_8 + 4(1.4)0_2 + 4(3.76)1.4N_2 \rightarrow 3CO_2 + 4H_20 + .6\ 0_2 + 21.056N_2$$

Therefore one cubic foot of Propane gas will yield 3 cf CO_2 + .6 cf 0_2 + 21.056 cf N_2 = 24.656 dscf of products of combustion when burned with 40% excess air. (The water was not included but would be 13.9% of the volume of 28.656 scf which is the total products of combustion from one cubic foot of Propane)

Combustion of Natural Gas (CH_4)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$CH_4 + 2(1.4)0_2 + 2(3.76)1.4N_2 \rightarrow CO_2 + 2H_20 + .80_2 + 10.528N_2$$

Therefore one cubic foot of Natural gas will yield 1 cf CO_2 + .8 cf 0_2 + 10.528 cf N_2 = 12.328 dscf (The water was not includedbut would be 13.9% of the volume of 14.328 scf which is the total products of combustion from one cubic foot of Natural Gas)

Combustion of Diesel Fuel

Theoretical equation using Dodecane ($C_{12}H_{26}$) as diesel fuel and using 140% theoretical air. (shown below as 1.4)

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

Atomic Weights: C=12, H=1, O=16, N=14

Molecular Weights: $C_{12}H_{26}$=170, O_2=32, N_2=28, CO_2=44, H_2O=18, N_2=28

Converting to pound moles

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

$$170 + 18.5(1.4)(32) + 18.5\ (3.76)(1.4)(28) \rightarrow 12(44) + 13(18) + 7.4(32) + (97.384)(28)$$

Therefore the combustion of diesel fuel (Dodecane) with 140% theoretical air (40% excess air) will yield products of combustion → 528 + 234 + 236.8 + 2726.752
or Dry (less H_20) = 528 + 236.8 + 2726.752 = 3491.552 lbs

Dividing by theoretical fuel input of 170 pounds (shown as pound moles above)
3491.552 ÷ 170 = 20.5385 lbs dry products of combustion per pound of fuel burned with 40% excess air

$$\text{Volume} = \left(\frac{528 \text{ lbs } CO_2}{170 \text{ lbs fuel}} x \frac{8.548 \text{ ft}^3}{lb \text{ of } CO_2}\right) + \left(\frac{236.8 \text{ lbs } O_2}{170 \text{ lbs fuel}} x \frac{11.819 \text{ ft}^3}{lb\ O_2}\right) +$$

$$\left(\frac{2{,}726.752 \text{ lbs } N_2}{170 \text{ lbs fuel}} x \frac{13.443 \text{ ft}^3}{\text{lbs } N_2}\right) = 26.55 + 16.46 + 215.62 =$$

= 258.63 scf of dry products of combustion per pound of diesel fuel burned at 40% excess air

Primary Fuel: Propane Gas.

From III above the total propane gas consumed by the drier and afterburner is 18,064 CFH.

18,064 CFH propane gas x 24.656 dscf/cf propane gas = 445,386 dscf/hr products of combustion when Propane is burned with 40% excess air.

First Alternate Fuel: Natural Gas

From III above the total natural gas consumed by the drier and afterburner is 45,578 CFH.

45,578 CFH natural gas x 12.328 dscf/cf nat. gas = 561,885 dscf/hr products of combustion when Natural Gas is burned with 40% excess air.

Second Alternate Fuel: No. 2 Fuel Oil

From III above the total No. 2 Fuel Oil consumed by the drier and afterburner is 2,296 lbs/hr.

2,296 lbs/hr x 258.63 dscf/lb diesel = 593,814 dscf/hr products of combustion when No. 2 Fuel Oil is burned with 40% excess air.

Oil burned from the soil: From C-2 above 1,400 lbs/hr are burned due to oil in the soil

1,400 lbs/hr x 258.63 dscf/lb diesel = 362,082 dscf/hr products of combustion when Oil is burned with 40% excess air.

Total Dry Products of Combustion for Propane Gas + Oil burned from the soil = 445,386 + 362,082 = 807,468 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for Natural Gas + Oil burned from the soil = 561,885 + 362,082 = 923,967 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for No. 2 Fuel Oil + Oil burned from soil = 593,814 + 362,082 = 955,869 dscf per hr @ 40% Excess Air

Baghouse Efficiency: Maximum allowable particulate emissions for incinerators is given by the state as .04 grains per dscf. We expect to run at an average 40% excess air so the above figures will be used.

Calculations for primary fuel: Propane Gas.

$$\frac{807{,}468 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{4.6141 \text{ lbs}}{\text{hour}} \text{ while firing propane}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 4.6141 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{4.6141 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 92.31\% \text{ Target Efficiency while firing Propane}$$

Required % efficiency while firing propane = 92.31%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing propane. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for First Alternate Fuel: Natural Gas.

$$\frac{923{,}967 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.2798 \text{ lbs}}{\text{hour}} \text{ while firing Natural Gas}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.2798 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.2798 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 91.19\% \text{ Target Efficiency while firing Natural Gas}$$

Required % efficiency while firing Natural Gas = 91.19%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing Natural Gas. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for Second Alternate Fuel: No. 2 Fuel Oil.

$$\frac{955{,}869 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.4621 \text{ lbs}}{\text{hour}} \text{ while firing No.2 Fuel Oil}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.4621 lbs/hr maximum particulate emission

* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.4621 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 90.89\% \text{ Target Efficiency while firing No. 2 Fuel Oil}$$

Required % efficiency while firing No. 2 Fuel Oil = 90.89%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing No. 2 Fuel Oil. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

E. Exhaust Gas Volume From Afterburner. Note: The actual volume of products of combustion, excess air and water vapor emerging from the stack will vary and will be controlled by use of the fan damper. This is done to maintain a negative pressure draft on the drier air intake (burner end). When soils with high hydrocarbon content are processed, the afterburner tends to overheat and the gas fuel to the afterburner is reduced to a minimum (1-2% of maximum). When high moisture soils are processed, the drier burner heat is increased and the air flow is increased to provide combustion air and drying air. Because of these variables we will estimate the total exhaust gas volume based on the rated capacity of the baghouse from D-1 above.

Stack gas flow rate = 9,284 SCFM (from D-1 above

Assumption: Afterburner set @ 1600°F

$$\text{Temperature Correction factor} = \frac{(1600 + 460)}{(70 + 460)} = 3.886$$

(3.886) x (9,284 scfm) = 36,077 acfm @ 1600° F

Stack gas velocity

Size of exhaust stack = 3.0 ft outside diameter, 2.75 ft inside diameter
Cross sectional area = 5.93 sq ft inside
Stack height above grade = 30.0 ft

$$\text{Exhaust Gas Velocity} = \frac{36{,}077 \text{ acfm}}{5.93 \text{ sq. ft.}} x \frac{1 \text{ min.}}{60 \text{ sec.}} = 101.23 \text{ fps}$$

Afterburner Retention Time Calculation:

* Exhaust gases in the afterburner are calculated to be 36,077 acfm @ 1600° F
* Afterburner I.D. = 5.0 ft
* Cross sectional area = 19.634 sq. ft

* $\text{Afterburner air velocity} = \frac{36{,}077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62 \text{ fps}$

* Afterburner air velocity = $\frac{36{,}077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62$ fps

* Length of afterburner combustion chamber = 38.16 ft
* Required retention time of gases = 0.5 sec

* Actual retention time of gases = $\frac{38.16 \text{ ft.}}{30.62 \text{ fps}} = 1.246$ sec.

F. Total Controlled Emissions of VOC's

* Afterburner operates at 1,500 to 1,600° F and field tests of similar units indicate it has a 99.00% destruction efficiency for all VOC's entering unit. However we will only claim a 98.5% efficiency since that will be good enough to keep controlled VOC effluent below 100 ton/year as shown below

* Uncontrolled VOC's = 1,400.2589 lb/hr (from C-5 above)

* Permissable VOC effluent = $\frac{100 \text{ tons}}{\text{year}} x \frac{2{,}000 \text{ lbs}}{\text{ton}} \div \frac{8{,}760 \text{ hours}}{\text{year}} = \frac{22.831 \text{ lbs}}{\text{hour}}$

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{Total Uncontrolled}}$$

$$\frac{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}} - \frac{22.831 \text{ lbs}}{\text{hour}}}{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}}} = 98.36\% \text{ Target Efficiency}$$

Target efficiency of 98.36% is needed to keep VOC emissions below 100 tpy.

* We will claim 98.5% efficiency which will result in
* Controlled VOC's emissions = 21.00 lb/hr based on 98.5% efficiency

* Controlled VOC's = 21.00 lb/hr based on 98.5% efficiency
* When added to the VOC emissions of the diesel powered electric generator (page 9).
  Total VOC's will be 21.00 lbs/hr + .496 lbs/hr = 21.496lbs/hr
  21.496 lbs/hr x 8760 hrs/yr ÷ 2000 lbs/ton = 94.15 TPY VOCs

G. Controlled Emissions other than Particulates and VOC's (from C-5 above)

* CO < 2.502 lbs/hr or 10.95 tpy
* NOx < 10.011 lbs/hr or 43.84 tpy
* SO2 < 14.018 lbs/hr or 61.39 tpy

New or used oil contaminating the soil may not contain more than the specified amount of the following. Therefore, the stack discharge may have similar traces.

5 ppm	Arsenic	100 ppm	Lead
2 ppm	Cadmium	1000 ppm	Total Halogens
10 ppm	Chromium	< 2 ppm	PCB

Diesel Powered Electricity Generator Emissions Calculations

Max capacity 240 Kilowatts
Design Load 150 Kilowatts
Operation Hours 8760 hours per year
Based on AP42 Table 3.3-1

Carbon Monoxide: 4.06 g/kwh x 150 kwh x .0022046 pounds/g = 1.34 lbs/hr

$$4.06 \times 8760 \text{ hrs/yr} \times 240 \text{ kilowatts} \times \frac{150 \text{ kilowatts used}}{240 \text{ kilowatts available}} = 5{,}334{,}840 \text{ grams/yr}$$

5,334.840 kg/yr x 2.2046 lbs/kg = 11,761.188 lbs/yr = 5.88 TPY carbon monoxide

Exhaust Hydrocarbons (VOC): 1.5 g/kwh x Ditto = .496 lbs/hr

1.50 g/kwh x 1,314,000 kwh = 1,971,000 grams/yr

1,971.000 kg/yr x 2.2046 lbs/kg = 4345.26 lbs/yr = 2.17 TPY VOC

2.17 TPY ÷ 8760 hrs/yr x 2000 lbs/ton = .496 lbs/hr

Nitrogen Oxides: 18.8 g/kwh x Ditto = 6.21 lbs/hr

18.8 g/kwh x 1,314,000 kwh = 24,703,200 grams/yr

24,703.200 kg/yr x 2.2046 lbs/kg = 54,460.67 lbs/yr = 27.23 TPY nitrogen oxide

Sulfur Oxides: 1.24 g/kwh x Ditto = .413 lbs/hr

1.25 g/kwh x 1,314,000 kwh = 1,642,500 gr/yr

1,642.500 kg/yr x 2.2046 lbs/kg = 3621.05 lbs/yr = 1.81 TPY sulfur oxides

Particulate: 1.34 g/kwh x Ditto = .443 lbs/hr

1.34 g/kwh x 1,314,000 kwh = 1,760,760 grams/yr

1,760.760 kg/yr x 2.2046 lbs/kg = 3,881.77 lbs/yr = 1.94 TPY particulates

EQUIPMENT SPECIFICATIONS

SOIL UNIT

DRIER STANDARD EQUIPMENT (CS6028 DRIER)

A. 515 Steel drum: diameter 60 inches, length 28 feet
B. Chain drive, 60 HP motor
C. Hauck powerstar LP burner, 23 million BTU
D. Burner blower 24 oz, 15 HP
E. Tertiary Fan, 10 HP
F. Burner control, ADM manual, ADM auto
G. LP pump
H. Motor control center
I. Take-away screw conveyor: 10 HP
J. Inlet belt conveyor (with scale) controlled by pressure drop in drum.
K. Adjustable drum frame with hydraulic system
L. Insulated drum - 2" duall

COLD FEED STANDARD EQUIPMENT

A. (1) 15 ton bin, 1/4" plate 8' x 10' top opening
B. 24" belt feeder lagged head pulley
C. Radial type gate with positive locks
D. 4" idlers, CEMA B throughout
E. Belt guards on feeders
F. Belts, 1/8" x 1/16": covers, 2 ply aggregate belt
G. Material detector

CONTROL ROOM STANDARD EQUIPMENT

A. 7'-7" x 15'-6" dimensions
B. Interior lighting
C. Heating and air conditioning
D. Control panel with manual and automatic systems for remote operation
E. CO and O_2 monitoring equipment with data logger.

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axel with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies

EQUIPMENT SPECIFICATIONS

Second Unit

AFTERBURNER STANDARD EQUIPMENT

A. Hauck LP burner, 22 million BTU
B. Burner blower 16 oz, 25 HP
C. Burner control, ADM manual, ADM auto
D. Ceramic-refractory lined chamber
E. Hydraulic raised stack
F. Stack temperature readout with probe
G. Electrical controls
H. LP pump

BAGHOUSE STANDARD EQUIPMENT (MODEL BH390-8)

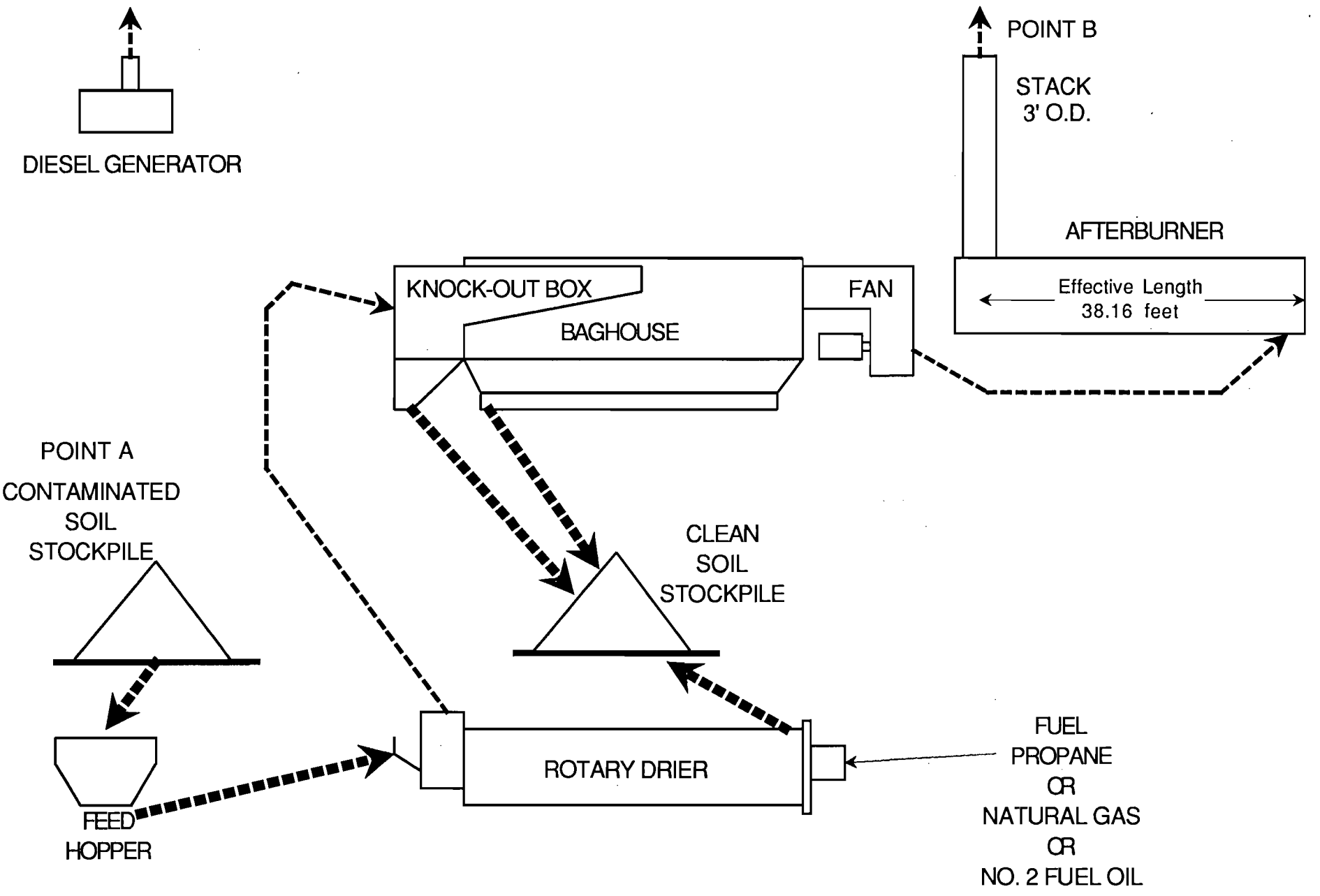
A. 3,840 sq ft of filter
B. 4.16:1 air to cloth ratio
C. Dust removal conveyors
D. 390 bags: 4.5" diameter, 96" long, P-84 material, 14 oz
E. Venturi orifice and injectors
F. Bag removal from top thru clean air section
G. Adjustable timer for cleaning and interval
H. Bags shipped mounted on cages
I. Outlet duct from exhaust fan to afterburner
J. 16,000 CFM exhaust fan: 50 HP @ 10" SP
K. Damper control
L. 30 HP air compressor: 84 CFM @ 100 PSI
M. Knock out box with breaching.

GENERATOR

A. 200 KW generator
B. Fuel tank-60 gallons
C. Fuel tank-1,000 gallon. (auxiliary)
D. Battery rack and cables
E. Air cleaner
F. Main breaker

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axle with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies



DRE Environmental Services, Inc.
Soil Remediation Incinerator (Portabl

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/25/93
Stack: Contaminated Soil Incinerator Run: 1 From 1819 to 1926

Y Factor	1.006		Nozzle Diameter	0.375	In
Total Time	60	Min	Nozzle Area	0.000767	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	30.22	In Hg
Stack Temperature	1630.6	°F	Meter Temperature	74.2	°F
Stack Pressure	30.20	In Hg	Meter Orifice Diff	3.311	In H_2O
Stack Avg √ Vel Head	1.099	In H_2O	Meter Volume	57.842	CF
			Condensate Volume	417.0	ml

1.	Volume Water Vapor Sampled	19.628 SCF
2.	Volume Standard Dry Gas Sampled	58.539 SCF
3.	Total Standard Sample Volume	78.167 SCF
4.	Percent Moisture	25.111
5.	Percent Dry Air	74.889
6.	Molecular Weight of Dry Flue Gas	29.768
7.	Molecular Weight of Wet Flue Gas	26.813
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen [O_2]	7.00
10.	Percent Carbon Dioxide [CO_2]	9.30
11.	Percent Excess Air	46.367
12.	Velocity of Flue Gas	126.814 FPS
13.	Actual Volumetric Flow Rate	45196.7 ACFM
14.	Dry Volumetric Flow Rate	33847.5 ACFMD
15.	Standard Volumetric Flow Rate	8628.6 SCFMD
16.	Emission Concentration	0.02894 gr/SCFD
17.	Emission Concentration	0.00553 gr/ACF
18.	Emission Rate	2.141 lbs/Hr
19.	Percent Isokinetic	87.6

Probe/Nozzle Wash	33.00 mg
Filter	76.80 mg
Total	109.80 mg

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 2 From 0908 to 1023

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1614.1	°F	Meter Temperature	78.4	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.682	In H_2O
Stack Avg √ Vel Head	0.914	In H_2O	Meter Volume	31.093	CF
			Condensate Volume	259.0	ml

1.	Volume Water Vapor Sampled	12.191 SCF
2.	Volume Standard Dry Gas Sampled	30.785 SCF
3.	Total Standard Sample Volume	42.976 SCF
4.	Percent Moisture	28.367
5.	Percent Dry Air	71.633
6.	Molecular Weight of Dry Flue Gas	29.804
7.	Molecular Weight of Wet Flue Gas	26.456
8.	Specific Gravity Flue Gas	0.92
9.	Percent Oxygen [O_2]	6.30
10.	Percent Carbon Dioxide [CO_2]	9.70
11.	Percent Excess Air	39.683
12.	Velocity of Flue Gas	106.196 FPS
13.	Actual Volumetric Flow Rate	37848.3 ACFM
14.	Dry Volumetric Flow Rate	27111.9 ACFMD
15.	Standard Volumetric Flow Rate	6913.3 SCFMD
16.	Emission Concentration	0.03569 gr/SCFD
17.	Emission Concentration	0.00652 gr/ACF
18.	Emission Rate	2.115 lbs/Hr
19.	Percent Isokinetic	107.8

Probe/Nozzle Wash	51.40 mg
Filter	19.80 mg
Total	71.20 mg

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Data: 02/26/93
Stack: Contaminated Soil Incinerator Run: 3 From 1056 to 1220

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1635.4	°F	Meter Temperature	74.0	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.849	In H_2O
Stack Avg √ Vel Head	1.020	In H_2O	Meter Volume	34.335	CF
			Condensate Volume	255.5	ml

1.	Volume Water Vapor Sampled	12.026 SCF
2.	Volume Standard Dry Gas Sampled	34.286 SCF
3.	Total Standard Sample Volume	46.314 SCF
4.	Percent Moisture	25.967
5.	Percent Dry Air	74.033 74.053
6.	Molecular Weight of Dry Flue Gas	29.812
7.	Molecular Weight of Wet Flue Gas	26.748
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen (O_2)	6.50
10.	Percent Carbon Dioxide (CO_2)	9.70
11.	Percent Excess Air	41.605
12.	Velocity of Flue Gas	118.402 FPS
13.	Actual Volumetric Flow Rate	42198.4 ACFM
14.	Dry Volumetric Flow Rate	31240.7 ACFMD
15.	Standard Volumetric Flow Rate	7885.3 SCFMD
16.	Emission Concentration	0.04235 gr/SCFD
17.	Emission Concentration	0.00791 gr/ACF
18.	Emission Rate	2.862 lbs/Hr
19.	Percent Isokinetic	105.3

Probe/Nozzle Wash	67.50 mg
Filter	26.60 mg
Total	94.10 mg

Average Percent Dry Air 73.528

D. R. E.
ENVIRONMENTAL INC.

PH. (904) 758-3164 FAX (904) 755-5430

" Destruction Removal Efficiencies "

April 29, 1993

Bureau of Air Regulations
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. Willard Hanks

RE: Air Operating Permit Application for DRE Environmental AC 16-187650

Dear Mr. Hanks:

DRE Environmental, Inc. has now completed its stack emission requirements for its mobile soil remediation unit and hereby submits the certificate of completion for your review and approval. Enclosed please find the permit fee in the amount of $1,500.00 for this unit.

DRE requests that the operating permit be amended to reflect the departments current updated regulations for soil thermal treatment units regarding testing requirements and soil analysis.

DRE has made several modifications to our unit since we first submitted our application to construct in 1990. The changes are listed below and are incorporated into our enclosed application to operate an air pollution source.

1. The primary fan impeller was replaced with a less efficient unit with a wider operating fan curve for better damper control by the operator.

2. The original cyclones proved to be ineffective due to high moisture in the soils; we replaced them with a large knock out box and also improved the breaching so the air enters the baghouse at a reduced velocity. The end results showed a much better dust removal efficiency and a reduction in the overall pressure drop of the system.

3. The baghouse/afterburner trailer has been redaced from 79' to 67' in length.

4. The 20 HP air compressor was upgraded to a 30 HP unit in order to provide more air for operation and maintance tasks.

POST OFFICE BOX 1386, LAKE CITY, FLORIDA 32056-1386

5. We have included calculations for No. 2 fuel oil as an additional alternative fuel source.

6. DRE modified its steam vent line from the rear of the drum and has installed a munters mist eliminator and 2 HP fan for dust control on the discharge auger.

DRE performed its stack test at this site at 20 tons per hour because of wet soil conditions, instead of our permit limit of 35 tons per hour. Results of the soil analysis and strip charts for the CO Monitor are provided for your review.

It is our understanding that we cannot exceed 110% of the tested rate until we submit data to the state showing compliance at the higher feed rate. The BAR will be notified in advance of any future testing of the unit.

If you have need of additional technical information please call 904-758-3164.

Sincerely,

DRE ENVIRONMENTAL, INC

Chris K. Sleeper
President

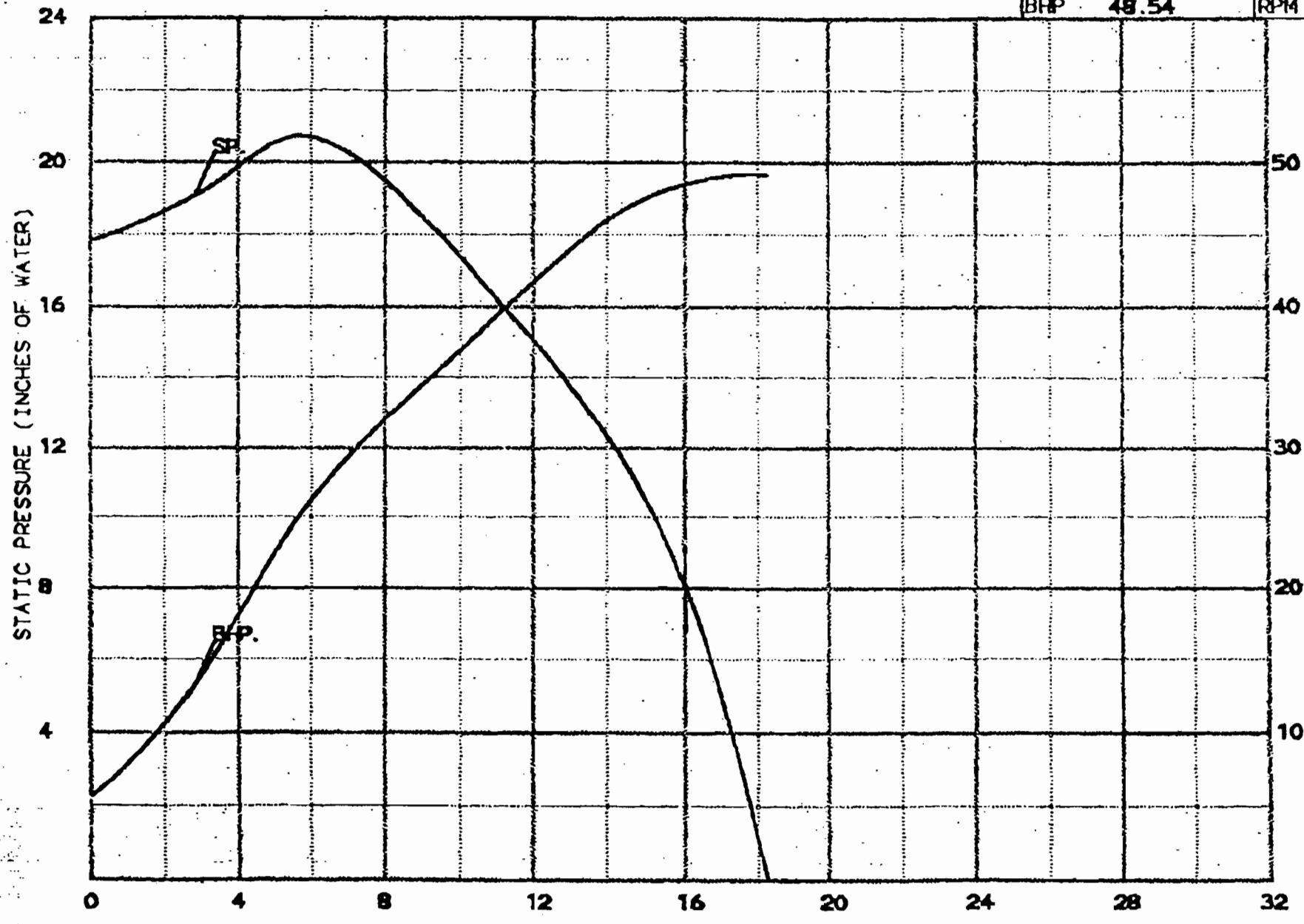
CKS/dln

104
C=1

TWIN CITY FAN & BLOWER CO.

PERFORMANCE CURVE

PROJECT			
FAN ID	330 RTF		
TAG #			
PERFORMANCE			
CFM	16000	SP	8.0
BHP	48.54	RPM	2118



AIR DEN
.0462 LI
MODIFIE
40% WIDT
WHEEL

SOUND POWER LEVELS
(IN DB REF 10^{-12} WATTS)

OCTAVE	1	2	3	4	5	6	7	8

DATE 4/27/199
#0

APR-27-'93 12:33 T-ASPHALT DRMIX 3164 #011-02

$1500 pd.
5-18-93
Rcpt. #18085-7

AO16-231440

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AIR POLLUTION SOURCES
CERTIFICATE OF COMPLETION OF CONSTRUCTION*

PERMIT NO. AC16-187650 DATE: May 9, 1993

Company Name: DRE Environmental, Inc. County: Portable

Source Identification(s): Soil Remediation Incinerator (Portable)

Actual costs of serving pollution control purpose: $ 350,000

Operating Rates: 35 tph Design Capacity: 35 tph

Expected Normal 30 tph During Compliance Test 20 tph

Date of Compliance Test: Feb. 25-26, 1993 (Attach detailed test report)

Test Results:

Pollutant	Actual Discharge	Allowed Discharge
Particulate	.03566 grains/dscf	.04 grains/dscf
VOC	.10 lbs/hr	22.8 lbs/hr

Date plant placed in operation: in Florida Feb 15, 1993

This is to certify that, with the exception of deviations noted**, the construction of the project has been completed in accordance with the application to construct and Construction Permit No. AC16-187650 dated _____.

A. Applicant:

Chris Sleeper, President — Chris Sleeper
Name of Person Signing (Type) — Signature of Owner or Authorized Representative and Title

Date: May 11, 1993 Telephone: (904) 758-3164

B. Professional Engineer:

Dole J. Kelley, Jr., P.E. — Dole J. Kelley
Name of Person Signing (Type) — Signature of Professional Engineer

Dole J. Kelley, Consulting Engineer — Florida Registration No. 6519
Company Name

Date: 5-11-93

(Seal) DOLE J. KELLEY JR. CERTIFICATE No. 6519 STATE OF FLORIDA REGISTERED ENGINEER

P.O. Box 10428 Jacksonville, FL. 32207
Mailing Address

(904) 731-7760
Telephone Number

*This form, satisfactorily completed, submitted in conjunction with an existing application to construct permit and payment of application processing fee will be accepted in lieu of an application to operate.

**As built, if not built as indicated include process flow sketch, plot plan sketch, and updates of applicable pages of application form.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: _____ [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [ ] Construction [X] Operation [ ] Modification

COMPANY NAME: DRE Environmental, Inc. COUNTY: Portable

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Soil Remediation Incinerator

SOURCE LOCATION: Street Portable City _____

UTM: East _____ North _____

Latitude ____° ____' ____"N Longitude ____° ____' ____"W

APPLICANT NAME AND TITLE: Chris Sleeper, President

APPLICANT ADDRESS: P.O. Box 1386, Lake City, FL 32056

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of DRE Environmental, Inc.

I certify that the statements made in this application for a Operating permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Chris N. Sleeper

Chris Sleeper, President
Name and Title (Please Type)

Date: _____ Telephone No. (904) 758-3164

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all spplicable statutes of the State of Florida and the rules and regulationa of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed _____

Dole J. Kelley, Jr. P.E.
Name (Please Type)

Dole J. Kelley, Consulting Engineer
Company Name (Please Type)

P.O. Box 10428, Jacksonville, FL 32207
Mailing Address (Please Type)

DOLE J. KELLEY, JR. CERTIFICATE No. 6519 STATE OF FLORIDA REGISTERED ENGINEER

Florida Registration No. 6519 Date: 5-11-93 Telephone No. (904) 731-7760

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in aource performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Portable facility for the decontamination of soil which contains virgin and non-virgin (used) oil which is within specifications. Treatment shall be in a rotary drier at 500°-700°F ~~followed by a knock out box, a baghouse and afterburner. This portable system~~ will operate normally 2-3 months at each site. Highly efficient pollution control equipment will result in total compliance with air pollution regulations.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N.A. Completion of Construction N.A.

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Afterburner $150,000

~~Baghouse $200,000~~

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

~~AC 16-187650~~

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr 8760 ; if seasonal, describe: _____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? YES

   a. If yes, has "offset" been applied? NO

   b. If yes, has "Lowest Achievable Emission Rate" been applied? NO

   c. If yes, list non-attainment pollutants. SO_2, Ozone, Particulates

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. NO

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? YES

   a. If yes, for what pollutants? Particulates

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

No applicable VOC standard exist.
Particlates emission will be less than .04 grains/dscf.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Petroleum contaminated soil	Particulates	100%	70,000	A
	VOC	varies		

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 70,000

2. Product Weight (lbs/hr): <70,000 depending on moisture content

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Controlled Emission Estimate[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Uncontrolled Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Particulates	4.61	20.19	.04 gr/dscf	4.61	199.88	873.1	B
CO	2.50	10.93			2.50	10.93	B
NO_x	10.01	43.73			10.01	43.73	B
SO_2	14.02	61.23			14.02	61.23	B
VOC	21.49	94.15			1400.75	6135.30	B

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency Predicted	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Hauck BH390-8 Baghouse	Particulate	99.7%	0-1000 microns	manufacturer
Hauck Afterburner	VOC	99.0%	N.A.	manufacturer
* The baghouse is rated for 15,073 ACFM (inlet) @ 400° F. It has 3840 sq. ft. cloth				
and a 3.92:1.0 air to cloth ratio.				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Propane Gas (drier)*		257.69 gal/hr	23 MMBTU/hr req'd @ 35tph
Propane Gas (afterburner)*		240.43 gal/hr	22 MMBTU/hr
#1 Diesel Fuel (generator)		13.16 gal/hr	1.8 MMBTU?hr
* alternate fuels for drier and afterburner will be natural gas and #2 fuel oil.			

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: <.5% Percent Ash: 0

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: 91,500 BTU/gal BTU/lb _____ BTU/gal
Propane 2523 BTU/cubic ft

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N.A. Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Dust from the knock out box and baghouse is added to finished product.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 30 feet ft. Stack Diameter: 2'9" 2.75 feet ft.

Gas Flow Rate: 36,077 ACFM _____ DSCFM Gas Exit Temperature: 1,600 °F.

Water Vapor Content: Varies % Velocity: 101.23 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include croas-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outleta for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^2* _____ Wind spd/dir

Period of Monitoring _____/_____/_____ to _____/_____/_____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from _____/____/____ to _____/____/____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	_____	grams/sec
SO^2	_____	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach acientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

CALCULATIONS
April 28, 1993

All calculations are based upon the expected worst case soil conditions and maximum expected operating hours per year.

I. Soil Conditions (for the purpose of this application we have set the soil conditions to be worse than those we encountered in previous work we've done)

* Feed rate = 35 tons per hour
* Ambient temperature = 60
* Moisture content = 8.0% by wt.
* Hydrocarbon content = 2.0% by wt.
* Bulk density = 100 Lb/cu ft

II. Plant Operating Hours

* 24 Hr/Day
* 7 Days/Wk
* 365 Days/Yr
* 8,760 Hr/Yr

III. Fuel Consumption

Primary Fuel: Propane Gas.

* Propane gas having 91,500 BTU's/gal, 2523 BTU/ft3
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 9345 cfh or 257.69 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 8,719 cfh or 240.43 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 18,064 cfh or 158.24 MM cfy
  = 498.12 gal/hr or 4,363,531 gal/yr propane

First Alternate Fuel: Natural Gas

* Natural gas having 1,000 BTU's/ft^3,
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 23,578.4 cfh
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 22,000 cfh
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 45,578 cfh or 399.26 MM cfy Natural Gas

Second Alternate Fuel: No. 2 Fuel Oil

* No. 2 Fuel Oil having 19,850 BTU's/lb, 144,865 BTU/gal (7.298 lbs/gal)
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 1,187.83 lbs/hr or 162.76 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 1,108.31 lbs/hr or 151.86 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 2296 lbs/hr or 20.11 MM lbs/yr
  = 314.6 gal/hr or 2.75 MMgal/yr
  No. 2 Fuel Oil

IV Emissions Factors

A. Rotary Drier
* Contaminated soil = raw material
* Emissions factor = 40 LB oil/ton of soil based on 2.0% oil by wt.
* Emissions factor = 5.7 lbs particulate will emerge from the drier per ton of soil processed. (ref. AP-42 8.18-1)

B. Soil Contaminate Is No. 2 Fuel Oil (Density 7.3 lbs per gallon which when burned has the following emissions)
* Particulates uncontrolled = 2.0 lb/1,000 gal
* Sulfur content of fuel = 0.5% by wt.
* Sulfur dioxide = 2.0 lb per 1%/100 lbs oil
* Nitrogen oxide = 20 lb/1,000 gal
* Carbon monoxide = 5 lb/1,000 gal

C. Total Uncontrolled Emissions from Rotary Drier Due to Soil and Oil Contaminate

Assumption: The raw material with 8% moisture and 2.0% HC's is processed at 35 tph. All HC's in the soil are treated like additional fuel in the afterburner.

1. Particulate emissions from Rotary Drier from soil:
   (AP-42 says approximately 5.7 lb/ton)
   (5.7 lb/ton) x (35 TPH) = 199.5 lb/hr

2. Hydrocarbon (VOC) emissions from oil in soil:
   * VOC = (2.0%) x (35 TPH) x (2,000 lb/ton) = 1,400 lb/hr
   * VOC fuel conversion
     = (1,400 lb/hr)/(7.3 lb/gal) = 191.78 gal/hr
   * Particulates = (2 lb/1000 gal) x (191.78 gal/hr)
     due to fuel oil = .3836 lb/hr
   * Sulfur Dioxide = 2.0 x .5 x 1,400/100 = 14 lb/hr
   * Nitrogen Oxide = (191.78 gal/hr) x 20 lb/1000 gal) = 3.835 lb/hr
   * Carbon Monoxide = (191.78 gal/hr) x (5.0 lb/1000 gal) = 0.958 lb/hr

3. Total Solid Uncontrolled Emissions (Particulates) from Rotary Drier
(Soil Emissions) + (HC Emissions) = Total
199.5 lb/hr + 0.3836 lb/hr = 199.8836 (plus .1134 lbs/hr from combustion of propane gas in Rotary Drier)

4. Uncontrolled Emissions from combustion of Propane Gas (AP-42 Table 1.5-1)
Natural gas is considered the same except for SO_2 which is slightly lower (.0114 lbs.hr)

Rotary Drier	= 257.69 gal/hr
Afterburner	= 240.43 gal/hr
TOTAL	= 498.12 gal/hr

Particulate	.09 to .44 lbs per 1000 gal	= .0447 lbs/hr to .2191 lbs/hr
SO2	.0378 lbs per 1000 gal	= .0188 lbs/hr
NOx	12.4 lbs per 1000 gal	= 6.1766 lbs/hr
CO	3.1 lbs per 1000 gal	= 1.544 lbs/hr
VOC	.52 lbs per 1000 gal	= .2589 bs/hr

5. Total Uncontrolled Emissions (Non-Particulate) due to combustion of propane and soil contaminent oil.

SO2	14 lbs/hr + .0188 lbs/hr	= 14.0188 lbs/hr
NOx	3.835 lbs/hr + 6.1766 lbs/hr	= 10.0116 lbs/hr
CO	0.958 lbs/hr + 1.544 lbs/hr	= 2.5020 lbs/hr
VOC	1,400 lbs/hr + .2589 lbs/hr	= 1400.2589 lbs/hr

D. Total Controlled Emissions of Solids

1. Exhaust gas conversion to SCFM
Baghouse capacity = 15,073 acfm @ 400°F

* Temperature correction factor $= \frac{(70 + 460)}{(400 + 460)} = \frac{530}{860} = 0.616$

* SCFM = (0.616) X (15,073 acfm) = 9,284 scfm baghouse design flow

2. Baghouse Efficiency
* The following calculations show what the baghouse efficiency would have to be to meet the state regulations allowing maximum particulate emissions from incinerators to be .04 grains per dscf.

CALCULATIONS OF DSCF PRODUCTS OF COMBUSTION

The following calculations will show the products of combustion: (Theoretically based on 40% excess air which is the amount we plan to use)

Combustion of Propane Gas (C_3H_8)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$C_3H_8 + 4(1.4)0_2 + 4(3.76)1.4N_2 \rightarrow 3CO_2 + 4H_20 + .6\ 0_2 + 21.056N_2$$

Therefore one cubic foot of Propane gas will yield 3 cf CO_2 + .6 cf 0_2 + 21.056 cf N_2 = 24.656 dscf of products of combustion when burned with 40% excess air. (The water was not included but would be 13.9% of the volume of 28.656 scf which is the total products of combustion from one cubic foot of Propane)

Combustion of Natural Gas (CH_4)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$CH_4 + 2(1.4)0_2 + 2(3.76)1.4N_2 \rightarrow CO_2 + 2H_20 + .80_2 + 10.528N_2$$

Therefore one cubic foot of Natural gas will yield 1 cf CO_2 + .8 cf 0_2 + 10.528 cf N_2 = 12.328 dscf (The water was not includedbut would be 13.9% of the volume of 14.328 scf which is the total products of combustion from one cubic foot of Natural Gas)

Combustion of Diesel Fuel

Theoretical equation using Dodecane ($C_{12}H_{26}$) as diesel fuel and using 140% theoretical air. (shown below as 1.4)

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

Atomic Weights: C=12, H=1, O=16, N=14

Molecular Weights: $C_{12}H_{26}$=170, O_2=32, N_2=28, CO_2=44, H_2O=18, N_2=28

Converting to pound moles

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

$$170 + 18.5(1.4)(32) + 18.5\ (3.76)(1.4)(28) \rightarrow 12(44) + 13(18) + 7.4(32) + (97.384)(28)$$

Therefore the combustion of diesel fuel (Dodecane) with 140% theoretical air (40% excess air) will yield products of combustion → 528 + 234 + 236.8 + 2726.752
or Dry (less H_20) = 528 + 236.8 + 2726.752 = 3491.552 lbs

Dividing by theoretical fuel input of 170 pounds (shown as pound moles above)
3491.552 ÷ 170 = 20.5385 lbs dry products of combustion per pound of fuel burned with 40% excess air

$$\text{Volume} = \left(\frac{528 \text{ lbs } CO_2}{170 \text{ lbs fuel}} x \frac{8.548 \text{ ft}^3}{lb \text{ of } CO_2}\right) + \left(\frac{236.8 \text{ lbs } O_2}{170 \text{ lbs fuel}} x \frac{11.819 \text{ ft}^3}{lb\ O_2}\right) +$$

$$\left(\frac{2{,}726.752 \text{ lbs } N_2}{170 \text{ lbs fuel}} x \frac{13.443 \text{ ft}^3}{\text{lbs } N_2}\right) = 26.55 + 16.46 + 215.62 =$$

= 258.63 scf of dry products of combustion per pound of diesel fuel burned at 40% excess air

Primary Fuel: Propane Gas.

From III above the total propane gas consumed by the drier and afterburner is 18,064 CFH.

18,064 CFH propane gas x 24.656 dscf/cf propane gas = 445,386 dscf/hr products of combustion when Propane is burned with 40% excess air.

First Alternate Fuel: Natural Gas

From III above the total natural gas consumed by the drier and afterburner is 45,578 CFH.

45,578 CFH natural gas x 12.328 dscf/cf nat. gas = 561,885 dscf/hr products of combustion when Natural Gas is burned with 40% excess air.

Second Alternate Fuel: No. 2 Fuel Oil

From III above the total No. 2 Fuel Oil consumed by the drier and afterburner is 2,296 lbs/hr.

2,296 lbs/hr x 258.63 dscf/lb diesel = 593,814 dscf/hr products of combustion when No. 2 Fuel Oil is burned with 40% excess air.

Oil burned from the soil: From C-2 above 1,400 lbs/hr are burned due to oil in the soil

1,400 lbs/hr x 258.63 dscf/lb diesel = 362,082 dscf/hr products of combustion when Oil is burned with 40% excess air.

Total Dry Products of Combustion for Propane Gas + Oil burned from the soil = 445,386 + 362,082 = 807,468 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for Natural Gas + Oil burned from the soil = 561,885 + 362,082 = 923,967 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for No. 2 Fuel Oil + Oil burned from soil = 593,814 + 362,082 = 955,869 dscf per hr @ 40% Excess Air

Baghouse Efficiency: Maximum allowable particulate emissions for incinerators is given by the state as .04 grains per dscf. We expect to run at an average 40% excess air so the above figures will be used.

Calculations for primary fuel: Propane Gas.

$$\frac{807{,}468\ \text{ft}^3\ \text{air}}{\text{hour}} \times \frac{.04\ \text{grains}}{\text{ft}^3\ \text{air}} \times \frac{1\ \text{pound}}{7{,}000\ \text{grains}} = \frac{4.6141\ \text{lbs}}{\text{hour}}$$ while firing propane

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 4.6141 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{4.6141 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 92.31\% \text{ Target Efficiency while firing Propane}$$

Required % efficiency while firing propane = 92.31%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing propane. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for First Alternate Fuel: Natural Gas.

$$\frac{923{,}967 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.2798 \text{ lbs}}{\text{hour}} \text{ while firing Natural Gas}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.2798 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.2798 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 91.19\% \text{ Target Efficiency while firing Natural Gas}$$

Required % efficiency while firing Natural Gas = 91.19%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing Natural Gas. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for Second Alternate Fuel: No. 2 Fuel Oil.

$$\frac{955{,}869 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.4621 \text{ lbs}}{\text{hour}} \text{ while firing No.2 Fuel Oil}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.4621 lbs/hr maximum particulate emission

* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.4621 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 90.89\% \text{ Target Efficiency while firing No. 2 Fuel Oil}$$

Required % efficiency while firing No. 2 Fuel Oil = 90.89%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing No. 2 Fuel Oil. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

E. Exhaust Gas Volume From Afterburner. Note: The actual volume of products of combustion, excess air and water vapor emerging from the stack will vary and will be controlled by use of the fan damper. This is done to maintain a negative pressure draft on the drier air intake (burner end). When soils with high hydrocarbon content are processed, the afterburner tends to overheat and the gas fuel to the afterburner is reduced to a minimum (1-2% of maximum). When high moisture soils are processed, the drier burner heat is increased and the air flow is increased to provide combustion air and drying air. Because of these variables we will estimate the total exhaust gas volume based on the rated capacity of the baghouse from D-1 above.

Stack gas flow rate = 9,284 SCFM (from D-1 above

Assumption: Afterburner set @ 1600°F

$$\text{Temperature Correction factor} = \frac{(1600 + 460)}{(70 + 460)} = 3.886$$

(3.886) x (9,284 scfm) = 36,077 acfm @ 1600° F

Stack gas velocity

Size of exhaust stack = 3.0 ft outside diameter, 2.75 ft inside diameter
Cross sectional area = 5.93 sq ft inside
Stack height above grade = 30.0 ft

$$\text{Exhaust Gas Velocity} = \frac{36{,}077 \text{ acfm}}{5.93 \text{ sq. ft.}} x \frac{1 \text{ min.}}{60 \text{ sec.}} = 101.23 \text{ fps}$$

Afterburner Retention Time Calculation:

* Exhaust gases in the afterburner are calculated to be 36,077 acfm @ 1600° F
* Afterburner I.D. = 5.0 ft
* Cross sectional area = 19.634 sq. ft

* $\text{Afterburner air velocity} = \frac{36{,}077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62 \text{ fps}$

* Afterburner air velocity = $\frac{36{,}077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62 \text{ fps}$

* Length of afterburner combustion chamber = 38.16 ft
* Required retention time of gases = 0.5 sec

* Actual retention time of gases = $\frac{38.16 \text{ ft.}}{30.62 \text{ fps}} = 1.246 \text{ sec.}$

F. Total Controlled Emissions of VOC's

* Afterburner operates at 1,500 to 1,600° F and field tests of similar units indicate it has a 99.00% destruction efficiency for all VOC's entering unit. However we will only claim a 98.5% efficiency since that will be good enough to keep controlled VOC effluent below 100 ton/year as shown below

* Uncontrolled VOC's = 1,400.2589 lb/hr (from C-5 above)

* Permissable VOC effluent = $\frac{100 \text{ tons}}{\text{year}} x \frac{2{,}000 \text{ lbs}}{\text{ton}} \div \frac{8{,}760 \text{ hours}}{\text{year}} = \frac{22.831 \text{ lbs}}{\text{hour}}$

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{Total Uncontrolled}}$$

$$\frac{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}} - \frac{22.831 \text{ lbs}}{\text{hour}}}{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}}} = 98.36\% \text{ Target Efficiency}$$

Target efficiency of 98.36% is needed to keep VOC emissions below 100 tpy.

* We will claim 98.5% efficiency which will result in
* Controlled VOC's emissions = 21.00 lb/hr based on 98.5% efficiency

* Controlled VOC's = 21.00 lb/hr based on 98.5% efficiency
* When added to the VOC emissions of the diesel powered electric generator (page 9).
  Total VOC's will be 21.00 lbs/hr + .496 lbs/hr = 21.496lbs/hr
  21.496 lbs/hr x 8760 hrs/yr ÷ 2000 lbs/ton = 94.15 TPY VOCs

G. Controlled Emissions other than Particulates and VOC's (from C-5 above)

* CO < 2.502 lbs/hr or 10.95 tpy
* NOx < 10.011 lbs/hr or 43.84 tpy
* SO2 < 14.018 lbs/hr or 61.39 tpy

New or used oil contaminating the soil may not contain more than the specified amount of the following. Therefore, the stack discharge may have similar traces.

5 ppm	Arsenic	100 ppm	Lead
2 ppm	Cadmium	1000 ppm	Total Halogens
10 ppm	Chromium	< 2 ppm	PCB

Diesel Powered Electricity Generator Emissions Calculations

Max capacity 240 Kilowatts
Design Load 150 Kilowatts
Operation Hours 8760 hours per year
Based on AP42 Table 3.3-1

Carbon Monoxide: 4.06 g/kwh x 150 kwh x .0022046 pounds/g = 1.34 lbs/hr

$$4.06 \times 8760 \text{ hrs/yr} \times 240 \text{ kilowatts} \times \frac{150 \text{ kilowatts used}}{240 \text{ kilowatts available}} = 5{,}334{,}840 \text{ grams/yr}$$

5,334.840 kg/yr x 2.2046 lbs/kg = 11,761.188 lbs/yr = 5.88 TPY carbon monoxide

Exhaust Hydrocarbons (VOC): 1.5 g/kwh x Ditto = .496 lbs/hr

1.50 g/kwh x 1,314,000 kwh = 1,971,000 grams/yr

1,971.000 kg/yr x 2.2046 lbs/kg = 4345.26 lbs/yr = 2.17 TPY VOC

2.17 TPY ÷ 8760 hrs/yr x 2000 lbs/ton = .496 lbs/hr

Nitrogen Oxides: 18.8 g/kwh x Ditto = 6.21 lbs/hr

18.8 g/kwh x 1,314,000 kwh = 24,703,200 grams/yr

24,703.200 kg/yr x 2.2046 lbs/kg = 54,460.67 lbs/yr = 27.23 TPY nitrogen oxide

Sulfur Oxides: 1.24 g/kwh x Ditto = .413 lbs/hr

1.25 g/kwh x 1,314,000 kwh = 1,642,500 gr/yr

1,642.500 kg/yr x 2.2046 lbs/kg = 3621.05 lbs/yr = 1.81 TPY sulfur oxides

Particulate: 1.34 g/kwh x Ditto = .443 lbs/hr

1.34 g/kwh x 1,314,000 kwh = 1,760,760 grams/yr

1,760.760 kg/yr x 2.2046 lbs/kg = 3,881.77 lbs/yr = 1.94 TPY particulates

EQUIPMENT SPECIFICATIONS

SOIL UNIT

DRIER STANDARD EQUIPMENT (CS6028 DRIER)

A. 515 Steel drum: diameter 60 inches, length 28 feet
B. Chain drive, 60 HP motor
C. Hauck powerstar LP burner, 23 million BTU
D. Burner blower 24 oz, 15 HP
E. Tertiary Fan, 10 HP
F. Burner control, ADM manual, ADM auto
G. LP pump
H. Motor control center
I. Take-away screw conveyor: 10 HP
J. Inlet belt conveyor (with scale) controlled by pressure drop in drum.
K. Adjustable drum frame with hydraulic system
L. Insulated drum - 2" duall

COLD FEED STANDARD EQUIPMENT

A. (1) 15 ton bin, 1/4" plate 8' x 10' top opening
B. 24" belt feeder lagged head pulley
C. Radial type gate with positive locks
D. 4" idlers, CEMA B throughout
E. Belt guards on feeders
F. Belts, 1/8" x 1/16": covers, 2 ply aggregate belt
G. Material detector

CONTROL ROOM STANDARD EQUIPMENT

A. 7'-7" x 15'-6" dimensions
B. Interior lighting
C. Heating and air conditioning
D. Control panel with manual and automatic systems for remote operation
E. CO and O_2 monitoring equipment with data logger.

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axel with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies

EQUIPMENT SPECIFICATIONS

Second Unit

AFTERBURNER STANDARD EQUIPMENT

A. Hauck LP burner, 22 million BTU
B. Burner blower 16 oz, 25 HP
C. Burner control, ADM manual, ADM auto
D. Ceramic-refractory lined chamber
E. Hydraulic raised stack
F. Stack temperature readout with probe
G. Electrical controls
H. LP pump

BAGHOUSE STANDARD EQUIPMENT (MODEL BH390-8)

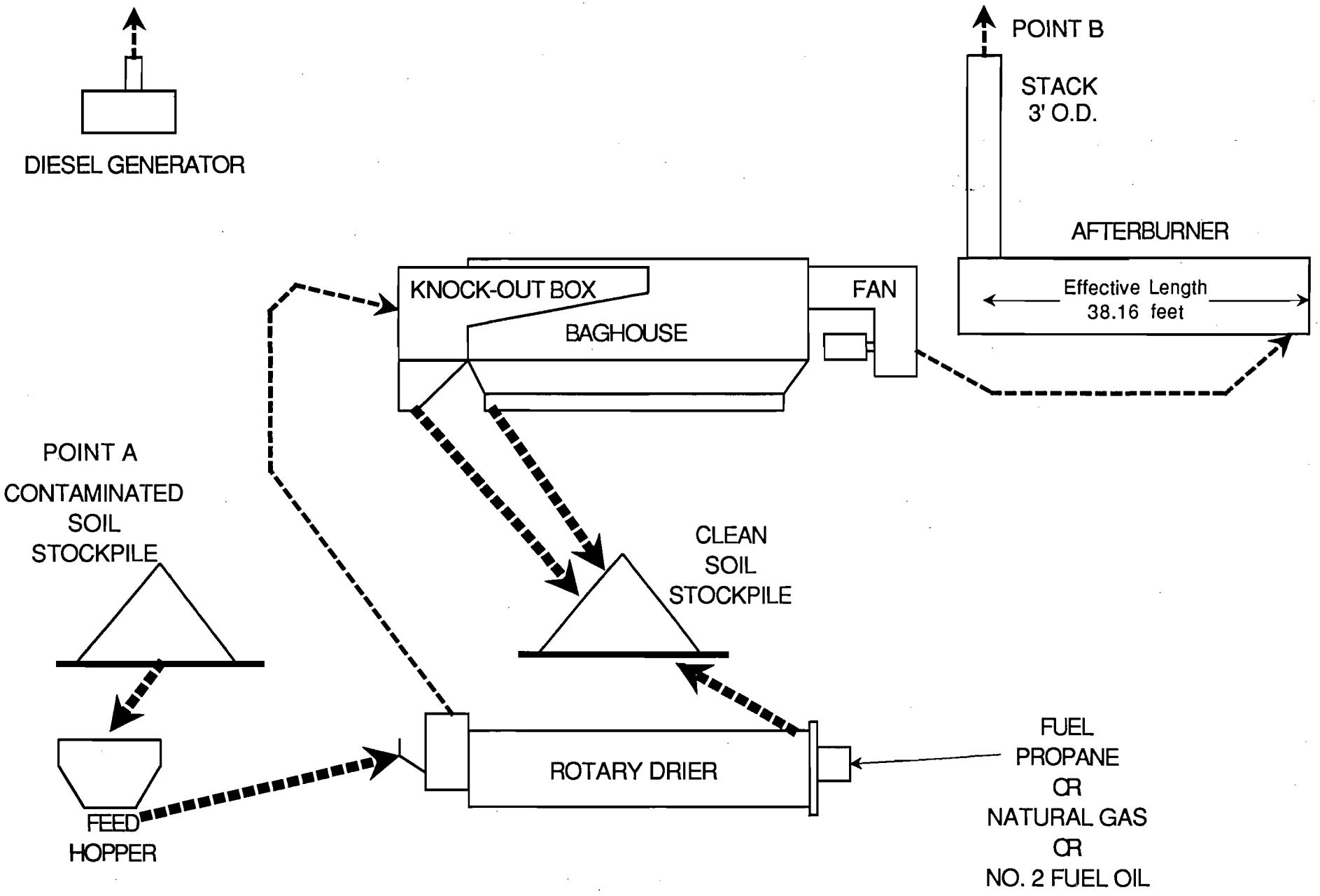
A. 3,840 sq ft of filter
B. 4.16:1 air to cloth ratio
C. Dust removal conveyors
D. 390 bags: 4.5" diameter, 96" long, P-84 material, 14 oz
E. Venturi orifice and injectors
F. Bag removal from top thru clean air section
G. Adjustable timer for cleaning and interval
H. Bags shipped mounted on cages
I. Outlet duct from exhaust fan to afterburner
J. 16,000 CFM exhaust fan: 50 HP @ 10" SP
K. Damper control
L. 30 HP air compressor: 84 CFM @ 100 PSI
M. Knock out box with breaching.

GENERATOR

A. 200 KW generator
B. Fuel tank-60 gallons
C. Fuel tank-1,000 gallon. (auxiliary)
D. Battery rack and cables
E. Air cleaner
F. Main breaker

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axle with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies



DRE Environmental Services, Inc.
Soil Remediation Incinerator (Portabl

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/25/93
Stack: Contaminated Soil Incinerator Run: 1 From 1819 to 1926

Y Factor	1.006		Nozzle Diameter	0.375	In
Total Time	60	Min	Nozzle Area	0.000767	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	30.22	In Hg
Stack Temperature	1630.6	°F	Meter Temperature	74.2	°F
Stack Pressure	30.20	In Hg	Meter Orifice Diff	3.311	In H_2O
Stack Avg √ Vel Head	1.099	In H_2O	Meter Volume	57.842	CF
			Condensate Volume	417.0	ml

1.	Volume Water Vapor Sampled	19.628 SCF
2.	Volume Standard Dry Gas Sampled	58.539 SCF
3.	Total Standard Sample Volume	78.167 SCF
4.	Percent Moisture	25.111
5.	Percent Dry Air	74.889
6.	Molecular Weight of Dry Flue Gas	29.768
7.	Molecular Weight of Wet Flue Gas	26.813
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen [O_2]	7.00
10.	Percent Carbon Dioxide [CO_2]	9.30
11.	Percent Excess Air	46.367
12.	Velocity of Flue Gas	126.814 FPS
13.	Actual Volumetric Flow Rate	45196.7 ACFM
14.	Dry Volumetric Flow Rate	33847.5 ACFMD
15.	Standard Volumetric Flow Rate	8628.6 SCFMD
16.	Emission Concentration	0.02894 gr/SCFD
17.	Emission Concentration	0.00553 gr/ACF
18.	Emission Rate	2.141 lbs/Hr
19.	Percent Isokinetic	87.6

Probe/Nozzle Wash	33.00 mg
Filter	76.80 mg
Total	109.80 mg

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 2 From 0908 to 1023

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1614.1	°F	Meter Temperature	78.4	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.682	In H_2O
Stack Avg √ Vel Head	0.914	In H_2O	Meter Volume	31.093	CF
			Condensate Volume	259.0	ml

1.	Volume Water Vapor Sampled	12.191 SCF
2.	Volume Standard Dry Gas Sampled	30.785 SCF
3.	Total Standard Sample Volume	42.976 SCF
4.	Percent Moisture	28.367
5.	Percent Dry Air	71.633
6.	Molecular Weight of Dry Flue Gas	29.804
7.	Molecular Weight of Wet Flue Gas	26.456
8.	Specific Gravity Flue Gas	0.92
9.	Percent Oxygen [O_2]	6.30
10.	Percent Carbon Dioxide [CO_2]	9.70
11.	Percent Excess Air	39.683
12.	Velocity of Flue Gas	106.196 FPS
13.	Actual Volumetric Flow Rate	37848.3 ACFM
14.	Dry Volumetric Flow Rate	27111.9 ACFMD
15.	Standard Volumetric Flow Rate	6913.3 SCFMD
16.	Emission Concentration	0.03569 gr/SCFD
17.	Emission Concentration	0.00652 gr/ACF
18.	Emission Rate	2.115 lbs/Hr
19.	Percent Isokinetic	107.8

Probe/Nozzle Wash	51.40 mg
Filter	19.80 mg
Total	71.20 mg

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 3 From 1056 to 1220

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1635.4	°F	Meter Temperature	74.0	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.849	In H_2O
Stack Avg √ Vel Head	1.020	In H_2O	Meter Volume	34.335	CF
			Condensate Volume	255.5	ml

1.	Volume Water Vapor Sampled	12.026 SCF
2.	Volume Standard Dry Gas Sampled	34.286 SCF
3.	Total Standard Sample Volume	46.314 SCF
4.	Percent Moisture	25.967
5.	Percent Dry Air	74.033 74.053
6.	Molecular Weight of Dry Flue Gas	29.812
7.	Molecular Weight of Wet Flue Gas	26.748
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen (O_2)	6.50
10.	Percent Carbon Dioxide (CO_2)	9.70
11.	Percent Excess Air	41.605
12.	Velocity of Flue Gas	118.402 FPS
13.	Actual Volumetric Flow Rate	42198.4 ACFM
14.	Dry Volumetric Flow Rate	31240.7 ACFMD
15.	Standard Volumetric Flow Rate	7885.3 SCFMD
16.	Emission Concentration	0.04235 gr/SCFD
17.	Emission Concentration	0.00791 gr/ACF
18.	Emission Rate	2.862 lbs/Hr
19.	Percent Isokinetic	105.3

Probe/Nozzle Wash	67.50 mg
Filter	26.60 mg
Total	94.10 mg

Average Percent Dry Air 73.528

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # 4015

DATE: 16 FEB 93 NAME: BOCA GRANDE SHIFT: 1

CUMULATIVE TONS		SCALE TONS	
Meter Finish:		Meter Finish:	74.5
Meter Start:		Meter Start:	0
Total Tons:		Total TOns:	74.5
HOUR METER		FUEL USE IN GALLONS	
Meter Finish:		Tank Finish:	11,781
Meter Start:		Tank Start:	10,710 + 2700
Total Hours:	4.66	Total Gallons:	1629

Production Time Start: 0750 Production Time Finish: 1230

Gallons divided by Billable Tons = 21.8 Gallons Per Billable Ton
Billable Tons Divided by Hours = 16 Billable Tons Per Hour

Water Usage: _____ Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2932.8

Recycled Tons: 0

Billable Tons: 74.5

BILLABLE TONS BURNED TO DATE: ~~3007.3~~ 3,012.3 BB WR

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

T.U.S. Hopkins — Gary Collins

CUSTOMER

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR _____ DATE 16 FEB 93
SHIFT _____ LOCATION Boca Grande PROJECT# _____

ARRIVED ON THE SITE _____ LEFT THE SITE _____
END METER READING _____ END TONNAGE 745
START METER READING _____ START TONNAGE 0
TOTAL METER READING _____ TOTAL TONNAGE 745
TOTAL GAS USED _____ REJECT/REBURN 0

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS 74.5

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @ _____ Finish Calibration: @ _____
SCALE COUNT READING 15810 WEIGH BELT % _____
Started Burners @ 0720 Shut Down Burners @ _____
Shut Rig Down @ _____ Production Hr. 4.66

STARTED FEED	STOPPED FEED	REMARKS
0750	1230	RAIN COOLED BAGHOUSE
		STOPPED FEED TO REHEAT
		BETWEEN TESTS
		LOST BOTH DRIER EXIT
		AND BAGHOUSE EXIT THERMO-
		CUPLES TAKING OUT PRIMARY
		BURNER AND I.D. FAN.

BILLABLE TONS -- HOURS = 16.0 TONS PER HOUR

TONS PER HOUR -- CU. FT. 21,87 GALLONS PER TON

COMMENTS: WATER START 781900
RAIN! 1108 Hrs.
FINISHED TESING 1210 Hrs 1ST START 0908 FINISH 1020 Hrs
2ND START 1100 Hrs FINISH 1210 Hrs
Maintance planned for Saturday - NW Burner

OPERATOR'S SIGNATURE W.D. Rankin

T.E ENVIRONMENTAL INC. PRODUCTION REPORT

UNIT #_____ BEST AVAILABLE COPY DATE 26 FEB 93

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

	HOUR	PPM CO / O2 CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
1215 Hrs	0100	30 0 5.9	2%	1773	321	50%	259	7"	725		69.2
1230 Hrs	0200	0	2%	1751	440	10%	254	9"	745		71.6
	0300										74.5
	0400										
	0500										
	0600										
	0700										
	0800	0	2%	1860	443	40%	298	7½"	851		2.8
0815	0900	11 0 6.8	5%	1563	388	40%	305	4½"	780		5.7
0830	1000	17 0 7.2	5%	1671	388	40%	308	4½"	776		10.1
0845	1100	18 0 7.7	4%	1648	376	42%	306	7"	714		14.1
0900	1200	22 0 6.4	3%	1650	400	40%	311	5"	766	18.1	18.1
0915	1300	26 0 6.6	3%	1696	383	40%	310	4½"	701		22..
0930 [illegible] HRS	1400	0	3%	1699	399	40%	318	4"	764		26.6
0945	1500	28 0 4.9	3%	1738	390	40%	312	3"	710		30.
1000 Hrs	1600	19 0 5.9	3%	1635	360	40%	302	3"	619	17.1	35.
1015 Hrs	1700	13 0 6.8	4%	1560	346	42%	291	3½"	622		38.
1030 HRS	1800	15 0 6.7	4%	1663	361	50%	285	6"	700		42.
1045	1900	20 0 5.9	4%	1729	376	50%	289	6½"	765		46.
1100 HRS	2000	23 0 6.1	3%	1712	367	50%	292	7½"	760	15.9	51.
1115 Hrs	2100	14 0 6.5	3%	1652	404	50%	298	6"	787		54.
1130 Hrs	2200	23 0 5.8	3%	1756	386	50%	309	6½"	963		58.
1145 Hrs	2300	29 0 6.4	1%	1731	334	50%	295	6"	801		62.
1200 Hrs	2400	26 0 6.3	1%	1778	334	50%	272	6"	941	14.4	65

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

02/26/93	07:04:48	Channel no.	7	PV=	370	A1=	-999	Cleared		
02/26/93	07:04:48	Channel no.	7	PV=	370	A2=	360	Set		
02/26/93	07:04:49	Channel no.	7	PV=	331	A2=	360	Cleared		
02/26/93	07:05:00	- . 2	62	62	66	70	28.6	169	.6	F
02/26/93	07:06:00	- . 2	62	62	66	70	26.0	52	.6	F
02/26/93	07:07:00	- . 2	62	62	66	70	23.3	29	.6	F
02/26/93	07:28:00	. 7	230	64	76	72	18.5	30	.8	F
02/26/93	07:29:00	. 6	247	65	83	72	17.6	51	.9	F
02/26/93	07:30:00	. 7	274	67	89	84	16.0	340	1.0	F
02/26/93	07:31:00	. 6	296	71	93	108	15.9	313	1.2	F
02/26/93	07:32:00	.10	315	76	96	141	16.0	280	1.2	F
02/26/93	07:33:00	. 9	331	81	97	186	16.0	229	1.2	F
02/26/93	07:34:00	.10	332	87	103	297	13.5	84	19.6	F
02/26/93	07:35:00	. 9	344	92	108	552	12.3	34	19.6	F
02/26/93	07:36:00	. 9	351	96	113	869	12.1	28	19.6	F
02/26/93	07:37:00	.10	371	100	118	1122	12.2	27	19.6	F
02/26/93	07:38:00	.11	386	103	124	1292	13.9	8	19.6	F
02/26/93	07:39:00	.10	407	105	130	1401	11.9	6	19.6	F
02/26/93	07:40:00	.10	411	107	137	1465	16.4	9	19.6	F
02/26/93	07:41:00	.21	416	108	144	1500	13.6	8	19.6	F
02/26/93	07:42:00	.19	427	108	151	1507	12.6	8	19.6	F
02/26/93	07:43:00	.18	443	108	158	1514	12.6	11	19.6	F
02/26/93	07:44:00	.18	453	108	165	1524	12.5	12	19.6	F
02/26/93	07:45:00	.17	464	107	172	1536	12.4	12	19.6	F
02/26/93	07:46:00	.25	470	106	180	1549	12.3	13	19.6	F
02/26/93	07:47:00	.30	479	105	187	1545	12.7	13	.8	F

		DRAFT	PTU	SOIL TEMP	SOIL B.H.	AFTER BURNER	O_2	CO	T.P.H.	
02/26/93	07:48:00	.29	483	105	194	1543	12.7	13	.8	F
02/26/93	07:49:00	.35	482	104	202	1550	12.9	13	.8	F
02/26/93	07:50:00	.28	487	103	208	1544	12.7	13	1.3	F
02/26/93	07:51:00	.32	478	103	216	1554	12.9	14	.8	F
02/26/93	07:52:00	.31	480	103	222	1546	13.0	14	.9	F
02/26/93	07:53:00	.29	489	102	229	1556	12.7	14	.8	F
02/26/93	07:54:00	.27	492	104	234	1551	12.5	14	.9	F
02/26/93	07:55:00	.29	494	104	239	1609	12.4	14	.8	F
02/26/93	07:56:00	.27	497	105	245	1614	12.4	14	.8	F
START FEED										
02/26/93	07:57:00	.24	426	106	249	1622	12.5	15	19.4	F
02/26/93	07:58:00	.10	360	106	251	1726	10.4	15	10.0	F
02/26/93	07:59:00	.11	431	107	255	1812	7.8	17	22.0	F
02/26/93	08:00:00	.9	422	125	258	1809	5.6	23	23.1	F
02/26/93	08:01:00	.6	428	239	260	1822	5.2	33	17.3	F
02/26/93	08:02:00	.7	435	414	261	1840	4.7	43	20.2	F
02/26/93	08:03:00	.4	422	584	262	1867	4.2	49	20.5	F
02/26/93	08:04:00	.3	418	709	264	1903	3.6	54	17.8	F
02/26/93	08:05:00	.2	424	785	265	1930	3.4	58	14.9	F
02/26/93	08:06:00	.2	416	817	263	1944	3.1	60	17.7	F
02/26/93	08:07:00	.1	413	826	266	1940	3.2	61	19.6	F
02/26/93	08:08:00	.0	420	822	267	1935	3.2	61	16.8	F
02/26/93	08:09:00	-.1	425	805	267	1931	4.3	60	18.7	F
02/26/93	08:10:00	-.2	411	786	267	1910	3.6	50	14.4	F
02/26/93	08:11:00	-.1	417	771	269	1873	4.0	46	15.8	F
02/26/93	08:12:00	-.2	415	755	269	1825	4.4	47	14.1	F
02/26/93	08:13:00	.1	420	741	269	1713	6.5	45	10.0	F
02/26/93	08:14:00	.2	405	732	269	1525	10.5	113	14.7	F
02/26/93	08:15:00	-.1	393	729	269	1433	12.8	308	12.3	F
02/26/93	08:16:00	.2	406	738	269	1473	8.3	205	17.2	F
02/26/93	08:17:00	-.1	402	748	269	1514	8.3	71	18.5	F
02/26/93	08:18:00	.4	388	754	270	1539	8.2	29	18.6	F
02/26/93	08:19:00	.5	397	764	270	1554	8.2	14	18.4	F
02/26/93	08:20:00	.6	397	772	270	1562	8.2	12	17.0	F

02/26/93	08:21:00	. 1	396	778	271	1569	8.2	11	17.2	F
02/26/93	08:22:00	. 1	391	783	271	1575	8.0	11	17.3	F
02/26/93	08:23:00	. 1	389	788	271	1580	8.0	11	15.4	F
02/26/93	08:24:00	. 4	390	790	271	1595	7.9	12	21.1	F
02/26/93	08:25:00	. 4	389	790	271	1600	8.0	12	15.8	F
02/26/93	08:26:00	.12	389	789	271	1601	8.2	13	16.1	F
02/26/93	08:27:00	.11	398	790	271	1607	8.1	13	21.3	F
02/26/93	08:28:00	. 7	391	785	272	1617	7.8	13	20.3	F
02/26/93	08:29:00	. 9	393	782	272	1625	7.9	14	19.8	F
02/26/93	08:30:00	. 7	400	782	272	1630	7.9	14	23.8	F
02/26/93	08:31:00	. 6	400	783	272	1641	7.6	15	20.7	F
02/26/93	08:32:00	. 7	398	780	272	1652	7.3	15	21.7	F
02/26/93	08:33:00	. 6	398	775	273	1658	7.3	16	21.3	F
02/26/93	08:34:00	. 5	392	768	273	1663	7.2	17	22.6	F
02/26/93	08:35:00	. 4	395	762	273	1667	7.2	17	21.5	F
02/26/93	08:36:00	. 4	401	751	274	1666	7.2	17	19.2	F
02/26/93	08:37:00	. 3	392	739	273	1659	7.2	17	21.0	F
02/26/93	08:38:00	. 6	394	729	273	1655	7.3	17	21.0	F
02/26/93	08:39:00	. 0	387	719	273	1648	7.2	17	19.7	F
02/26/93	08:40:00	. 2	384	706	272	1634	7.6	18	22.4	F
02/26/93	08:41:00	. 5	379	697	272	1626	7.7	18	18.5	F
02/26/93	08:42:00	. 5	381	693	271	1615	8.1	18	19.3	F
02/26/93	08:43:00	. 4	387	690	270	1612	8.0	17	20.9	F
02/26/93	08:44:00	. 2	380	688	270	1607	7.9	17	20.3	F
02/26/93	08:45:00	. 5	377	688	269	1608	7.9	18	18.7	F
02/26/93	08:46:00	. 3	383	692	269	1622	7.6	18	14.8	F
02/26/93	08:47:00	. 4	384	690	269	1632	7.6	18	17.2	F
02/26/93	08:48:00	. 1	378	695	268	1640	7.7	18	17.9	F
02/26/93	08:49:00	. 4	384	700	268	1645	7.7	18	18.4	F
02/26/93	08:50:00	. 4	385	705	268	1651	7.7	19	17.9	F
02/26/93	08:51:00	. 4	382	707	268	1653	7.6	19	18.2	F
02/26/93	08:52:00	. 3	384	714	268	1656	7.7	19	18.5	F
02/26/93	08:53:00	. 3	384	720	267	1657	7.6	19	17.0	F

02/26/93	08:54:00	. 3	391	727	268	1659	7.4	19	19.9	F
02/26/93	08:55:00	. 3	396	734	268	1662	7.5	19	19.7	F
02/26/93	08:56:00	.11	395	741	269	1663	7.5	20	17.4	F
02/26/93	08:57:00	. 8	402	747	270	1670	7.5	20	16.3	F
02/26/93	08:58:00	. 8	407	752	271	1692	6.9	20	20.2	F
02/26/93	08:59:00	. 6	412	756	271	1690	6.8	20	20.7	F
02/26/93	09:00:00	. 7	411	757	272	1672	6.7	21	20.1	F
02/26/93	09:01:00	. 7	410	756	273	1660	6.6	21	16.9	F
02/26/93	09:02:00	. 6	407	755	274	1653	6.5	22	18.8	F
02/26/93	09:03:00	. 5	408	753	274	1649	6.5	22	17.2	F
02/26/93	09:04:00	. 4	413	750	275	1645	6.4	22	19.7	F
02/26/93	09:05:00	. 6	416	744	275	1642	6.3	23	19.4	F
02/26/93	09:06:00	. 1	421	736	276	1640	6.4	23	18.8	F
02/26/93	09:07:00	. 0	419	731	275	1640	6.4	23	20.7	F
02/26/93	09:08:00	. 2	423	726	278	1638	6.4	24	16.0	F
0908 STARTED TEST #2										
02/26/93	09:09:00	. 2	395	725	280	1634	6.2	24	20.8	F
02/26/93	09:10:00	. 0	365	726	281	1627	6.2	24	22.7	F
02/26/93	09:11:00	. 2	351	723	281	1610	6.8	24	24.5	F
02/26/93	09:12:00	. 2	342	703	280	1585	7.6	25	21.2	F
02/26/93	09:13:00	. 3	344	658	277	1640	6.6	26	24.5	F
02/26/93	09:14:00	.10	362	644	275	1669	7.3	25	23.0	F
02/26/93	09:15:00	. 6	369	653	275	1684	7.4	24	17.0	F
02/26/93	09:16:00	. 9	376	669	275	1716	6.5	24	20.3	F
02/26/93	09:17:00	. 6	384	682	275	1719	6.4	25	17.4	F
02/26/93	09:18:00	. 4	395	685	276	1693	6.6	26	15.2	F
02/26/93	09:19:00	. 5	398	685	276	1674	6.6	26	16.9	F
02/26/93	09:20:00	. 5	406	685	277	1667	6.6	23	22.5	F
02/26/93	09:21:00	. 7	409	686	276	1662	6.6	15	17.8	F
02/26/93	09:22:00	. 7	404	687	276	1664	6.4	15	21.5	F
02/26/93	09:23:00	. 7	411	688	279	1674	6.2	15	18.6	F
02/26/93	09:24:00	. 6	407	691	279	1681	7.6	- 6	21.3	F
02/26/93	09:25:00	. 6	405	694	280	1686	8.5	0	16.9	F
02/26/93	09:26:00	. 4	414	702	281	1685	8.8	0	16.6	F

02/26/93	09:27:00	. 5	419	710	281	1691	6.2	4	17.1	F
02/26/93	09:28:00	. 4	410	713	282	1694	6.1	15	21.7	F
02/26/93	09:29:00	. 4	408	718	281	1695	6.1	22	20.7	F
02/26/93	09:30:00	. 5	411	723	282	1695	6.0	24	22.3	F
02/26/93	09:31:00	. 3	415	726	283	1694	6.0	25	20.7	F
02/26/93	09:32:00	. 3	407	731	283	1695	6.0	24	21.3	F
02/26/93	09:33:00	. 7	404	738	282	1696	6.0	24	17.2	F
02/26/93	09:34:00	. 7	410	743	283	1696	5.9	24	24.2	F
02/26/93	09:35:00	. 7	404	747	283	1696	5.9	24	22.9	F
02/26/93	09:36:00	. 9	407	750	283	1695	5.9	24	23.3	F
02/26/93	09:37:00	. 9	407	748	284	1696	5.8	23	24.2	F
02/26/93	09:38:00	. 9	395	736	284	1695	5.7	24	17.2	F
02/26/93	09:39:00	.11	392	726	284	1694	5.8	24	18.4	F
02/26/93	09:40:00	.10	401	717	283	1707	5.4	24	17.5	F
02/26/93	09:41:00	. 7	403	709	284	1755	4.2	25	23.2	F
02/26/93	09:42:00	. 8	402	703	283	1775	4.1	27	19.9	F
02/26/93	09:43:00	. 8	408	701	283	1776	4.3	29	20.8	F
02/26/93	09:44:00	.10	405	697	282	1779	4.4	29	16.8	F
02/26/93	09:45:00	. 7	408	695	283	1767	5.2	29	19.0	F
02/26/93	09:46:00	. 9	404	695	282	1753	4.7	27	20.0	F
02/26/93	09:47:00	. 6	405	696	282	1745	4.8	28	19.5	F
02/26/93	09:48:00	. 7	406	695	281	1743	4.8	29	20.6	F
02/26/93	09:49:00	. 6	399	696	281	1740	4.9	29	18.3	F
02/26/93	09:50:00	. 9	402	698	280	1735	4.9	28	18.9	F
02/26/93	09:51:00	. 8	394	697	280	1734	4.9	28	17.7	F
02/26/93	09:52:00	.11	388	695	279	1736	5.0	28	19.5	F
02/26/93	09:53:00	. 5	391	693	278	1736	5.0	28	19.8	F
02/26/93	09:54:00	. 9	392	689	277	1738	4.9	22	19.4	F
02/26/93	09:55:00	. 8	388	684	277	1743	4.9	22	19.2	F
02/26/93	09:56:00	. 8	392	680	277	1748	4.9	23	22.5	F
02/26/93	09:57:00	. 6	384	674	275	1756	4.8	22	20.1	F
02/26/93	09:58:00	. 5	390	669	276	1758	4.8	22	21.8	F
02/26/93	09:59:00	. 6	385	661	274	1718	5.6	22	22.7	F

02/26/93	10:00:00	. 6	383	654	274	1685	5.7	21	23.0	F
02/26/93	10:01:00	.10	381	645	273	1669	5.6	20	15.8	F
02/26/93	10:02:00	. 9	372	634	272	1658	5.7	20	20.1	F
02/26/93	10:03:00	. 9	370	625	272	1651	5.8	20	19.5	F
02/26/93	10:04:00	. 8	369	616	271	1645	5.8	19	18.0	F
02/26/93	10:05:00	. 7	366	609	270	1633	5.9	19	20.8	F
02/26/93	10:06:00	. 9	367	605	269	1625	5.9	19	20.5	F
02/26/93	10:07:00	. 8	366	603	268	1622	5.9	19	16.1	F
02/26/93	10:08:00	. 8	367	603	267	1619	5.9	19	17.8	F
02/26/93	10:09:00	. 9	362	626	266	1619	5.9	19	19.9	F
02/26/93	10:10:00	. 7	359	609	264	1653	5.3	19	19.3	F
02/26/93	10:11:00	. 8	359	612	266	1700	5.1	19	17.4	F
02/26/93	10:12:00	. 8	361	614	265	1721	5.1	19	18.8	F
02/26/93	10:13:00	. 8	359	614	264	1705	6.1	17	20.1	F
02/26/93	10:14:00	. 9	362	612	263	1671	6.2	16	20.0	F
02/26/93	10:15:00	. 9	356	613	262	1623	6.7	15	19.9	F
02/26/93	10:16:00	. 9	359	608	261	1584	6.7	15	21.8	F
02/26/93	10:17:00	. 8	358	608	259	1558	7.0	16	21.7	F
02/26/93	10:18:00	. 9	356	609	259	1554	6.8	16	17.7	F
02/26/93	10:19:00	. 4	354	612	258	1556	6.8	13	17.4	F
02/26/93	10:20:00	. 1	361	614	257	1556	6.8	13	16.3	F
— End Test #2										
02/26/93	10:21:00	. 1	363	615	256	1560	6.8	13	18.2	F
02/26/93	10:22:00	. 3	362	618	256	1579	6.5	13	16.5	F
02/26/93	10:23:00	. 1	367	620	255	1621	5.8	13	14.3	F
02/26/93	10:24:00	. 2	365	620	255	1683	5.3	13	16.7	F
02/26/93	10:25:00	. 4	366	626	254	1698	5.4	14	18.5	F
02/26/93	10:26:00	. 4	356	630	253	1680	6.2	15	17.7	F
02/26/93	10:27:00	. 3	360	639	252	1672	6.2	14	14.7	F
02/26/93	10:28:00	. 2	368	649	251	1687	5.9	15	18.9	F
02/26/93	10:29:00	. 3	369	661	251	1692	6.0	15	18.6	F
02/26/93	10:30:00	. 4	372	670	250	1670	6.7	15	18.0	F
02/26/93	10:31:00	. 2	371	677	250	1651	6.7	15	16.0	F
02/26/93	10:32:00	. 4	376	685	250	1644	6.8	15	19.1	F

02/26/93	10:33:00	.	4	371	691	250	1642	6.8	15	20.2	F
02/26/93	10:34:00	.	1	373	698	250	1665	6.2	15	18.9	F
02/26/93	10:35:00	.	0	378	704	250	1687	6.1	16	16.5	F
02/26/93	10:36:00	.	2	376	708	250	1701	6.0	16	18.2	F
02/26/93	10:37:00	.	1	380	708	250	1713	5.9	17	15.3	F
02/26/93	10:38:00	.	2	378	707	250	1717	5.9	17	17.4	F
02/26/93	10:39:00	.	3	381	704	250	1723	5.8	17	20.6	F
02/26/93	10:40:00	.	3	380	701	251	1725	5.7	17	17.4	F
02/26/93	10:41:00	.	4	378	702	252	1723	5.7	17	17.4	F
02/26/93	10:42:00	.	4	380	703	250	1721	5.8	18	16.5	F
02/26/93	10:43:00	.	3	383	708	250	1721	5.7	18	18.7	F
02/26/93	10:44:00	.	3	382	714	250	1724	5.7	18	18.2	F
02/26/93	10:45:00	.	3	385	721	250	1726	5.8	19	17.8	F
02/26/93	10:46:00	.	3	382	728	251	1724	5.8	19	15.4	F
02/26/93	10:47:00	.	3	383	735	251	1724	5.7	19	19.5	F
02/26/93	10:48:00	.	3	386	741	251	1725	5.8	20	20.7	F
02/26/93	10:49:00	.	2	387	748	251	1727	5.8	20	19.7	F
02/26/93	10:50:00	.	2	386	755	251	1726	5.9	20	22.2	F
02/26/93	10:51:00	.	4	388	761	251	1727	5.9	20	19.4	F
02/26/93	10:52:00	.	5	388	765	252	1725	5.8	20	18.8	F
02/26/93	10:53:00	.	6	386	768	252	1725	5.8	20	18.5	F
02/26/93	10:54:00	.	5	383	768	253	1729	5.8	20	21.8	F
02/26/93	10:55:00	.	4	378	766	252	1733	5.8	21	20.0	F
02/26/93	10:56:00	.	3	376	763	253	1736	5.9	21	18.5	F
02/26/93	10:57:00	.	5	373	759	252	1737	5.8	21	18.9	F
02/26/93	10:58:00	.	3	366	754	251	1742	6.9	19	19.6	F
02/26/93	10:59:00	.	2	365	752	252	1747	5.9	19	19.4	F
02/26/93	11:00:00	.	2	365	749	252	1747	5.8	21	19.1	F
-START TEST #3											
02/26/93	11:01:00	.	1	368	747	252	1738	6.0	22	15.7	F
02/26/93	11:02:00	.	1	369	746	252	1729	5.9	22	12.7	F
02/26/93	11:03:00	.	2	368	745	252	1722	5.9	22	19.2	F
02/26/93	11:04:00	.	1	371	743	252	1717	5.9	23	18.0	F
02/26/93	11:05:00	.	2	369	740	252	1714	5.9	23	16.7	F

02/26/93	11:06:00		. 2	373	740	253	1712	6.1	23	18.2	F
02/26/93	11:07:00		. 0	371	743	253	1709	6.1	23	15.9	F
02/26/93	11:08:00		. 0	377	749	253	1709	6.1	23	15.7	F
02/26/93	11:09:00	-	. 1	366	756	251	1702	6.1	24	14.2	F
02/26/93	11:10:00	-	. 1	374	764	254	1683	6.6	24	16.2	F
02/26/93	11:11:00		. 3	394	771	256	1649	7.1	23	18.8	F
02/26/93	11:12:00		. 2	374	780	257	1659	6.6	23	16.5	F
02/26/93	11:13:00	-	. 2	373	790	260	1751	3.3	24	17.7	F
02/26/93	11:14:00	-	. 1	334	789	261	1791	3.4	30	15.7	F
02/26/93	11:15:00		. 3	340	759	261	1735	5.3	33	16.5	F
02/26/93	11:16:00		. 6	383	714	258	1619	8.5	29	17.8	F
02/26/93	11:17:00		. 9	406	689	259	1510	9.6	88	16.2	F
02/26/93	11:18:00		. 6	417	692	260	1521	7.4	171	16.2	F
02/26/93	11:19:00		. 7	422	720	261	1586	7.0	54	13.5	F
02/26/93	11:20:00		. 6	422	758	263	1633	6.7	21	15.0	F
02/26/93	11:21:00		. 5	426	793	264	1657	6.5	13	15.4	F
02/26/93	11:22:00		. 5	426	822	266	1674	6.5	13	18.0	F
02/26/93	11:23:00		. 4	424	844	267	1690	6.5	13	16.4	F
02/26/93	11:24:00		. 5	426	866	268	1700	6.2	14	16.8	F
02/26/93	11:25:00		. 4	424	890	270	1707	6.2	15	23.4	F
02/26/93	11:26:00		. 3	432	914	270	1713	6.2	16	21.1	F
02/26/93	11:27:00		. 4	425	935	271	1719	6.1	17	22.2	F
02/26/93	11:28:00		. 5	429	954	272	1730	6.1	17	23.3	F
02/26/93	11:29:00		. 5	428	964	273	1740	5.8	19	24.4	F
02/26/93	11:30:00		. 6	415	965	274	1733	6.1	20	20.7	F
02/26/93	11:31:00		. 6	409	964	274	1734	6.1	20	16.7	F
02/26/93	11:32:00		. 7	396	959	273	1740	5.9	21	28.0	F
02/26/93	11:33:00		.11	396	954	273	1746	5.8	22	21.8	F
02/26/93	11:34:00		. 9	386	950	272	1748	6.0	22	20.4	F
02/26/93	11:35:00		.10	405	946	272	1748	6.0	22	20.7	F
02/26/93	11:36:00		.12	400	944	272	1751	5.9	22	23.4	F
02/26/93	11:37:00		.12	397	933	271	1758	5.8	23	20.7	F
02/26/93	11:38:00		. 8	394	915	271	1755	5.8	23	19.4	F

02/26/93	11:39:00	. 6	385	894	271	1757	5.6	24	21.1	F
02/26/93	11:40:00	. 5	375	873	270	1758	5.5	25	21.4	F
02/26/93	11:41:00	. 5	374	856	268	1760	5.6	25	17.5	F
02/26/93	11:42:00	. 7	367	841	268	1763	5.6	25	20.6	F
02/26/93	11:43:00	. 6	372	825	266	1768	5.6	25	18.9	F
02/26/93	11:44:00	. 7	370	811	265	1751	6.1	25	18.7	F
02/26/93	11:45:00	. 7	365	801	264	1717	6.4	25	18.6	F
02/26/93	11:46:00	. 9	369	795	263	1699	6.5	25	21.0	F
02/26/93	11:47:00	.11	364	790	261	1689	6.4	25	19.0	F
02/26/93	11:48:00	.10	361	788	261	1722	5.8	25	15.4	F
02/26/93	11:49:00	.13	356	788	261	1762	4.7	27	14.6	F
02/26/93	11:50:00	.11	354	785	259	1718	5.3	29	10.5	F
02/26/93	11:51:00	.11	351	784	258	1673	6.9	27	23.0	F
02/26/93	11:52:00	.10	351	786	256	1681	7.1	26	13.3	F
02/26/93	11:53:00	.12	346	791	255	1630	7.4	26	15.3	F
02/26/93	11:54:00	.12	341	799	253	1612	7.7	25	12.1	F
02/26/93	11:55:00	.10	338	808	251	1594	7.8	25	17.5	F
02/26/93	11:56:00	.11	340	822	249	1579	7.9	24	12.9	F
02/26/93	11:57:00	.11	344	840	247	1571	8.1	24	15.0	F
02/26/93	11:58:00	.14	356	859	246	1590	7.6	24	14.4	F
02/26/93	11:59:00	.12	359	879	244	1602	7.7	24	18.3	F
02/26/93	12:00:00	.11	371	897	242	1641	6.8	24	18.6	F
02/26/93	12:01:00	.10	373	913	243	1695	6.5	26	28.9	F
02/26/93	12:02:00	. 9	373	925	241	1732	7.0	26	17.4	F
02/26/93	12:03:00	. 9	359	932	240	1746	6.3	24	16.6	F
02/26/93	12:04:00	.11	348	929	239	1763	9.1	23	17.0	F
02/26/93	12:05:00	. 9	345	916	238	1781	8.8	25	19.6	F
02/26/93	12:06:00	. 3	344	900	237	1781	6.2	26	19.1	F
02/26/93	12:07:00	. 6	349	864	237	1760	6.0	27	22.3	F
02/26/93	12:08:00	. 6	354	861	235	1782	5.9	28	19.1	F
02/26/93	12:09:00	. 8	352	835	234	1764	6.1	29	21.9	F
02/26/93	12:10:00	. 9	350	810	234	1787	6.0	29	17.8	F
02/26/93	12:11:00	.10	339	792	233	1785	6.1	29	17.0	F

02/26/93	12:12:00	.10	343	778	233	1782	6.1	28	18.1	F
02/26/93	12:13:00	.11	338	766	232	1778	6.0	29	17.3	F
02/26/93	12:14:00	.10	337	754	231	1776	8.4	29	18.7	F
02/26/93	12:15:00	.10	334	744	230	1774	7.1	30	18.7	F
02/26/93	12:16:00	.9	330	735	229	1776	6.4	30	16.5	F
02/26/93	12:17:00	.10	328	729	228	1779	6.1	31	16.6	F
02/26/93	12:18:00	.11	332	723	227	1793	5.9	31	17.6	F
02/26/93	12:19:00	.11	333	715	225	1787	5.9	32	15.8	F
02/26/93	12:20:00	.11	334	706	225	1794	6.0	32	12.9	F
02/26/93	12:21:00	.11	335	698	222	1797	5.8	33	15.5	F
02/26/93	12:22:00	.12	329	692	220	1768	6.4	33	17.7	F
02/26/93	12:23:00	.14	229	688	221	1722	7.1	32	16.5	F
1213 Hrs TEST OVER STOPPED FEED Test #3										
02/26/93	12:24:00	.12	325	686	220	1688	7.5	30	14.4	F
02/26/93	12:25:00	.13	335	687	219	1668	7.5	30	12.2	F
02/26/93	12:26:00	.15	332	690	217	1658	7.4	30	6.1	F
02/26/93	12:27:00	.12	352	694	217	1657	7.4	30	3.7	F
02/26/93	12:28:00	.13	376	701	216	1627	8.1	31	5.1	F
02/26/93	12:29:00	.14	346	715	215	1616	7.9	31	6.0	F
02/26/93	12:30:00	.6	322	736	212	1665	7.3	31	7.3	F
02/26/93	12:31:00	.7	357	768	213	1840	5.4	30	4.5	F
02/26/93	12:32:00	.8	372	795	212	1952	3.8	32	3.7	F
02/26/93	12:33:00	.8	402	802	210	1911	6.8	36	4.8	F
02/26/93	12:34:00	.8	422	794	209	1879	7.2	32	3.5	F
02/26/93	12:35:00	.10	426	776	209	1865	8.0	29	3.6	F
02/26/93	12:36:00	.11	440	758	208	1849	8.4	28	3.7	F
02/26/93	12:37:00	.12	454	746	208	1825	9.1	27	3.6	F
02/26/93	12:38:00	.13	462	740	212	1808	9.6	27	4.0	F
02/26/93	12:39:00	.13	470	729	213	1738	11.7	27	4.0	F
02/26/93	12:40:00	.10	469	716	217	1678	11.9	25	3.9	F

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

ENCO
Laboratories
DHRS Certification No. 83318, E83182

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.1
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and
identified by client as:

Boca Grande
Project #4015

#1 -	Preburn Test 1	02/25/93	19:30
#2 -	Preburn Test 2	02/26/93	10:20
#3 -	Preburn Test 3	02/26/93	12:23

MANAGER, CLIENT SERVICES David J. Vesey

David J. Vesey

RESULTS OF ANALYSIS

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Preburn Test 1	Preburn Test 2	Preburn Test 3	units
Total Petroleum Hydrocarbons	54	50.5	54.3	mg/kg
Date Analyzed	03/03/93	03/03/93	03/03/93	

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

ENCO Laboratories

ENVIRONMENTAL CONSERVATION LABORATORIES
10207 GENERAL DRIVE, ORLANDO, FLORIDA 32824
PHONE (407) 826-5314 • FAX (407) 850-6945

CHAIN OF CUSTODY RECORD

PROJECT NO.: 4015
PROJECT NAME: Boca Grande
SAMPLER'S (SIGNATURE): Wayne Raulerson

STATION NO.	DATE	TIME	COMPOSITE	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH	8010-8020	metals						REMARKS
#2	2-25-93	19:30	X		Preburn Test 1	3	X	X	X						
#2	2-25-93	19:30	X		Post burn Test 1		X	X	X						
#2	2-26-93	10:20	X		Post burn Test 2		X	X	X						
#2	2-26-93	10:20	X		Preburn Test 2		X	X	X						
#2	2-26-93	12:23	X		Post burn Test 3		X	X	X						
#2	2-26-93	12:23	X		Preburn Test 3		X	X	X						

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:
W. Raulerson	15:15 2-26-93				
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME:	REMARKS:
					2095
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RECEIVED FOR LABORATORY BY: Ellen Todd	3/1/93 8:30 AM	

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

RECEIVED MAR 2 2 1993

ENCO Laboratories
DHRS Certification No. 83318, E83182

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.2
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and
identified by client as:

Boca Grande
Project #4015
Composite of 3 samples

#1 - Postburn Test 1	02/25/93	19:30
#2 - Postburn Test 2	02/26/93	10:20
#3 - Postburn Test 3	02/26/93	12:23

MANAGER, CLIENT SERVICES David J. Vesey

David J. Vesey

RESULTS OF ANALYSIS

EPA METHOD 8010 - VOLATILE HALOCARBONS	Postburn Composite	units
Dichlorodifluoromethane	BDL(5)	µg/kg
Chloromethane	BDL(5)	µg/kg
Vinyl Chloride	BDL(5)	µg/kg
Bromomethane	BDL(5)	µg/kg
Chloroethane	BDL(5)	µg/kg
Trichlorofluoromethane	BDL(5)	µg/kg
1,1-Dichloroethene	BDL(5)	µg/kg
Methylene Chloride	BDL(5)	µg/kg
t-1,2-Dichloroethene	BDL(5)	µg/kg
1,1-Dichloroethane	BDL(5)	µg/kg
Chloroform	BDL(5)	µg/kg
1,1,1-Trichloroethane	BDL(5)	µg/kg
Carbon Tetrachloride	BDL(5)	µg/kg
1,2-Dichloroethane	BDL(5)	µg/kg
1,2-Dichloropropane	BDL(5)	µg/kg
Trichloroethene	BDL(5)	µg/kg
Bromodichloromethane	BDL(5)	µg/kg
c-1,3-Dichloropropene	BDL(5)	µg/kg
t-1,3-Dichloropropene	BDL(5)	µg/kg
1,1,2-Trichloroethane	BDL(5)	µg/kg
Tetrachloroethene	BDL(5)	µg/kg
Dibromochloromethane	BDL(5)	µg/kg
Chlorobenzene	BDL(5)	µg/kg
Bromoform	BDL(5)	µg/kg
1,1,2,2-Tetrachloroethane	BDL(5)	µg/kg
1,3-Dichlorobenzene	BDL(5)	µg/kg
1,4-Dichlorobenzene	BDL(5)	µg/kg
1,2-Dichlorobenzene	BDL(5)	µg/kg
Surrogate:	**% Recov**	**Limits**
Bromofluorobenzene	75	51-151
Date Analyzed	03/12/93	

BDL = Below Detection Level; detection level in parentheses

RESULTS OF ANALYSIS

EPA METHOD 8020 - VOLATILE AROMATICS	Postburn Composite	units
Methyl Tert Butyl Ether	BDL(10)	µg/kg
Benzene	7	µg/kg
Toluene	13	µg/kg
Ethylbenzene	18	µg/kg
m-Xylene & p-Xylene	38	µg/kg
o-Xylene	6	µg/kg
Chlorobenzene	BDL(5)	µg/kg
1,2-Dichlorobenzene	BDL(5)	µg/kg
1,3-Dichlorobenzene	BDL(5)	µg/kg
1,4-Dichlorobenzene	BDL(5)	µg/kg
Surrogate:	**% Recov**	**Limits**
Bromofluorobenzene	102	50-154
Date Analyzed	03/12/93	

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Postburn Composite	units
Total Petroleum Hydrocarbons	<5.0A	mg/kg
Date Analyzed	03/03/93	

A = Average of three determinations
BDL = Below Detection Level; detection level in parentheses
< = Less Than

RESULTS OF ANALYSIS

TOTAL METALS ANALYSIS	Method Number	Postburn Composite	units
Arsenic, As	7061	1.5	mg/kg
Date Analyzed		03/12/93	
Barium, Ba	7080	51.2	mg/kg
Date Analyzed		03/15/93	
Cadmium, Cd	7130	<0.80	mg/kg
Date Analyzed		03/10/93	
Chromium, Cr	7190	12.2	mg/kg
Date Analyzed		03/15/93	
Lead, Pb	7420	11.4	mg/kg
Date Analyzed		03/14/93	
Mercury, Hg	7470	<0.050	mg/kg
Date Analyzed		03/12/93	
Selenium, Se	7741	<0.40	mg/kg
Date Analyzed		03/12/93	
Silver, Ag	7760	<1.6	mg/kg
Date Analyzed		03/11/93	

< = Less Than

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 8010			
Methylene Chloride	83/109/ 96	48-143	27
Chloroform	108/102/ 86	50-154	6
Carbon Tetrachloride	110/ 97/ 94	58-152	12
Trichloroethene	81/ 87/ 92	58-143	7
Tetrachloroethene	95/102/102	59-151	7
Chlorobenzene	101/ 94/ 99	63-136	7
EPA 8020			
Benzene	107/104/111	59-143	3
Toluene	81/ 80/112	59-137	1
Ethylbenzene	109/110/112	61-135	1
Total Xylenes	107/107/108	56-136	1
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA
TOTAL METALS			
Arsenic, 7061	85/ 90/ 91	63-139	5
Barium, 7080	103/106/ 99	64-135	3
Cadmium, 7130	105/108/106	72-121	3
Chromium, 7190	100/ 99/ 97	63-148	1
Lead, 7420	106/110/ 96	63-135	4
Mercury, 7470	91/ 91/ 91	40-140	<1
Selenium, 7741	98/100/102	58-126	2
Silver, 7760	89/ 90/101	89-112	<1

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

< = Less Than

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # 4016

DATE: 25 Feb 93 NAME: Boca Grande SHIFT: 1

CUMULATIVE TONS
Meter Finish: _____
Meter Start: _____
Total Tons: _____

SCALE TONS
Meter Finish: 49.5
Meter Start: 0
Total TOns: 49.5

HOUR METER
Meter Finish: _____
Meter Start: _____
Total Hours: 3.0

FUEL USE IN GALLONS
Tank Finish: 10,710
Tank Start: 12,240
Total Gallons: 1530

Production Time Start: _____ Production Time Finish: 1940

Gallons divided by Billable Tons = 30.9 Gallons Per Billable Ton
Billable Tons Divided by Hours = 16 Billable Tons Per Hour

Water Usage: 3000 Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2883.3
Recycled Tons: 0
Billable Tons: 49.5

2,937.8 BZ WR

BILLABLE TONS BURNED TO DATE: 1932.7

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

David Hopkins
CUSTOMER

Gary Collins

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR GARY COLLINS DATE 25 FEB 93
SHIFT _____ LOCATION BOCA GRANDE PROJECT# _____

ARRIVED ON THE SITE _____ LEFT THE SITE _____
END METER READING _____ END TONNAGE _____
START METER READING _____ START TONNAGE 0
TOTAL METER READING _____ TOTAL TONNAGE _____
TOTAL GAS USED _____ REJECT/REBURN _____

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS _____

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @ _____ Finish Calibration: @ _____
SCALE COUNT READING _____ WEIGH BELT % _____
Started Burners @ 1000 HRS Shut Down Burners @ _____
Shut Rig Down @ _____ Production Hr. _____

STARTED FEED	STOPPED FEED	REMARKS
		1834 TO 1934
		Run #1 STACK TEST
	1940 HRS	

BILLABLE TONS -- HOURS = _____ TONS PER HOUR

TONS PER HOUR -- CU. FT. _____ GALLONS PER TON

COMMENTS: WATER START 779900
STACK TEST

OPERATOR'S SIGNATURE Gary Collins

D E ENVIRONMENTAL INC. PRODUCTION REPORT

UNIT #_____ BEST AVAILABLE COPY DATE 25 FEB 93

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

HOUR	CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
0100										
0200										
0300										
0400										
0500										
0600										
0700										
0800	Warm up & unit.									
0900	Waiting on STACK TEST CO									
1000	TO GET STARTED.									
1100										
1200										
1300										
1400										
1500										
1600										
1700										
1845 1800	0	5%	1663	404	50%	323	6½"	782		35.0
1900	0	2%	1714	427	50%	324	6"	775	ST	40.0
1915 2000	0	3%	1631	340	50%	325	9½"	781		44.
1930 2100	0	2%	1674	265	50%	301	13"	730		48.
2200										49.
2300										
2400										

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

02/25/93	18:25:00	. 8	423	694	281	1687	5.8	11	15.8	F
02/25/93	18:26:00	. 7	417	720	283	1696	5.7	12	20.8	F
02/25/93	18:27:00	. 6	410	738	283	1718	5.3	13	22.0	F
02/25/93	18:28:00	. 4	413	752	284	1738	5.1	14	18.2	F
02/25/93	18:28:49	Channel no. 7	PV= 425	A2= 360	Set	CALIBRATION of				
02/25/93	18:28:52	Channel no. 7	PV= OPEN	A1= -999	Set	CEMS PRIOR TO				
02/25/93	18:29:00	. 6	415	762	284	1600	9.4	OPENA	18.0	F
02/25/93	18:29:41	Channel no. 7	PV= 536	A1= -999	Cleared					
02/25/93	18:29:47	Channel no. 7	PV= 340	A2= 360	Cleared					
02/25/93	18:30:00	. 6	412	767	285	1705	3.9	148	18.3	F
02/25/93	18:31:00	. 5	408	768	285	1718	5.3	35	19.3	F
02/25/93	18:31:14	Channel no. 7	PV= 398	A2= 360	Set					
02/25/93	18:31:17	Channel no. 7	PV= OPEN	A1= -999	Set					
02/25/93	18:32:00	. 3	415	766	285	1449	12.7	OPENA	16.2	F
02/25/93	18:33:00	. 4	420	762	285	1375	7.6	OPENA	15.1	F
02/25/93	18:33:16	Channel no. 7	PV= 536	A1= -999	Cleared					
02/25/93	18:33:29	Channel no. 7	PV= 352	A2= 360	Cleared					
—	START TEST Run #1									
02/25/93	18:34:00	. 5	428	755	285	1625	3.8	221	19.2	F
02/25/93	18:35:00	. 5	428	751	285	1670	5.9	133	22.4	F
02/25/93	18:36:00	. 6	426	751	285	1632	6.5	90	19.3	F
02/25/93	18:37:00	. 6	420	753	286	1623	6.2	65	9.9	F
02/25/93	18:38:00	. 5	422	757	286	1638	5.9	50	21.3	F
02/25/93	18:39:00	. 5	424	760	286	1648	5.9	40	21.2	F
02/25/93	18:40:00	. 5	413	761	287	1656	5.9	34	22.9	F
02/25/93	18:41:00	. 4	410	765	287	1660	5.9	29	20.1	F
02/25/93	18:42:00	. 2	409	768	286	1667	5.8	26	18.7	F
02/25/93	18:43:00	- . 1	408	770	286	1676	5.7	23	18.0	F
02/25/93	18:44:00	- . 1	415	770	286	1674	5.9	21	15.8	F
02/25/93	18:45:00	. 2	411	770	286	1671	5.9	20	19.6	F
02/25/93	18:46:00	. 2	416	770	286	1668	6.0	19	17.8	F
02/25/93	18:47:00	. 2	416	771	285	1664	6.1	17	17.3	F
02/25/93	18:48:00	. 1	410	771	286	1661	6.1	16	21.9	F

02/25/93	18:50:00		.	2	411	765	286	1657	6.0	15	18.1	F
02/25/93	18:51:00		.	0	413	760	286	1655	6.0	14	20.8	F
02/25/93	18:52:00		.	0	407	755	286	1656	6.1	13	20.8	F
02/25/93	18:53:00		.	1	412	747	285	1655	6.1	13	21.1	F
02/25/93	18:54:00		.	0	415	740	285	1654	6.2	12	21.4	F
02/25/93	18:55:00		.	1	415	738	285	1654	6.1	12	18.1	F
02/25/93	18:56:00		.	3	413	741	285	1654	6.1	12	22.4	F
02/25/93	18:57:00		.	1	413	745	286	1649	6.0	12	17.8	F
02/25/93	18:58:00		.	0	395	746	287	1646	5.7	12	19.7	F
02/25/93	18:59:00	-	.	1	366	740	288	1649	5.5	12	17.5	F
02/25/93	19:00:00		.	0	353	717	287	1613	6.9	13	18.5	F
02/25/93	19:01:00		.	2	375	675	285	1556	7.7	27	15.6	F
02/25/93	19:02:00	-	.	2	404	642	283	1570	7.5	13	15.2	F
02/25/93	19:03:00	-	.	1	422	643	284	1628	6.8	10	15.8	F
02/25/93	19:04:00	-	.	2	436	664	284	1667	6.6	9	18.0	F
02/25/93	19:05:00		.	5	433	693	284	1677	6.6	9	19.0	F
02/25/93	19:06:00		.	1	432	721	285	1683	6.6	9	13.9	F
02/25/93	19:07:00		.	1	435	750	286	1711	5.8	10	21.0	F
02/25/93	19:08:00		.	1	440	783	287	1700	6.2	10	19.0	F
02/25/93	19:09:00		.	1	442	810	288	1692	6.2	10	16.9	F
02/25/93	19:10:00		.	0	442	826	289	1694	6.0	11	20.2	F
02/25/93	19:11:00		.	0	437	833	290	1698	6.0	11	19.6	F
02/25/93	19:12:00	-	.	2	430	836	291	1692	5.9	11	21.1	F
02/25/93	19:13:00	-	.	1	424	834	290	1659	6.5	11	22.1	F
02/25/93	19:14:00	-	.	2	415	827	290	1641	6.5	11	21.0	F
02/25/93	19:15:00	-	.	1	407	816	289	1617	6.7	11	20.1	F
02/25/93	19:16:00		.	0	396	804	288	1591	7.1	12	23.2	F
02/25/93	19:17:00	-	.	2	381	792	286	1571	7.3	13	20.2	F
02/25/93	19:18:00	-	.	1	372	780	285	1613	6.4	11	19.0	F
02/25/93	19:19:00	-	.	1	375	767	284	1671	6.1	11	17.3	F
02/25/93	19:20:00	-	.	3	367	754	283	1705	5.8	11	19.6	F
02/25/93	19:21:00	-	.	3	355	743	282	1701	5.9	10	18.0	F

02/25/93	19:23:00	.	4	330	708	280	705	6.5	10	16.7	F
02/25/93	19:24:00	-	. 3	315	676	277	1715	6.6	10	15.4	F
02/25/93	19:25:00	-	. 3	312	641	274	1707	7.2	9	13.7	F
02/25/93	19:26:00	-	. 2	313	633	272	1688	7.6	9	18.8	F
02/25/93	19:27:00	-	. 3	309	650	269	1688	7.4	10	19.2	F
02/25/93	19:28:00	-	. 3	302	676	268	1724	6.6	11	13.0	F
02/25/93	19:29:00	-	. 2	303	697	266	1725	6.9	11	13.4	F
02/25/93	19:30:00	-	. 2	311	707	265	1709	7.1	12	19.1	F
02/25/93	19:31:00	-	. 2	309	711	263	1695	7.2	13	21.2	F
02/25/93	19:32:00	-	. 2	302	714	262	1677	7.4	13	20.4	F
02/25/93	19:33:00	-	. 2	303	716	260	1659	7.6	14	19.6	F
02/25/93	19:34:00		. 1	305	718	257	1628	7.8	14	19.6	F
	- END OF TEST #1										
02/25/93	19:35:00	-	. 1	296	720	256	1584	8.4	17	22.1	F
02/25/93	19:36:00		. 0	289	721	254	1561	8.2	16	18.8	F
02/25/93	19:37:00	-	. 1	292	718	253	1551	8.2	15	1.5	F
02/25/93	19:38:00	-	. 1	312	713	253	1548	8.0	15	1.2	F
02/25/93	19:39:00		. 0	337	706	254	1544	8.0	15	1.2	F
02/25/93	19:40:00		. 2	307	704	253	1526	8.3	17	1.2	F
02/25/93	19:41:00		. 4	293	716	249	1490	10.0	27	.8	F
02/25/93	19:42:00		. 4	270	741	245	1482	10.9	16	1.0	F
02/25/93	19:43:00		. 2	237	759	242	1494	11.6	10	1.0	F
02/25/93	19:44:00		. 4	225	762	238	1342	19.2	183	1.8	F
02/25/93	19:45:00		. 6	211	751	236	1199	19.5	110	.7	F
02/25/93	19:46:00		. 6	204	732	234	1084	19.5	85	.7	F
02/25/93	19:47:00		. 6	197	711	231	991	19.5	84	1.0	F
02/25/93	19:48:00		. 7	198	690	228	913	19.5	67	1.0	F
02/25/93	19:49:00		.12	185	668	226	847	19.5	55	1.0	F
02/25/93	19:50:00		.12	177	644	223	789	19.5	39	.7	F
02/25/93	19:51:00		.12	178	618	219	739	19.5	29	.8	F
02/25/93	19:52:00		.25	181	592	217	695	19.5	23	1.0	F
02/25/93	19:53:00		.25	179	565	213	656	19.5	17	1.2	F
02/25/93	19:54:00		.26	174	538	210	621	19.5	13	.7	F

1.0 INTRODUCTION

On February 25-26, 1993, Air Consulting and Engineering, Inc. (ACE) conducted particulate, Volatile Organic Compounds (VOC), Carbon Monoxide (CO), and Visible Emissions (VE) testing on the Afterburner Exhaust of the Mobile Soil Remediation Unit in Boca Grande, Florida.

Testing was performed to satisfy the conditions of the construction Permit Number AC16-187650. Emission testing was also designed to accommodate permit conditions as may be modified upon operating permit application.

The following United States Environmental Protection Agency (EPA) test methods were employed; EPA Method 5 (particulate), EPA Method 10 (CO), EPA Method 25A (VOC), and EPA Method 9 (VE).

A Ratfisch RS55 was used for the VOC testing.

Mr. Chris Sleeper of DRE Environmental, Inc. (DRE) coordinated testing and provided production data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

The remediation unit was found to be operating within the conditions of the permit as well as the NSPS standard of 0.04 grains per standard cubic feet (gr/SCF). The stack gas temperature and flow rate averaged 1627°F and 7809 SCFMD, respectively.

Particulate emissions averaged 0.034 (gr/SCF) corrected to 50 percent excess air and 2.37 pounds per hour (lbs/Hr). Allowable emissions are 0.08 gr/SCF at 50 percent excess air or 7.4 lbs/Hr.

Carbon Monoxide emissions averaged 0.02 lbs/Hr. Emissions on a ppm basis are 0.69 corrected to 7% O2 and 0.67 corrected to 50% excess air.

VOC emissions averaged 0.10 lbs/Hr as carbon which is within the allowable emissions of 22.1 lbs/Hr.

During the test, the contaminated soil input rate to the dryer of the remediation unit averaged 19.85 tons per hour (TPH) compound with a permitted limit of 35 TPH. The total recoverable petroleum hydrocarbon concentration in the contaminated soil averaged 53 mg/Kg which is much lower than the system design capacity.

A destruction removal efficiency of 95.24 percent was achieved based on the hydrocarbon feed rate and stack gas discharge rate. See Appendix G for production data. The current permitted destruction efficiency is 98.42%. That degree of destruction is difficult to achieve at the low VOC input values of this test series. Outlet emissions have also not been corrected for background methane (0.5 - 1.2 ppm). The Run 1 VOC emissions were also biased high due to a burner flame-out at the beginning of that run.

Table 1 Emission Summary
Mobile Soil Remediation Unit - Afterburner Stack
DRE Environmental, Inc.
Boca Grande, Florida
February 25-26, 1993

Run Number	Time	Flow Rate SCFMD	O2 %	Particulate Emissions				VOC Emissions		CO Emissions	
				gr/SCF	gr/SCF @ 50% excess air	gr/SCF @ 7% O2	lbs/Hr	ppm as propane	lbs/Hr as Carbon	ppm	lbs/Hr
1	1819-1926	8629	7.0	0.0289	0.028	0.028	2.14	3.3	0.16	1.40	0.05
2	0908-1023	6913	6.3	0.0357	0.033	0.034	2.12	2.0	0.08	0.40	0.01
3	1056-1220	7885	6.5	0.0424	0.040	0.041	2.86	1.4	0.06	0.34	0.01
AVERAGE	---	7809	6.6	0.0357	0.034	0.035	2.37	2.2	0.10	0.71	0.02

3

$$\text{gr/SCF @ 50\% EA} = \text{gr/SCF} \frac{100 + \%\ \text{excess air}}{150}$$

$$\text{lbs/Hr} = \text{ppm} \ (2.595 \times 10^{-9}) \ \text{MW} \ (\text{SCFMD}) \ 60$$

Emission Limits:

PM = 0.08 gr/SCF @ 50% excess air
or 7.4 lbs/Hr

VOC = 22.1 lbs/Hr

Table 2 Emission Summary
Mobile Soil Remediation Unit - Afterburner Stack
DRE Environmental, Inc.
Boca Grande, Florida
February 25-26, 1993

Run Number	Contaminated Soil Feed Rate tons/Hr	TRPH Conc. in Feed mg/kg	TRPH Conc. in Feed lbs/Hr	THC Conc. in stack gas lbs/Hr	DRE %
1	18.65	54.0	2.01	0.16	
2	19.89	50.5	2.01	0.08	
3	21.02	54.3	2.28	0.06	
AVERAGE	19.85	52.93	2.10	0.10	95.24

TRPH in feed = Feed rate (lbs/Hr) x feed conc. (mg/kg) x 10^{-6}

Destruction Removal Efficiency = $\frac{\text{lbs/Hr feed - lbs/Hr THC stack gas}}{\text{lbs/Hr feed}} \times 100$

Visible emissions averaged 0.0 percent opacity for the highest six minute period of the test which is within the 5% opacity limit (see Appendix E for VE data sheet).

Complete emission summary, field data sheets, laboratory data, and strip chart copies are presented in Appendices A, B, C, and D, respectively.

2.0 SUMMARY OF RESULTS

Results of the particulate matter emission measurements conducted on the mobile soil remediation unit on February 7, 1992 are summarized in Table 1. During the test period, the contaminated soil input rate to the dryer averaged 22.2 tons per hour, compared with a maximum permitted rate of 35 tons per hour. The permit for the soil remediation unit limits the mass emission rate of particulate matter to 2.4 pounds per hour.

The particulate matter concentration in the stack gas during the three tests averaged 0.1746 grains per dry standard cubic foot, at stack conditions, and the mass emission rate averaged 13.02 pounds per hour. The particulate matter concentration averaged 0.1708 grains per dry standard cubic foot when corrected to 50 percent excess air, and averaged 0.1753 grains per dry standard cubic foot when corrected to seven percent oxygen. The stack gas flow rate averaged 8664 SCFMD, the stack gas temperature averaged 1626°F and the stack gas moisture averaged 31.0 percent.

Results of the total hydrocarbon (THC) emission measurements are summarized in Table 2. The THC concentration in the stack gas during the three tests averaged less than 1.0 ppm (as propane) and the mass emission rate averaged less than 0.1 pound per hour. The permit limits the mass emission rate of THC to 14.0 pounds per hour. The THC in the waste feed treated during the three test runs averaged 44 mg/kg. This is equivalent

to a feed rate of hydrocarbons to the kiln of 2.0 pounds per hour. Based on the hydrocarbon feed rate and the stack gas discharge rate, a destruction-removal efficiency of 98.3 percent was achieved.

During the two 30-minute observation periods, no visible emissions were noted. The permit limits visible emissions from the baghouse/afterburner exhaust stack to five percent opacity and limits visible emissions from the conveying and soil handling operation to 10 percent opacity.

TABLE 2

TOTAL HYDROCARBON EMISSION MEASUREMENTS

DRE ENVIRONMENTAL, INC.
QUANTICO, VIRGINIA

FEBRUARY 7, 1992

Run No.	Stack Gas Flow Rate (SCFMD)	Stack Gas Concentration (ppm)	Emission Rate (lbs/hr)
1	9076	0	BDL
2	9316	1-2	0.1
3	7600	0	BDL
Avg	8664	0.67	<0.1

Calculations:

(conc. ppm) x ft^3/min x 60 min/hr x 44/385 x 10^{-6} = lbs/hr

TABLE 3

DESTRUCTION REMOVAL EFFICIENCY

DRE ENVIRONMENTAL, INC.
QUANTICO, VIRGINIA

FEBRUARY 7, 1992

Run No.	Contaminated Soil Feed Rate (tons/hr)	TRPH Conc. in Feed (mg/kg)	TRPH Conc. in Feed (lb/hr)	THC Conc. in Stack Gas (ppm)	THC Conc. in Stack Gas (lb/hr)	DRE (%)
1	20.3	40.7	1.65	0	BDL	
2	23.2	11.7	0.54	2	0.1	
3	23.1	79.5	3.67	0	BDL	
Avg.	22.2	44.0	1.96	0.67	<0.1	98.3

Calculations:

TRPH in feed = Feed Rate (lb/hr) x Feed Conc. (mg/kg) x 10^{-6}

TRPH in stack gas from Table 2

DRE = (TPHC in feed - THC in stack gas) x 100/TPHC in feed

1.0 INTRODUCTION

On May 21, 1991, Koogler & Associates Environmental Services conducted emission measurements for particulate matter, metals, volatile organic compounds, total petroleum hydrocarbons and carbon monoxide on a mobile soil remediation unit for D.R.E. Environmental, Inc., at Malone, Florida.

Particulate matter emission measurements were made in accordance with EPA Method 5 and in conjunction with the multi-metals train described in EPA publication PB91-120-006. The particulate matter emission measurements ranged from 4.15 to 5.91 pounds per hour and averaged 4.95 pounds per hour. A summary of the particulate matter emissions, gas flow and stack parameters is presented in Table 1.

Volatile organic compounds emission measurements were made with the Volatile Organic Sampling Train (VOST) by EPA Method SW846 0030. Benzene averaged 1.1×10^{-4} pounds per hour for the three runs while toluene averaged 3.9×10^{-4} pounds per hour; ethylbenzene averaged 1.9×10^{-4} pounds per hour; and xylene averaged 13.0×10^{-4} pounds per hour. A summary of the BTEX emission measurements is presented in Table 2.

Total hydrocarbon (THC) emission measurements were made with a FID by EPA Method 25A. The emissions ranged from 0.022 to 0.105 pounds per hour and averaged 0.060 pounds per hour (calculated as propane). Carbon monoxide emissions measured with a continuous emission monitor by EPA Method 10A ranged from 0.24 to 0.29 pounds per hour and averaged 0.27 pounds per hour

4.0 SUMMARY OF RESULTS

Particulate matter concentrations in the stack gas during the three tests averaged 0.0593 grains per dry standard cubic foot and the mass emission rate averaged 4.95 pounds per hour. This compares to the allowable 0.08 grains per dry standard cubic foot and 28.3 pounds per hour, per FAC Rule 17-2.610(1)(b).

Total hydrocarbon emissions averaged 0.060 pounds per hour, compared to the allowable of 22.1 pounds per hour. The emission rates averaged 1.1 x 10^{-4} pounds per hour for benzene; 3.9 x 10^{-4} pounds per hour for toluene; 1.9 x 10^{-4} pounds per hour for ethylbenzene; and 13.0 x 10^{-4} pounds per hour for xylene. Benzene, which is regulated by the permit, was well below the maximum emission limit of 8.6 pounds per hour.

Total hydrocarbons in the stack gas averaged 0.060 pounds per hour as propane (0.049 lb/hr as carbon) during the three tests. When compared to the average feed rate of petroleum hydrocarbons of 15.36 pounds per hour (11.94 lb/hr as carbon), the resulting destruction efficiency is 99.6 percent.

Carbon monoxide emissions averaged 0.27 pounds per hour during the three tests. The allowable CO emissions are 2.5 pounds per hour.

Metals emissions were all quite low with five of ten metals at or below the detection limit of the analysis.

(13.9 ppm at 7.0 percent oxygen). A summary of the THC and CO emissions is presented in Table 3.

A comparison of the total hydrocarbons from the stack and in the soil feed is presented in Table 4 and shows an average destruction efficiency of 99.6 percent.

Metals emissions ranged from less than 6×10^{-5} pounds per hour for cadmium to 1.39×10^{-3} pounds per hour for selenium. Arsenic, cadmium, lead, nickel, silver and selenium were found at or below the detection limits. A summary of the metals emission rates is presented in Table 5.

TABLE 1

SUMMARY OF SOURCE EMISSION TEST DATA

D.R.E. Environmental
Baghouse / Afterburner
May 21, 1991

Run No.	Process Weight Rate (Tons/Hr)	Stack Gas Flow Rate (SCFMD)	Stack Gas Temperature (°F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/dscf)	Particulate Matter Emission Rate (Lbs/Hr)
1	26.0	9133	1623.0	29.1	0.0755	5.91
2	28.0	10687	1654.0	27.7	0.0453	4.15
3	30.0	9831	1636.0	32.6	0.0570	4.80
Average	28.0	9884	1637.7	29.8	0.0593	4.95

Allowable Particulate Matter Emission Rate = 28.3 Lbs/hr
As per F.A.C. Rule 17-2.610(1)(b)

TABLE 3

SUMMARY OF TOTAL HYDROCARBONS AND
CARBON MONOXIDE EMISSION MEASUREMENTS

	POUNDS PER HOUR			
	Run 1	Run 2	Run 3	Average
THC	0.105 (1.7 ppm)	0.052 (0.7 ppm)	0.022 (0.3 ppm)	0.060 (0.90 ppm, stack cond)
CO	0.29 (7.2 ppm) (16.4 ppm)	0.28 (6.0 ppm) (14.0 ppm)	0.24 (5.6 ppm) (11.4 ppm)	0.27 (6.3 ppm, stack cond) (13.9 ppm, 7.0% O_2)

TABLE 4

COMPARISON OF TPHC IN FEED AND STACK TO
DETERMINE DESTRUCTION EFFICIENCY (DRE)

Run	Feed (lbs/hr)		Stack (lbs/hr)		DRE* (%)
	as TPHC	as Carbon	as Propane	as Carbon	
1	22.00	17.09	0.105	0.086	99.5
2	8.74	6.79	0.052	0.043	99.4
3	15.36	11.93	0.022	0.018	99.8
Average	15.36	11.94	0.060	0.049	99.6

* Based on carbon.

$1,500 pd.
5-18-93
Recpt. # 180857

AO16-231440

RECEIVED
MAY 18 1993
Division of Air Resources Management

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AIR POLLUTION SOURCES
CERTIFICATE OF COMPLETION OF CONSTRUCTION*

PERMIT NO. AC16-187650 DATE: May 9, 1993

Company Name: DRE Environmental, Inc. County: Portable

Source Identification(s): Soil Remediation Incinerator (Portable)

Actual costs of serving pollution control purpose: $ 350,000

Operating Rates: 35 tph Design Capacity: 35 tph

Expected Normal 30 tph During Compliance Test 20 tph

Date of Compliance Test: Feb. 25-26, 1993 (Attach detailed test report)

Test Results:	Pollutant	Actual Discharge	Allowed Discharge
	Particulate	.03566 grains/dscf	.04 grains/dscf
	VOC	.10 lbs/hr	22.8 lbs/hr

Date plant placed in operation: in Florida Feb 15, 1993

This is to certify that, with the exception of deviations noted**, the construction of the project has been completed in accordance with the application to construct and Construction Permit No. AC16-187650 dated _____.

A. Applicant:

Chris Sleeper, President
Name of Person Signing (Type)

Chris M. Sleeper
Signature of Owner or Authorized Representative and Title

Date: May 11, 1993 Telephone: (904) 758-3164

B. Professional Engineer:

Dole J. Kelley, Jr., P.E.
Name of Person Signing (Type)

Dole J. Kelley, Consulting Engineer
Company Name

Dole J. Kelley
Signature of Professional Engineer

Florida Registration No. 6519

Date: 5-11-93

(Seal) DOLE J. KELLEY, JR. NO. 6519 STATE OF FLORIDA REGISTERED ENGINEER

P.O. Box 10428 Jacksonville, FL. 32207
Mailing Address

(904) 731-7760
Telephone Number

*This form, satisfactorily completed, submitted in conjunction with an existing application to construct permit and payment of application processing fee will be accepted in lieu of an application to operate.

**As built, if not built as indicated include process flow sketch, plot plan sketch, and updates of applicable pages of application form.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT
3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

RECEIVED
MAY 18 1993
Division of Air Resources Management

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: _____ [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [ ] Construction [X] Operation [ ] Modification

COMPANY NAME: DRE Environmental, Inc. COUNTY: Portable

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Soil Remediation Incinerator

SOURCE LOCATION: Street Portable City _____

UTM: East _____ North _____

Latitude ____° ____' ____"N Longitude ____° ____' ____"W

APPLICANT NAME AND TITLE: Chris Sleeper, President

APPLICANT ADDRESS: P.O. Box 1386, Lake City, FL 32056

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of DRE Environmental, Inc.

I certify that the statements made in this application for a Operating permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Chris N. Sleeper

Chris Sleeper, President
Name and Title (Please Type)

Date: _____ Telephone No. (904) 758-3164

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed _____

Dole J. Kelley, Jr., P.E.
Name (Please Type)

Dole J. Kelley, Consulting Engineer
Company Name (Please Type)

P.O. Box 10428, Jacksonville, FL 32207
Mailing Address (Please Type)

DOLE J. KELLEY, JR. CERTIFICATE No. 6519 STATE OF FLORIDA REGISTERED ENGINEER

Florida Registration No. 6519 Date: 5-11-93 Telephone No. (904) 731-7760

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Portable facility for the decontamination of soil which contains virgin and non-virgin (used) oil which is within specifications. Treatment shall be in a rotary drier at 500°-700°F ~~followed by a knock out box, a baghouse and afterburner. This portable system~~ will operate normally 2-3 months at each site. Highly efficient pollution control equipment will result in total compliance with air pollution regulations.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N.A. Completion of Construction N.A.

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Afterburner $150,000

~~Baghouse $200,000~~

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

~~AC 16-187650~~

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr 8760 ; if seasonal, describe: _____

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? YES

   a. If yes, has "offset" been applied? NO

   b. If yes, has "Lowest Achievable Emission Rate" been applied? NO

   c. If yes, list non-attainment pollutants. SO_2, Ozone, Particulates

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. NO

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? YES

   a. If yes, for what pollutants? Particulates

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

No applicable VOC standard exist.
Particlates emission will be less than .04 grains/dscf.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Petroleum contaminated soil	Particulates	100%	70,000	A
	VOC	varies		

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 70,000

2. Product Weight (lbs/hr): <70,000 depending on moisture content

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Controlled Emission[1] Estimate		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Uncontrolled Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Particulates	4.61	20.19	.04 gr/dscf	4.61	199.88	873.1	B
CO	2.50	10.93			2.50	10.93	B
NO_x	10.01	43.73			10.01	43.73	B
SO_2	14.02	61.23			14.02	61.23	B
VOC	21.49	94.15			1400.75	6135.30	B

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency Predicted	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Hauck BH390-8 Baghouse	Particulate	99.7%	0-1000 microns	manufacturer
Hauck Afterburner	VOC	99.0%	N.A.	manufacturer
* The baghouse is rated for 15,073 ACFM (inlet) @ 400° F. It has 3840 sq. ft. cloth				
and a 3.92:1.0 air to cloth ratio.				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Propane Gas (drier)*		257.69 gal/hr	23 MMBTU/hr req'd @ 35tph
Propane Gas (afterburner)*		240.43 gal/hr	22 MMBTU/hr
#1 Diesel Fuel (generator)		13.16 gal/hr	1.8 MMBTU?hr
* alternate fuels for drier and afterburner will be natural gas and #2 fuel oil.			

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: <.5% Percent Ash: 0

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: 91,500 BTU/gal BTU/lb _____ BTU/gal
Propane 2523 BTU/cubic ft

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N.A. Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Dust from the knock out box and baghouse is added to finished product.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each atack):

Stack Height: 30 feet ft. Stack Diameter: 2'9" 2.75 feet ft.

Gas Flow Rate: 36,077 ACFM _____ DSCFM Gas Exit Temperature: 1,600 °F.

Water Vapor Content: Varies % Velocity: 101.23 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available apace, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to conatruct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emisaions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^2* _____ Wind spd/dir

Period of Monitoring _____/____/____ to _____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from _____/_____/_____ to _____/_____/_____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach deacription.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	_____	grams/sec
SO^2	_____	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source nams, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, psyroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach acientific, engineering, and technical material, reporta, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

CALCULATIONS
April 28, 1993

All calculations are based upon the expected worst case soil conditions and maximum expected operating hours per year.

I. Soil Conditions (for the purpose of this application we have set the soil conditions to be worse than those we encountered in previous work we've done)

* Feed rate = 35 tons per hour
* Ambient temperature = 60
* Moisture content = 8.0% by wt.
* Hydrocarbon content = 2.0% by wt.
* Bulk density = 100 Lb/cu ft

II. Plant Operating Hours

* 24 Hr/Day
* 7 Days/Wk
* 365 Days/Yr
* 8,760 Hr/Yr

III. Fuel Consumption

Primary Fuel: Propane Gas.

* Propane gas having 91,500 BTU's/gal, 2523 BTU/ft3
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 9345 cfh or 257.69 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 8,719 cfh or 240.43 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 18,064 cfh or 158.24 MM cfy
  = 498.12 gal/hr or 4,363,531 gal/yr propane

First Alternate Fuel: Natural Gas

* Natural gas having 1,000 BTU's/ft^3,
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 23,578.4 cfh
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 22,000 cfh
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 45,578 cfh or 399.26 MM cfy Natural Gas

Second Alternate Fuel: No. 2 Fuel Oil

* No. 2 Fuel Oil having 19,850 BTU's/lb, 144,865 BTU/gal (7.298 lbs/gal)
* Rotary Drier Burner
  Maximum capacity = 23 MM BTU/HR
  Drier rated capacity = 35 TPH heated to 700°F soil temperature
  Energy req'd at rated cap = 23.5784 MM BTU/HR
  Maximum fuel consumption = 1,187.83 lbs/hr or 162.76 gal/hr
* Afterburner Burner (Note: The afterburner typically runs @ 2% of MAX when soil contains more than .5% hydrocarbons)
  Maximum rated capacity = 22.0 MM BTU/HR
  Maximum fuel consumption = 1,108.31 lbs/hr or 151.86 gal/hr
* Total Maximum Fuel Consumption
  (Drier @ 35 TPH) + (Afterburner @ MAX) = 2296 lbs/hr or 20.11 MM lbs/yr
  = 314.6 gal/hr or 2.75 MMgal/yr
  No. 2 Fuel Oil

IV Emissions Factors

A. Rotary Drier
* Contaminated soil = raw material
* Emissions factor = 40 LB oil/ton of soil based on 2.0% oil by wt.
* Emissions factor = 5.7 lbs particulate will emerge from the drier per ton of soil processed. (ref. AP-42 8.18-1)

B. Soil Contaminate Is No. 2 Fuel Oil (Density 7.3 lbs per gallon which when burned has the following emissions)
* Particulates uncontrolled = 2.0 lb/1,000 gal
* Sulfur content of fuel = 0.5% by wt.
* Sulfur dioxide = 2.0 lb per 1%/100 lbs oil
* Nitrogen oxide = 20 lb/1,000 gal
* Carbon monoxide = 5 lb/1,000 gal

C. Total Uncontrolled Emissions from Rotary Drier Due to Soil and Oil Contaminate

Assumption: The raw material with 8% moisture and 2.0% HC's is processed at 35 tph. All HC's in the soil are treated like additional fuel in the afterburner.

1. Particulate emissions from Rotary Drier from soil:
   (AP-42 says approximately 5.7 lb/ton)
   (5.7 lb/ton) x (35 TPH) = 199.5 lb/hr

2. Hydrocarbon (VOC) emissions from oil in soil:
   * VOC = (2.0%) x (35 TPH) x (2,000 lb/ton) = 1,400 lb/hr
   * VOC fuel conversion
     = (1,400 lb/hr)/(7.3 lb/gal) = 191.78 gal/hr
   * Particulates = (2 lb/1000 gal) x (191.78 gal/hr)
     due to fuel oil = .3836 lb/hr
   * Sulfur Dioxide = 2.0 x .5 x 1,400/100 = 14 lb/hr
   * Nitrogen Oxide = (191.78 gal/hr) x 20 lb/1000 gal) = 3.835 lb/hr
   * Carbon Monoxide = (191.78 gal/hr) x (5.0 lb/1000 gal) = 0.958 lb/hr

3. Total Solid Uncontrolled Emissions (Particulates) from Rotary Drier
(Soil Emissions) + (HC Emissions) = Total
199.5 lb/hr + 0.3836 lb/hr = 199.8836 (plus .1134 lbs/hr from combustion of propane gas in Rotary Drier)

4. Uncontrolled Emissions from combustion of Propane Gas (AP-42 Table 1.5-1) Natural gas is considered the same except for SO_2 which is slightly lower (.0114 lbs.hr)

Rotary Drier = 257.69 gal/hr
Afterburner = 240.43 gal/hr
TOTAL = 498.12 gal/hr

Particulate	.09 to .44 lbs per 1000 gal	= .0447 lbs/hr to .2191 lbs/hr
SO2	.0378 lbs per 1000 gal	= .0188 lbs/hr
NOx	12.4 lbs per 1000 gal	= 6.1766 lbs/hr
CO	3.1 lbs per 1000 gal	= 1.544 lbs/hr
VOC	.52 lbs per 1000 gal	= .2589 bs/hr

5. Total Uncontrolled Emissions (Non-Particulate) due to combustion of propane and soil contaminent oil.

SO2	14 lbs/hr + .0188 lbs/hr	= 14.0188 lbs/hr
NOx	3.835 lbs/hr + 6.1766 lbs/hr	= 10.0116 lbs/hr
CO	0.958 lbs/hr + 1.544 lbs/hr	= 2.5020 lbs/hr
VOC	1,400 lbs/hr + .2589 lbs/hr	= 1400.2589 lbs/hr

D. Total Controlled Emissions of Solids

1. Exhaust gas conversion to SCFM
Baghouse capacity = 15,073 acfm @ 400°F

* Temperature correction factor $= \frac{(70 + 460)}{(400 + 460)} = \frac{530}{860} = 0.616$

* SCFM = (0.616) X (15,073 acfm) = 9,284 scfm baghouse design flow

2. Baghouse Efficiency
* The following calculations show what the baghouse efficiency would have to be to meet the state regulations allowing maximum particulate emissions from incinerators to be .04 grains per dscf.

CALCULATIONS OF DSCF PRODUCTS OF COMBUSTION

The following calculations will show the products of combustion: (Theoretically based on 40% excess air which is the amount we plan to use)

Combustion of Propane Gas (C_3H_8)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$C_3H_8 + 4(1.4)O_2 + 4(3.76)1.4N_2 \rightarrow 3CO_2 + 4H_20 + .6\ O_2 + 21.056N_2$$

Therefore one cubic foot of Propane gas will yield 3 cf CO_2 + .6 cf 0_2 + 21.056 cf N_2 = 24.656 dscf of products of combustion when burned with 40% excess air. (The water was not included but would be 13.9% of the volume of 28.656 scf which is the total products of combustion from one cubic foot of Propane)

Combustion of Natural Gas (CH_4)

Theoretical equation using 140% theoretical air. (shown as 1.4 below)

$$CH_4 + 2(1.4)0_2 + 2(3.76)1.4N_2 \rightarrow CO_2 + 2H_20 + .80_2 + 10.528N_2$$

Therefore one cubic foot of Natural gas will yield 1 cf CO_2 + .8 cf 0_2 + 10.528 cf N_2 = 12.328 dscf (The water was not includedbut would be 13.9% of the volume of 14.328 scf which is the total products of combustion from one cubic foot of Natural Gas)

Combustion of Diesel Fuel

Theoretical equation using Dodecane ($C_{12}H_{26}$) as diesel fuel and using 140% theoretical air. (shown below as 1.4)

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

Atomic Weights: C=12, H=1, O=16, N=14

Molecular Weights: $C_{12}H_{26}$=170, O_2=32, N_2=28, CO_2=44, H_2O=18, N_2=28

Converting to pound moles

$$C_{12}H_{26} + 18.5\ (1.4)\ 0_2 + 18.5(3.76)(1.4)N_2 \rightarrow 12CO_2 + 13H_2O + 7.4\ O_2 + 97.384N_2$$

$$170 + 18.5(1.4)(32) + 18.5\ (3.76)(1.4)(28) \rightarrow 12(44) + 13(18) + 7.4(32) + (97.384)(28)$$

Therefore the combustion of diesel fuel (Dodecane) with 140% theoretical air (40% excess air) will yield products of combustion → 528 + 234 + 236.8 + 2726.752
or Dry (less H_20) = 528 + 236.8 + 2726.752 = 3491.552 lbs

Dividing by theoretical fuel input of 170 pounds (shown as pound moles above)
3491.552 ÷ 170 = 20.5385 lbs dry products of combustion per pound of fuel burned with 40% excess air

$$\text{Volume} = \left(\frac{528\ \text{lbs}\ CO_2}{170\ \text{lbs fuel}} x \frac{8.548\ \text{ft}^3}{lb\ \text{of}\ CO_2}\right) + \left(\frac{236.8\ \text{lbs}\ O_2}{170\ \text{lbs fuel}} x \frac{11.819\ \text{ft}^3}{lb\ O_2}\right) +$$

$$\left(\frac{2{,}726.752\ \text{lbs}\ N_2}{170\ \text{lbs fuel}} x \frac{13.443\ \text{ft}^3}{\text{lbs}\ N_2}\right) = 26.55 + 16.46 + 215.62 =$$

= 258.63 scf of dry products of combustion per pound of diesel fuel burned at 40% excess air

Primary Fuel: Propane Gas.

From III above the total propane gas consumed by the drier and afterburner is 18,064 CFH.

18,064 CFH propane gas x 24.656 dscf/cf propane gas = 445,386 dscf/hr products of combustion when Propane is burned with 40% excess air.

First Alternate Fuel: Natural Gas

From III above the total natural gas consumed by the drier and afterburner is 45,578 CFH.

45,578 CFH natural gas x 12.328 dscf/cf nat. gas = 561,885 dscf/hr products of combustion when Natural Gas is burned with 40% excess air.

Second Alternate Fuel: No. 2 Fuel Oil

From III above the total No. 2 Fuel Oil consumed by the drier and afterburner is 2,296 lbs/hr.

2,296 lbs/hr x 258.63 dscf/lb diesel = 593,814 dscf/hr products of combustion when No. 2 Fuel Oil is burned with 40% excess air.

Oil burned from the soil: From C-2 above 1,400 lbs/hr are burned due to oil in the soil

1,400 lbs/hr x 258.63 dscf/lb diesel = 362,082 dscf/hr products of combustion when Oil is burned with 40% excess air.

Total Dry Products of Combustion for Propane Gas + Oil burned from the soil = 445,386 + 362,082 = 807,468 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for Natural Gas + Oil burned from the soil = 561,885 + 362,082 = 923,967 dscf per hr @ 40% Excess Air

Total Dry Products of Combustion for No. 2 Fuel Oil + Oil burned from soil = 593,814 + 362,082 = 955,869 dscf per hr @ 40% Excess Air

Baghouse Efficiency: Maximum allowable particulate emissions for incinerators is given by the state as .04 grains per dscf. We expect to run at an average 40% excess air so the above figures will be used.

Calculations for primary fuel: Propane Gas.

$$\frac{807{,}468 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{4.6141 \text{ lbs}}{\text{hour}} \text{ while firing propane}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 4.6141 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{4.6141 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 92.31\% \text{ Target Efficiency while firing Propane}$$

Required % efficiency while firing propane = 92.31%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing propane. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for First Alternate Fuel: Natural Gas.

$$\frac{923{,}967 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.2798 \text{ lbs}}{\text{hour}} \text{ while firing Natural Gas}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.2798 lbs/hr maximum particulate emission
* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.2798 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 91.19\% \text{ Target Efficiency while firing Natural Gas}$$

Required % efficiency while firing Natural Gas = 91.19%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing Natural Gas. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

Calculations for Second Alternate Fuel: No. 2 Fuel Oil.

$$\frac{955{,}869 \text{ ft}^3 \text{ air}}{\text{hour}} x \frac{.04 \text{ grains}}{\text{ft}^3 \text{ air}} x \frac{1 \text{ pound}}{7{,}000 \text{ grains}} = \frac{5.4621 \text{ lbs}}{\text{hour}} \text{ while firing No.2 Fuel Oil}$$

* The baghouse dust collector efficiency must be as shown below to achieve regulatory compliance of 5.4621 lbs/hr maximum particulate emission

* Total uncontrolled particulate emissions from IV C3 above = 199.8836 lbs/hr
* Inlet conditions at the baghouse will be controlled by a knock out box which has approximately 70% efficiency
* 199.8836 lbs/hr x 30% passes through = 59.96 lbs/hr escaping the knock out box and entering the baghouse

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{(Total Uncontrolled)}}$$

$$\frac{\frac{59.96 \text{ lbs}}{\text{hour}} - \frac{5.4621 \text{ lbs}}{\text{hour}}}{\frac{59.96 \text{ lbs}}{\text{hour}}} = 90.89\% \text{ Target Efficiency while firing No. 2 Fuel Oil}$$

Required % efficiency while firing No. 2 Fuel Oil = 90.89%

* This is the efficiency required to meet .04 gr/dscf corrected to 40% excess air while firing No. 2 Fuel Oil. Actual baghouse efficiency is estimated at 99.7%, so we should have no problem meeting this efficiency requirement.

E. Exhaust Gas Volume From Afterburner. Note: The actual volume of products of combustion, excess air and water vapor emerging from the stack will vary and will be controlled by use of the fan damper. This is done to maintain a negative pressure draft on the drier air intake (burner end). When soils with high hydrocarbon content are processed, the afterburner tends to overheat and the gas fuel to the afterburner is reduced to a minimum (1-2% of maximum). When high moisture soils are processed, the drier burner heat is increased and the air flow is increased to provide combustion air and drying air. Because of these variables we will estimate the total exhaust gas volume based on the rated capacity of the baghouse from D-1 above.

Stack gas flow rate = 9,284 SCFM (from D-1 above

Assumption: Afterburner set @ 1600°F

$$\text{Temperature Correction factor} = \frac{(1600 + 460)}{(70 + 460)} = 3.886$$

(3.886) x (9,284 scfm) = 36,077 acfm @ 1600° F

Stack gas velocity

Size of exhaust stack = 3.0 ft outside diameter, 2.75 ft inside diameter
Cross sectional area = 5.93 sq ft inside
Stack height above grade = 30.0 ft

$$\text{Exhaust Gas Velocity} = \frac{36,077 \text{ acfm}}{5.93 \text{ sq. ft.}} x \frac{1 \text{ min.}}{60 \text{ sec.}} = 101.23 \text{ fps}$$

Afterburner Retention Time Calculation:

* Exhaust gases in the afterburner are calculated to be 36,077 acfm @ 1600° F
* Afterburner I.D. = 5.0 ft
* Cross sectional area = 19.634 sq. ft

* $\text{Afterburner air velocity} = \frac{36,077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62 \text{ fps}$

* Afterburner air velocity = $\frac{36{,}077 \text{ acfm}}{19.634 \text{ sq. ft.}} = 30.62 \text{ fps}$

* Length of afterburner combustion chamber = 38.16 ft
* Required retention time of gases = 0.5 sec

* Actual retention time of gases = $\frac{38.16 \text{ ft.}}{30.62 \text{ fps}} = 1.246 \text{ sec.}$

F. Total Controlled Emissions of VOC's

* Afterburner operates at 1,500 to 1,600° F and field tests of similar units indicate it has a 99.00% destruction efficiency for all VOC's entering unit. However we will only claim a 98.5% efficiency since that will be good enough to keep controlled VOC effluent below 100 ton/year as shown below

* Uncontrolled VOC's = 1,400.2589 lb/hr (from C-5 above)

* Permissable VOC effluent = $\frac{100 \text{ tons}}{\text{year}} x \frac{2{,}000 \text{ lbs}}{\text{ton}} \div \frac{8{,}760 \text{ hours}}{\text{year}} = \frac{22.831 \text{ lbs}}{\text{hour}}$

$$\text{Efficiency} = \frac{\text{(Total Uncontrolled) - (Total Controlled)}}{\text{Total Uncontrolled}}$$

$$\frac{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}} - \frac{22.831 \text{ lbs}}{\text{hour}}}{\frac{1{,}400.2589 \text{ lbs}}{\text{hour}}} = 98.36\% \text{ Target Efficiency}$$

Target efficiency of 98.36% is needed to keep VOC emissions below 100 tpy.

* We will claim 98.5% efficiency which will result in
* Controlled VOC's emissions = 21.00 lb/hr based on 98.5% efficiency

* Controlled VOC's = 21.00 lb/hr based on 98.5% efficiency
* When added to the VOC emissions of the diesel powered electric generator (page 9).
  Total VOC's will be 21.00 lbs/hr + .496 lbs/hr = 21.496lbs/hr
  21.496 lbs/hr x 8760 hrs/yr ÷ 2000 lbs/ton = 94.15 TPY VOCs

G. Controlled Emissions other than Particulates and VOC's (from C-5 above)

* CO < 2.502 lbs/hr or 10.95 tpy
* NOx < 10.011 lbs/hr or 43.84 tpy
* SO2 < 14.018 lbs/hr or 61.39 tpy

New or used oil contaminating the soil may not contain more than the specified amount of the following. Therefore, the stack discharge may have similar traces.

5 ppm	Arsenic	100 ppm	Lead
2 ppm	Cadmium	1000 ppm	Total Halogens
10 ppm	Chromium	< 2 ppm	PCB

Diesel Powered Electricity Generator Emissions Calculations

Max capacity 240 Kilowatts
Design Load 150 Kilowatts
Operation Hours 8760 hours per year
Based on AP42 Table 3.3-1

Carbon Monoxide: 4.06 g/kwh x 150 kwh x .0022046 pounds/g = 1.34 lbs/hr

$$4.06 \times 8760 \text{ hrs/yr} \times 240 \text{ kilowatts} \times \frac{150 \text{ kilowatts used}}{240 \text{ kilowatts available}} = 5{,}334{,}840 \text{ grams/yr}$$

5,334.840 kg/yr x 2.2046 lbs/kg = 11,761.188 lbs/yr = 5.88 TPY carbon monoxide

Exhaust Hydrocarbons (VOC): 1.5 g/kwh x Ditto = .496 lbs/hr

1.50 g/kwh x 1,314,000 kwh = 1,971,000 grams/yr

1,971.000 kg/yr x 2.2046 lbs/kg = 4345.26 lbs/yr = 2.17 TPY VOC

2.17 TPY ÷ 8760 hrs/yr x 2000 lbs/ton = .496 lbs/hr

Nitrogen Oxides: 18.8 g/kwh x Ditto = 6.21 lbs/hr

18.8 g/kwh x 1,314,000 kwh = 24,703,200 grams/yr

24,703.200 kg/yr x 2.2046 lbs/kg = 54,460.67 lbs/yr = 27.23 TPY nitrogen oxide

Sulfur Oxides: 1.24 g/kwh x Ditto = .413 lbs/hr

1.25 g/kwh x 1,314,000 kwh = 1,642,500 gr/yr

1,642.500 kg/yr x 2.2046 lbs/kg = 3621.05 lbs/yr = 1.81 TPY sulfur oxides

Particulate: 1.34 g/kwh x Ditto = .443 lbs/hr

1.34 g/kwh x 1,314,000 kwh = 1,760,760 grams/yr

1,760.760 kg/yr x 2.2046 lbs/kg = 3,881.77 lbs/yr = 1.94 TPY particulates

EQUIPMENT SPECIFICATIONS

SOIL UNIT

DRIER STANDARD EQUIPMENT (CS6028 DRIER)

A. 515 Steel drum: diameter 60 inches, length 28 feet
B. Chain drive, 60 HP motor
C. Hauck powerstar LP burner, 23 million BTU
D. Burner blower 24 oz, 15 HP
E. Tertiary Fan, 10 HP
F. Burner control, ADM manual, ADM auto
G. LP pump
H. Motor control center
I. Take-away screw conveyor: 10 HP
J. Inlet belt conveyor (with scale) controlled by pressure drop in drum.
K. Adjustable drum frame with hydraulic system
L. Insulated drum - 2" duall

COLD FEED STANDARD EQUIPMENT

A. (1) 15 ton bin, 1/4" plate 8' x 10' top opening
B. 24" belt feeder lagged head pulley
C. Radial type gate with positive locks
D. 4" idlers, CEMA B throughout
E. Belt guards on feeders
F. Belts, 1/8" x 1/16": covers, 2 ply aggregate belt
G. Material detector

CONTROL ROOM STANDARD EQUIPMENT

A. 7'-7" x 15'-6" dimensions
B. Interior lighting
C. Heating and air conditioning
D. Control panel with manual and automatic systems for remote operation
E. CO and O_2 monitoring equipment with data logger.

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axel with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies

EQUIPMENT SPECIFICATIONS

Second Unit

AFTERBURNER STANDARD EQUIPMENT

A. Hauck LP burner, 22 million BTU
B. Burner blower 16 oz, 25 HP
C. Burner control, ADM manual, ADM auto
D. Ceramic-refractory lined chamber
E. Hydraulic raised stack
F. Stack temperature readout with probe
G. Electrical controls
H. LP pump

BAGHOUSE STANDARD EQUIPMENT (MODEL BH390-8)

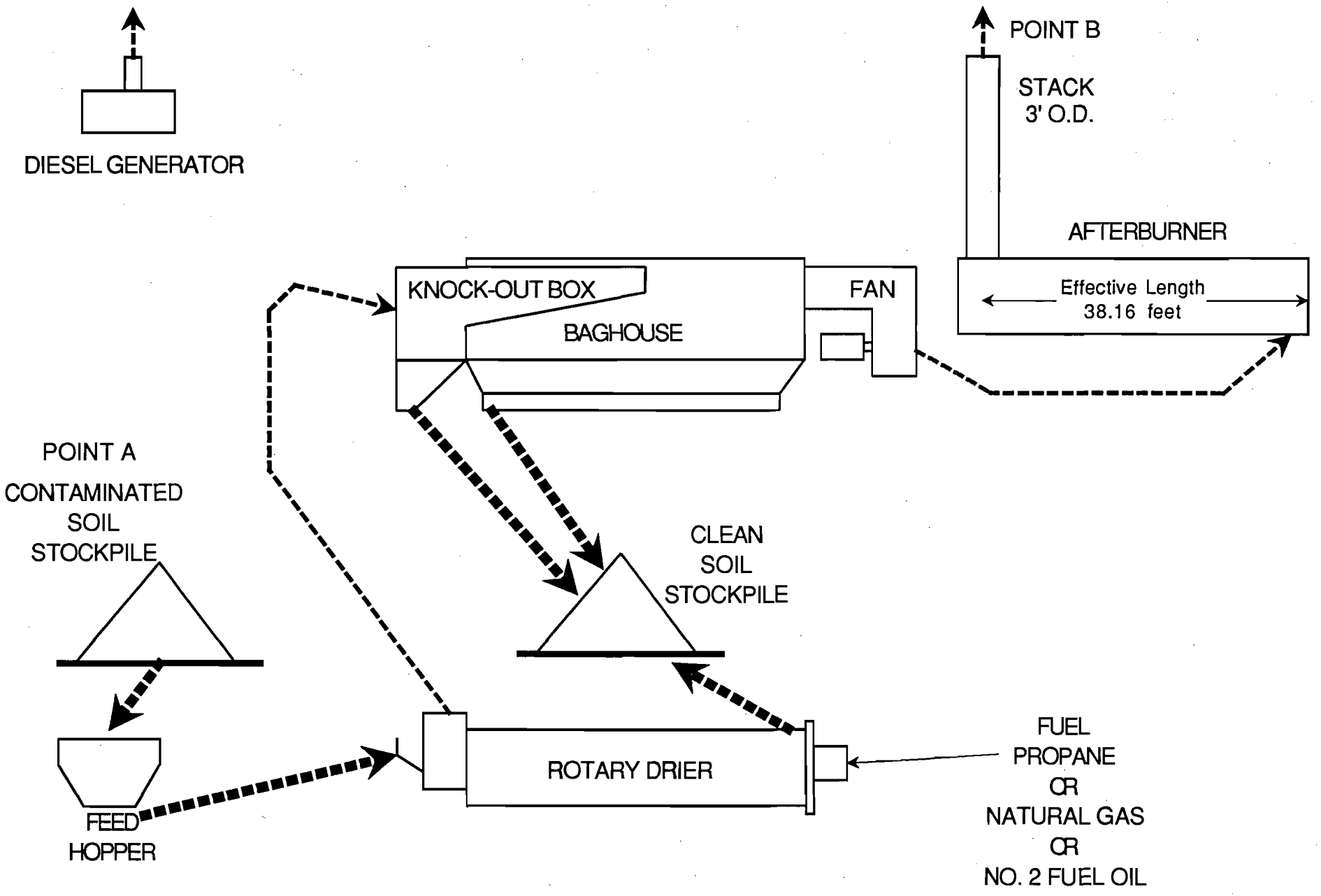
A. 3,840 sq ft of filter
B. 4.16:1 air to cloth ratio
C. Dust removal conveyors
D. 390 bags: 4.5" diameter, 96" long, P-84 material, 14 oz
E. Venturi orifice and injectors
F. Bag removal from top thru clean air section
G. Adjustable timer for cleaning and interval
H. Bags shipped mounted on cages
I. Outlet duct from exhaust fan to afterburner
J. 16,000 CFM exhaust fan: 50 HP @ 10" SP
K. Damper control
L. 30 HP air compressor: 84 CFM @ 100 PSI
M. Knock out box with breaching.

GENERATOR

A. 200 KW generator
B. Fuel tank-60 gallons
C. Fuel tank-1,000 gallon. (auxiliary)
D. Battery rack and cables
E. Air cleaner
F. Main breaker

TRAILER STANDARD EQUIPMENT

A. 5th wheel gooseneck
B. Tandem axle with suspensions
C. 10:00 x 20 tires
D. Air brakes and lighting
E. Heavy duty frame to support above items
F. Leg assemblies



DRE Environmental Services, Inc.
Soil Remediation Incinerator (Portabl

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/25/93
Stack: Contaminated Soil Incinerator Run: 1 From 1819 to 1926

Y Factor	1.006		Nozzle Diameter	0.375	In
Total Time	60	Min	Nozzle Area	0.000767	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	30.22	In Hg
Stack Temperature	1630.6	°F	Meter Temperature	74.2	°F
Stack Pressure	30.20	In Hg	Meter Orifice Diff	3.311	In H_2O
Stack Avg √ Vel Head	1.099	In H_2O	Meter Volume	57.842	CF
			Condensate Volume	417.0	ml

1.	Volume Water Vapor Sampled	19.628 SCF
2.	Volume Standard Dry Gas Sampled	58.539 SCF
3.	Total Standard Sample Volume	78.167 SCF
4.	Percent Moisture	25.111
5.	Percent Dry Air	74.889
6.	Molecular Weight of Dry Flue Gas	29.768
7.	Molecular Weight of Wet Flue Gas	26.813
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen [O_2]	7.00
10.	Percent Carbon Dioxide [CO_2]	9.30
11.	Percent Excess Air	46.367
12.	Velocity of Flue Gas	126.814 FPS
13.	Actual Volumetric Flow Rate	45196.7 ACFM
14.	Dry Volumetric Flow Rate	33847.5 ACFMD
15.	Standard Volumetric Flow Rate	8628.6 SCFMD
16.	Emission Concentration	0.02894 gr/SCFD
17.	Emission Concentration	0.00553 gr/ACF
18.	Emission Rate	2.141 lbs/Hr
19.	Percent Isokinetic	87.6

Probe/Nozzle Wash	33.00 mg
Filter	76.80 mg
Total	109.80 mg

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 2 From 0908 to 1023

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1614.1	°F	Meter Temperature	78.4	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.682	In H_2O
Stack Avg √ Vel Head	0.914	In H_2O	Meter Volume	31.093	CF
			Condensate Volume	259.0	ml

1.	Volume Water Vapor Sampled	12.191 SCF
2.	Volume Standard Dry Gas Sampled	30.785 SCF
3.	Total Standard Sample Volume	42.976 SCF
4.	Percent Moisture	28.367
5.	Percent Dry Air	71.633
6.	Molecular Weight of Dry Flue Gas	29.804
7.	Molecular Weight of Wet Flue Gas	26.456
8.	Specific Gravity Flue Gas	0.92
9.	Percent Oxygen [O_2]	6.30
10.	Percent Carbon Dioxide [CO_2]	9.70
11.	Percent Excess Air	39.683
12.	Velocity of Flue Gas	106.196 FPS
13.	Actual Volumetric Flow Rate	37848.3 ACFM
14.	Dry Volumetric Flow Rate	27111.9 ACFMD
15.	Standard Volumetric Flow Rate	6913.3 SCFMD
16.	Emission Concentration	0.03569 gr/SCFD
17.	Emission Concentration	0.00652 gr/ACF
18.	Emission Rate	2.115 lbs/Hr
19.	Percent Isokinetic	107.8

Probe/Nozzle Wash	51.40 mg
Filter	19.80 mg
Total	71.20 mg

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 3 From 1056 to 1220

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1635.4	°F	Meter Temperature	74.0	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.849	In H_2O
Stack Avg √ Vel Head	1.020	In H_2O	Meter Volume	34.335	CF
			Condensate Volume	255.5	ml

1.	Volume Water Vapor Sampled	12.026 SCF
2.	Volume Standard Dry Gas Sampled	34.286 SCF
3.	Total Standard Sample Volume	46.314 SCF
4.	Percent Moisture	25.967
5.	Percent Dry Air	74.033 74.053
6.	Molecular Weight of Dry Flue Gas	29.812
7.	Molecular Weight of Wet Flue Gas	26.748
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen (O_2)	6.50
10.	Percent Carbon Dioxide (CO_2)	9.70
11.	Percent Excess Air	41.605
12.	Velocity of Flue Gas	118.402 FPS
13.	Actual Volumetric Flow Rate	42198.4 ACFM
14.	Dry Volumetric Flow Rate	31240.7 ACFMD
15.	Standard Volumetric Flow Rate	7885.3 SCFMD
16.	Emission Concentration	0.04235 gr/SCFD
17.	Emission Concentration	0.00791 gr/ACF
18.	Emission Rate	2.862 lbs/Hr
19.	Percent Isokinetic	105.3

Probe/Nozzle Wash	67.50 mg
Filter	26.60 mg
Total	94.10 mg

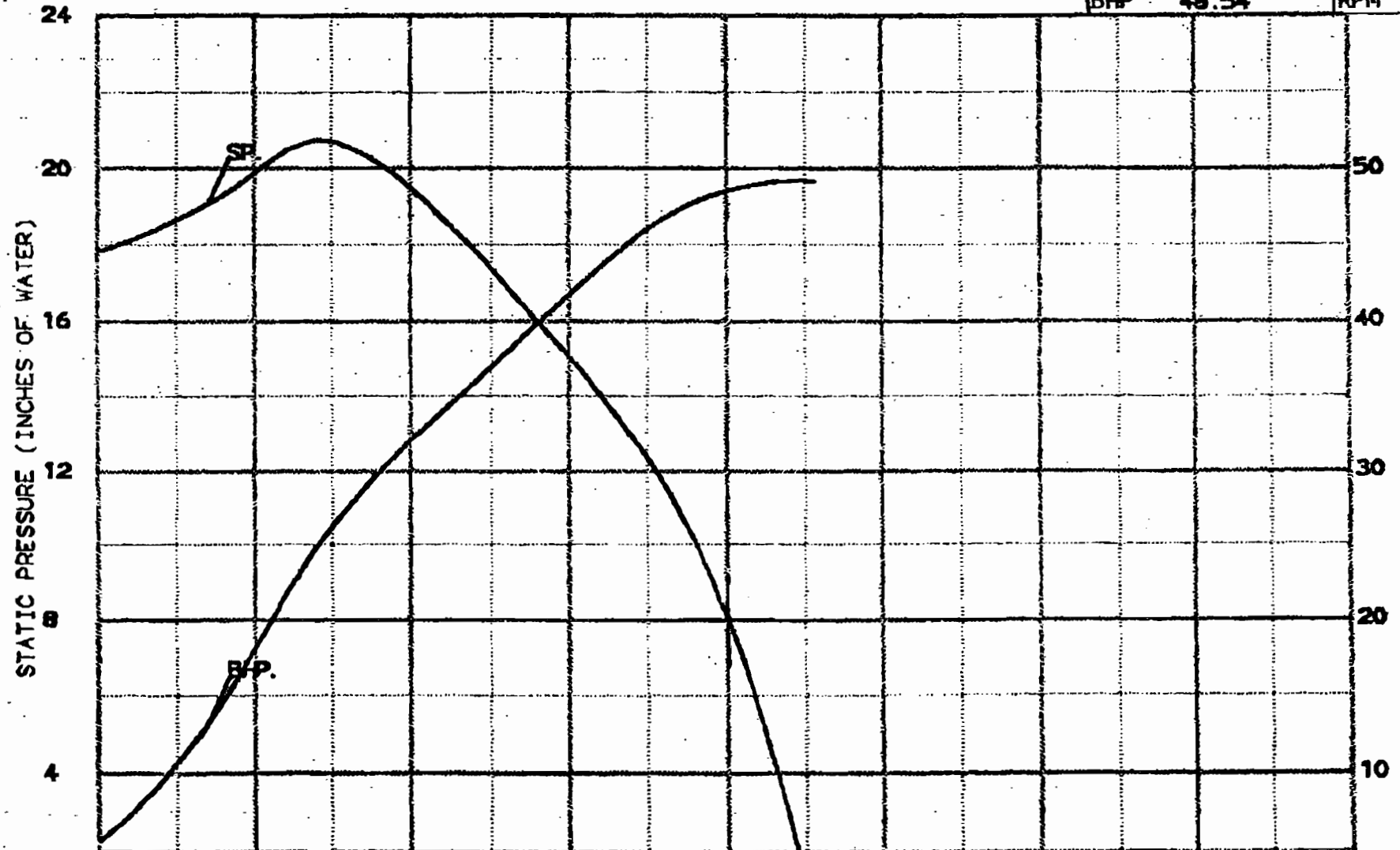
Average Percent Dry Air 73.528

104
C-1

TWIN CITY FAN & BLOWER CO.

PERFORMANCE CURVE

PROJECT			
FAN ID	330 RTF		
TAG #			
PERFORMANCE			
CFM	16000	SP	8.0
BHP	48.54	RPM	2118



AIR DEN
.0462 LI
MODIFIE
40% WIDT
WHEEL

SOUND POWER LEVELS (IN DB REF 10^{-12} WATTS)								
OCTAVE	1	2	3	4	5	6	7	8

DATE 4/27/199
#0

33 T-ASPHALT DRMIX 3164 #011-02

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

ENCO
Laboratories
DHRS Certification No 83318, E83182

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.1
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and
identified by client as:

Boca Grande
Project #4015

#1 -	Preburn Test 1	02/25/93	19:30
#2 -	Preburn Test 2	02/26/93	10:20
#3 -	Preburn Test 3	02/26/93	12:23

MANAGER, CLIENT SERVICES David J. Vesey

David J. Vesey

RESULTS OF ANALYSIS

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Preburn Test 1	Preburn Test 2	Preburn Test 3	units
Total Petroleum Hydrocarbons	54	50.5	54.3	mg/kg
Date Analyzed	03/03/93	03/03/93	03/03/93	

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

ENCO Laboratories

ENVIRONMENTAL CONSERVATION LABORATORIES
10207 GENERAL DRIVE, ORLANDO, FLORIDA 32824
PHONE (407) 826-5314 • FAX (407) 850-6945

CHAIN OF CUSTODY RECORD

PROJECT NO.: 4015
PROJECT NAME: Boca Grande
SAMPLER'S (SIGNATURE): W Wayne Paulson

STATION NO.	DATE	TIME	COMPOSITE	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH	8010-8020	metals	REMARKS
2	2-25-93	19:30	X		Preburn Test 1	3	X	X	X	
2	2-25-93	19:30	X		Post burn Test 1		X	X	X	
2	2-26-93	10:20	X		Post burn Test 2		X	X	X	
2	2-26-93	10:20	X		Preburn Test 2		X	X	X	
2	2-26-93	12:23	X		Post burn Test 3		X	X	X	
2	2-26-93	12:23	X		Preburn Test 3		X	X	X	

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:
W. Paulson	15:15 2-26-93				
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME:	REMARKS:
					2095
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	RECEIVED FOR LABORATORY BY: Eileen Todd	3/1/93 8:30 AM	

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

ENCO Laboratories
DHRS Certification No 83318, E83182

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.2
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and
identified by client as:

Boca Grande
Project #4015
Composite of 3 samples

#1 - Postburn Test 1 02/25/93 19:30

#2 - Postburn Test 2 02/26/93 10:20

#3 - Postburn Test 3 02/26/93 12:23

MANAGER, CLIENT SERVICES David J. Vesey

David J. Vesey

RESULTS OF ANALYSIS

EPA METHOD 8010 - VOLATILE HALOCARBONS	Postburn Composite	units
Dichlorodifluoromethane	BDL(5)	µg/kg
Chloromethane	BDL(5)	µg/kg
Vinyl Chloride	BDL(5)	µg/kg
Bromomethane	BDL(5)	µg/kg
Chloroethane	BDL(5)	µg/kg
Trichlorofluoromethane	BDL(5)	µg/kg
1,1-Dichloroethene	BDL(5)	µg/kg
Methylene Chloride	BDL(5)	µg/kg
t-1,2-Dichloroethene	BDL(5)	µg/kg
1,1-Dichloroethane	BDL(5)	µg/kg
Chloroform	BDL(5)	µg/kg
1,1,1-Trichloroethane	BDL(5)	µg/kg
Carbon Tetrachloride	BDL(5)	µg/kg
1,2-Dichloroethane	BDL(5)	µg/kg
1,2-Dichloropropane	BDL(5)	µg/kg
Trichloroethene	BDL(5)	µg/kg
Bromodichloromethane	BDL(5)	µg/kg
c-1,3-Dichloropropene	BDL(5)	µg/kg
t-1,3-Dichloropropene	BDL(5)	µg/kg
1,1,2-Trichloroethane	BDL(5)	µg/kg
Tetrachloroethene	BDL(5)	µg/kg
Dibromochloromethane	BDL(5)	µg/kg
Chlorobenzene	BDL(5)	µg/kg
Bromoform	BDL(5)	µg/kg
1,1,2,2-Tetrachloroethane	BDL(5)	µg/kg
1,3-Dichlorobenzene	BDL(5)	µg/kg
1,4-Dichlorobenzene	BDL(5)	µg/kg
1,2-Dichlorobenzene	BDL(5)	µg/kg
Surrogate:	**% Recov**	**Limits**
Bromofluorobenzene	75	51-151
Date Analyzed	03/12/93	

BDL = Below Detection Level; detection level in parentheses

RESULTS OF ANALYSIS

EPA METHOD 8020 - VOLATILE AROMATICS	Postburn Composite	units
Methyl Tert Butyl Ether	BDL(10)	µg/kg
Benzene	7	µg/kg
Toluene	13	µg/kg
Ethylbenzene	18	µg/kg
m-Xylene & p-Xylene	38	µg/kg
o-Xylene	6	µg/kg
Chlorobenzene	BDL(5)	µg/kg
1,2-Dichlorobenzene	BDL(5)	µg/kg
1,3-Dichlorobenzene	BDL(5)	µg/kg
1,4-Dichlorobenzene	BDL(5)	µg/kg
Surrogate:	**% Recov**	**Limits**
Bromofluorobenzene	102	50-154
Date Analyzed	03/12/93	

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Postburn Composite	units
Total Petroleum Hydrocarbons	<5.0A	mg/kg
Date Analyzed	03/03/93	

A = Average of three determinations
BDL = Below Detection Level; detection level in parentheses
< = Less Than

RESULTS OF ANALYSIS

TOTAL METALS ANALYSIS	Method Number	Postburn Composite	units
Arsenic, As	7061	1.5	mg/kg
Date Analyzed		03/12/93	
Barium, Ba	7080	51.2	mg/kg
Date Analyzed		03/15/93	
Cadmium, Cd	7130	<0.80	mg/kg
Date Analyzed		03/10/93	
Chromium, Cr	7190	12.2	mg/kg
Date Analyzed		03/15/93	
Lead, Pb	7420	11.4	mg/kg
Date Analyzed		03/14/93	
Mercury, Hg	7470	<0.050	mg/kg
Date Analyzed		03/12/93	
Selenium, Se	7741	<0.40	mg/kg
Date Analyzed		03/12/93	
Silver, Ag	7760	<1.6	mg/kg
Date Analyzed		03/11/93	

< = Less Than

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 8010			
Methylene Chloride	83/109/ 96	48-143	27
Chloroform	108/102/ 86	50-154	6
Carbon Tetrachloride	110/ 97/ 94	58-152	12
Trichloroethene	81/ 87/ 92	58-143	7
Tetrachloroethene	95/102/102	59-151	7
Chlorobenzene	101/ 94/ 99	63-136	7
EPA 8020			
Benzene	107/104/111	59-143	3
Toluene	81/ 80/112	59-137	1
Ethylbenzene	109/110/112	61-135	1
Total Xylenes	107/107/108	56-136	1
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA
TOTAL METALS			
Arsenic, 7061	85/ 90/ 91	63-139	5
Barium, 7080	103/106/ 99	64-135	3
Cadmium, 7130	105/108/106	72-121	3
Chromium, 7190	100/ 99/ 97	63-148	1
Lead, 7420	106/110/ 96	63-135	4
Mercury, 7470	91/ 91/ 91	40-140	<1
Selenium, 7741	98/100/102	58-126	2
Silver, 7760	89/ 90/101	89-112	<1

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

< = Less Than

SOURCE TEST REPORT
for
PARTICULATE, VOLATILE ORGANIC COMPOUNDS,
CARBON MONOXIDE, AND VISIBLE EMISSIONS

from the
MOBILE SOIL REMEDIATION UNIT NUMBER 1
AFTERBURNER EXHAUST
BOCA GRANDE, FLORIDA

FDER PERMIT NUMBER AC16-187650

FEBRUARY 25-26, 1993

Prepared for:

DRE ENVIRONMENTAL, INC.
2 GURDEN ROAD
LAKE CITY FLORIDA 32056

Prepared by:

AIR CONSULTING AND ENGINEERING, INC.
2106 N.W. 67TH PLACE, SUITE 4
GAINESVILLE, FLORIDA 32606
(904) 335-1889

342-93-01

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ACE
AIR CONSULTING
& ENGINEERING, INC.

2106 N.W. 67th Place • Suite 4 • Gainesville, Florida • 32606
(904) 335-1889 FAX (904) 335-1891

REPORT CERTIFICATION

To the best of my knowledge, all applicable field and analytical procedures comply with Florida Department of Environmental Regulation requirements and all test data and plant operating data are true and correct.

Dagmar Neck

Dagmar Neck

3/31/93

Date

1.0 INTRODUCTION

On February 25-26, 1993, Air Consulting and Engineering, Inc. (ACE) conducted particulate, Volatile Organic Compounds (VOC), Carbon Monoxide (CO), and Visible Emissions (VE) testing on the Afterburner Exhaust of the Mobile Soil Remediation Unit in Boca Grande, Florida.

Testing was performed to satisfy the conditions of the construction Permit Number AC16-187650. Emission testing was also designed to accommodate permit conditions as may be modified upon operating permit application.

The following United States Environmental Protection Agency (EPA) test methods were employed; EPA Method 5 (particulate), EPA Method 10 (CO), EPA Method 25A (VOC), and EPA Method 9 (VE).

A Ratfisch RS55 was used for the VOC testing.

Mr. Chris Sleeper of DRE Environmental, Inc. (DRE) coordinated testing and provided production data.

2.0 SUMMARY AND DISCUSSION OF RESULTS

The remediation unit was found to be operating within the conditions of the permit as well as the NSPS standard of 0.04 grains per standard cubic feet (gr/SCF). The stack gas temperature and flow rate averaged 1627°F and 7809 SCFMD, respectively.

Particulate emissions averaged 0.034 (gr/SCF) corrected to 50 percent excess air and 2.37 pounds per hour (lbs/Hr). Allowable emissions are 0.08 gr/SCF at 50 percent excess air or 7.4 lbs/Hr.

Carbon Monoxide emissions averaged 0.02 lbs/Hr. Emissions on a ppm basis are 0.69 corrected to 7% O2 and 0.67 corrected to 50% excess air.

VOC emissions averaged 0.10 lbs/Hr as carbon which is within the allowable emissions of 22.1 lbs/Hr.

During the test, the contaminated soil input rate to the dryer of the remediation unit averaged 19.85 tons per hour (TPH) compound with a permitted limit of 35 TPH. The total recoverable petroleum hydrocarbon concentration in the contaminated soil averaged 53 mg/Kg which is much lower than the system design capacity.

A destruction removal efficiency of 95.24 percent was achieved based on the hydrocarbon feed rate and stack gas discharge rate. See Appendix G for production data. The current permitted destruction efficiency is 98.42%. That degree of destruction is difficult to achieve at the low VOC input values of this test series. Outlet emissions have also not been corrected for background methane (0.5 - 1.2 ppm). The Run 1 VOC emissions were also biased high due to a burner flame-out at the beginning of that run.

Table 1 Emission Summary
Mobile Soil Remediation Unit - Afterburner Stack
DRE Environmental, Inc.
Boca Grande, Florida
February 25-26, 1993

Run Number	Time	Flow Rate SCFMD	O2 %	Particulate Emissions				VOC Emissions		CO Emissions	
				gr/SCF	gr/SCF @ 50% excess air	gr/SCF @ 7% O2	lbs/Hr	ppm as propane	lbs/Hr as Carbon	ppm	lbs/Hr
1	1819-1926	8629	7.0	0.0289	0.028	0.028	2.14	3.3	0.16	1.40	0.05
2	0908-1023	6913	6.3	0.0357	0.033	0.034	2.12	2.0	0.08	0.40	0.01
3	1056-1220	7885	6.5	0.0424	0.040	0.041	2.86	1.4	0.06	0.34	0.01
AVERAGE	---	7809	6.6	0.0357	0.034	0.035	2.37	2.2	0.10	0.71	0.02

3

$$\text{gr/SCF @ 50\% EA} = \text{gr/SCF} \frac{100 + \%\ \text{excess air}}{150}$$

$$\text{lbs/Hr} = \text{ppm} \ (2.595 \times 10^{-9}) \ \text{MW} \ (\text{SCFMD}) \ 60$$

Emission Limits:

PM = 0.08 gr/SCF @ 50% excess air
or 7.4 lbs/Hr

VOC = 22.1 lbs/Hr

Table 2 Emission Summary
Mobile Soil Remediation Unit - Afterburner Stack
DRE Environmental, Inc.
Boca Grande, Florida
February 25-26, 1993

Run Number	Contaminated Soil Feed Rate tons/Hr	TRPH Conc. in Feed mg/kg	TRPH Conc. in Feed lbs/Hr	THC Conc. in stack gas lbs/Hr	DRE %
1	18.65	54.0	2.01	0.16	
2	19.89	50.5	2.01	0.08	
3	21.02	54.3	2.28	0.06	
AVERAGE	19.85	52.93	2.10	0.10	95.24

TRPH in feed = Feed rate (lbs/Hr) x feed conc. (mg/kg) x 10^{-6}

Destruction Removal Efficiency = $\frac{\text{lbs/Hr feed - lbs/Hr THC stack gas}}{\text{lbs/Hr feed}} \times 100$

Visible emissions averaged 0.0 percent opacity for the highest six minute period of the test which is within the 5% opacity limit (see Appendix E for VE data sheet).

Complete emission summary, field data sheets, laboratory data, and strip chart copies are presented in Appendices A, B, C, and D, respectively.

3.0 PROCESS DESCRIPTION AND OPERATION

The 35 tons per hour (TPH) mobile soil remediation unit consists of a 15 ton bid to receive the contaminated soil, a 24 inch belt conveyor for transferring up to 35 TPH of wet soil to the kiln, a rotary kiln, a Hauck BH390-8 baghouse, a Hauck afterburner capable of operating above 1600°F with a one second residence time, two propane or natural gas burners (23 MMBTU/Hr for kiln and 22 MMBTU/Hr for afterburner), and a 200 KW generator.

The burners were fired on liquid propane during the test.

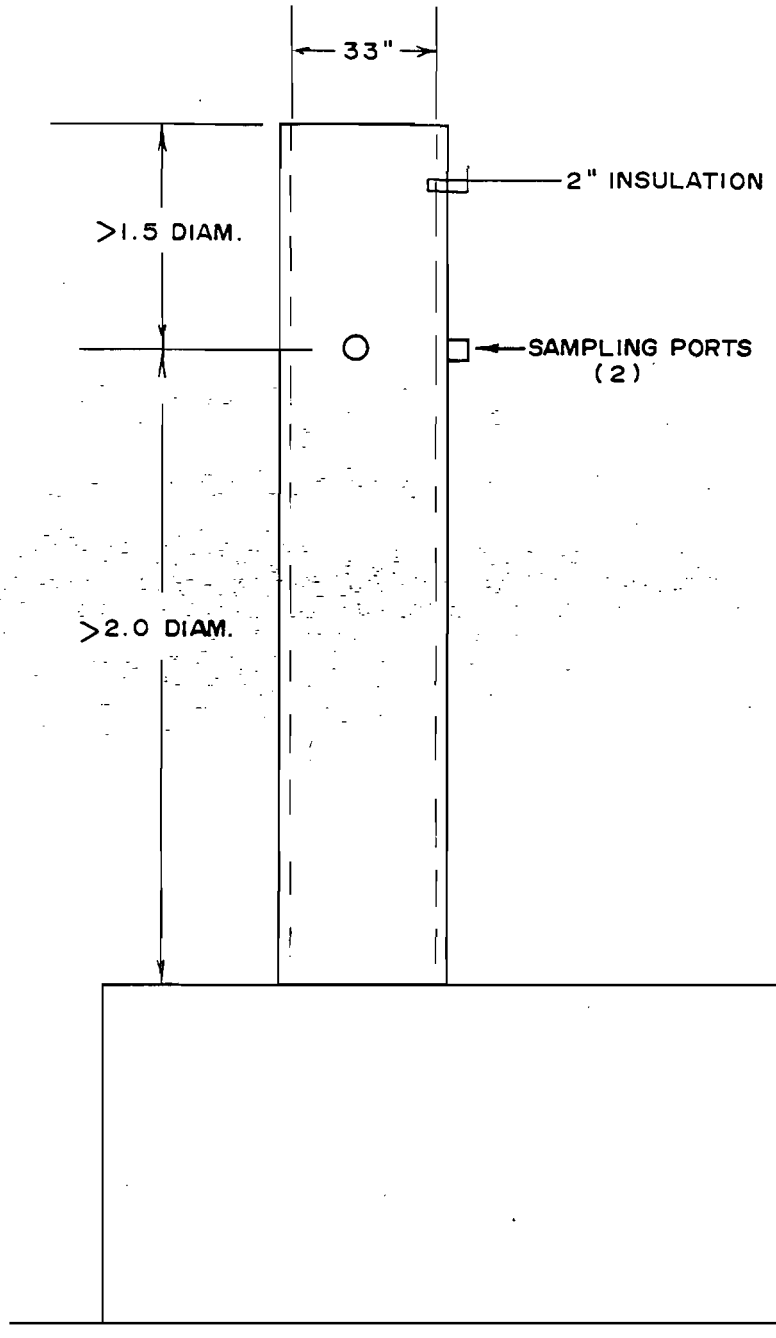
The unit is equipped with a stack. During the emission test the feed rate was 19.85 TPH. Production data and soil test data are provided in Appendix G.

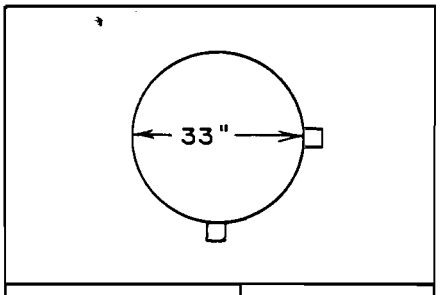
Contaminated soils pass through the rotary kiln where the VOC's are evaporated. The gas stream leaving the kiln passes through a baghouse and an afterburner for control of particulate matter and VOC emissions.

Contaminated soils are reduced to lumps that are a maximum of two inches in diameter prior to being fed to the kiln. The soil is heated to about 700°F in the kiln to evaporate the petroleum products. The gas stream then passes through a baghouse which removes the particulate matter and into an afterburner to control the petroleum vapor. The afterburner operates at a minimum temperature of 1600°F and a minimum residence time of one second.

4.0 SAMPLING POINT LOCATION

The outlet stack schematic and sampling point location are shown in Figure 1. The sampling point locations for the EPA Method 5 test were established in accordance with EPA Method 1.





TRAVERSE POINT NUMBER	INCHES INSIDE STACK WALL
1	.69
2	2.21
3	3.89
4	5.84
5	8.25
6	11.75
7	21.25
8	24.75
9	27.16
10	29.12
11	30.79
12	32.31

NOTE: NOT TO SCALE

FIGURE 1.
SAMPLING POINT LOCATION
SOIL REMEDIATION UNIT
DRE ENVIRONMENTAL
BOCA GRANDE, FLORIDA

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and
ENGINEERING

5.0 FIELD AND ANALYTICAL PROCEDURES

5.1 Particulate Matter Sampling and Analysis--EPA Method 5 (Glass Probe)

Particulate matter samples were collected by the particulate matter emission measurement method specified by the United States Environmental Protection Agency. A schematic diagram of the sampling train used is shown in Figure 2. All particulate matter captured from the nozzle to, and including, the filter was included in the calculation of the emission rate of particulate matter.

PREPARATION OF EQUIPMENT

1. FILTERS - Gelman type "A" filters were placed in a drying oven for two hours at 105 degrees C, removed and placed in a standard desiccator containing indicating silica gel, allowed to cool for two hours, and weighed to the nearest 0.1 mg. The filters were then re-desiccated for a minimum of six hours and weighed to a constant weight (less than 0.5 mg change from previous weighing). The average of the two constant weights was used as the tare weight.

2. NOZZLE, FILTER HOLDER, AND SAMPLING PROBE - The nozzle, filter holder, and sampling probe were washed vigorously with soapy water and brushes, rinsed with distilled water and acetone, and dried prior to the test program. All openings on the sampling equipment were sealed while in transit to the test site.

3. IMPINGERS - The Greenburg-Smith impingers were cleaned with a warm soapy water solution and brushes, rinsed with distilled water and acetone, and dried. The impingers were sealed tightly during transit.

TEST PROCEDURE

Prior to performing the actual particulate matter sample runs, certain stack and stack gas parameters were measured. These preliminary measurements included the average gas temperature, the stack gas velocity head, the stack gas moisture content, and the stack dimensions at the point where the tests were being performed. The stack gas temperature was determined by using a

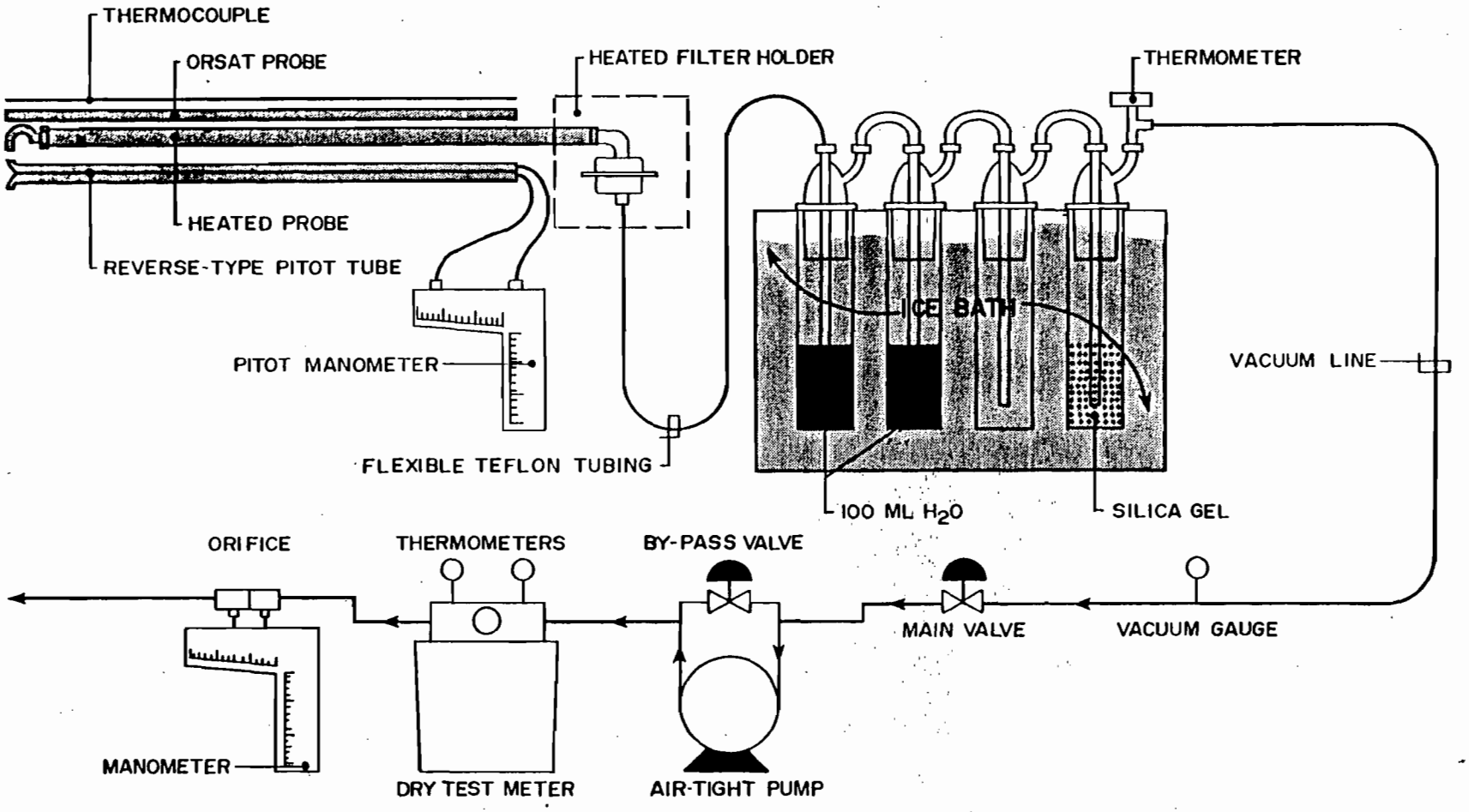

FIGURE 2
EPA METHOD 5 SAMPLING TRAIN

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bi-metallic thermocouple and calibrated pyrometer. Velocity head measurements were made with calibrated type "S" pitot tube and an inclined manometer. Velocity head measurements of 0.05 inches H_2O or less were measured utilizing a micromanometer.

The sampling traverse points were selected so that a representative sample could be extracted from the gas stream. The traverse points were located in the center of equal areas, the number of which were dependent upon the distance upstream and downstream from flow disturbances.

Each particulate matter test run consisted of sampling for a specific amount of time at each traverse point. The type "S" pitot tube was connected to the sampling probe so that an instantaneous velocity head measurement could be made at each traverse point while making the test run. The stack gas temperature was also measured at each traverse point. Nomographs were used to calculate the isokinetic sampling rate at each traverse point during each test run.

The gases sampled passed through the following components: a stainless steel nozzle and glass probe; a glass fiber filter; two impingers each with 100 ml of distilled deionized water; one impinger dry; one impinger with 200 grams of silica gel; a flexible sample line; an air-tight pump; a dry test meter; and a calibrated orifice. The second impinger had a standard tip, while the first,

third, and fourth impingers had modified tips with a 0.5 inch I.D. opening.

Sample recovery was accomplished by the following procedures:

1. The pre-tared filter was removed from its holder and placed in Container 1 and sealed. (This is usually performed in the lab.)

2. All sample-exposed surfaces prior to the filter were washed with acetone and placed in Container 2, sealed and the liquid level marked.

3. The volume of water from the first three impingers was measured for the purpose of calculating the moisture in the stack gas and then discarded.

4. The used silica gel from the fourth impinger was transferred to the original tared container and sealed.

LABORATORY ANALYSIS

The three sample containers from each sample run were analyzed according to the following procedures:

1. The filter was dried at 105 degrees C for three hours, desiccated for a minimum of one hour, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart was made to determine constant weight.

2. The acetone from Container 2 was transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure, desiccated for 24 hours, and weighed to the nearest 0.1 mg. A minimum of two such weighings six hours apart were made to determine constant weight.

3. The used silica gel in its tared container was weighed to the nearest 0.1 gram.

The total sample weight included the weight of material collected on the filter plus the weight of material collected in the nozzle, sampling probe, and front half of the filter holder.

DATA

The field data sheets, calculation sheets, and nomenclature definitions are included in the appendices of this report.

5.2 Visible Emissions Testing--EPA Method 9

The visible emission tests were performed in accordance with EPA Method 9. The observers maintain semi-annual FDER certification for the performance of visible emission tests.

All procedures listed in Method 9 were followed including observer's position relative to the sun, distance from the stack, and line of sight. These items are noted on the visible emission data sheet. Observations were made at 15-second intervals and recorded to the nearest 5 percent. The final opacity was determined by calculating the highest consecutive six minute average during the observation period.

5.3 Determination of Carbon Monoxide Emissions from Stationary Source --EPA Method 10

The sampling system is shown in Figure 3. A sample was drawn from the stack at a rate of approximately 2 SCFH. A stainless steel probe assembly was followed by a three-way stainless steel valve. The sample was pumped through an ice-cooled condensate trap followed by a 1/4" O.D. TEFLON sampling line.

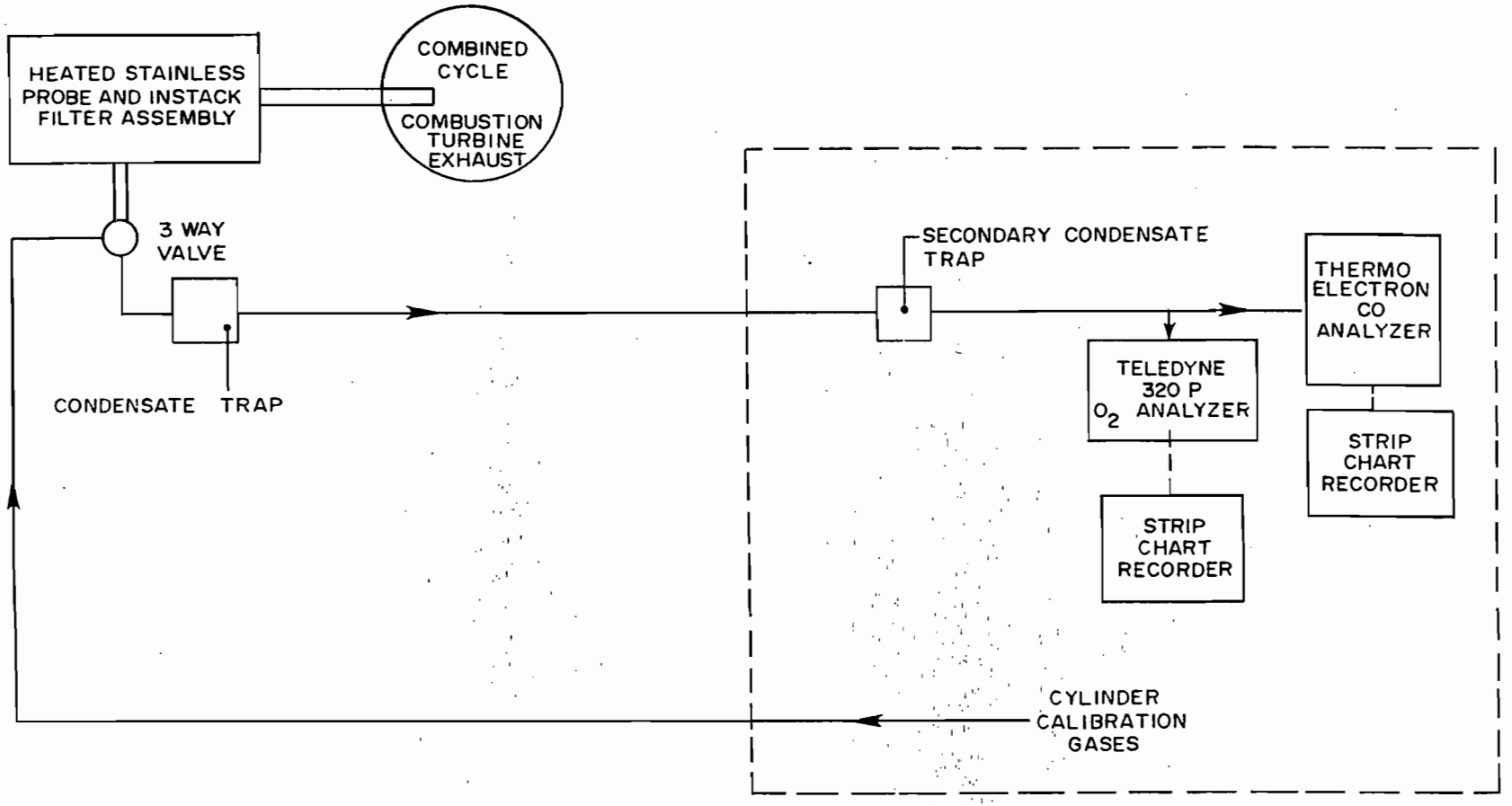

FIGURE 3.
EPA METHOD 7A, 10 SAMPLING SCHEMATIC

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Calibration gases were introduced at the sampling interface (the three way valve) through another 1/4" O.D. TEFLON line. The sample pump delivered gases to a manifold system where one flow is divided between a Teledyne 320P O_2 analyzer and a Thermo Electron Model 48 CO analyzer (NDIR with gas filter correlation). Excess flow is dumped to ambient. All instrument responses were recorded on strip chart recorders. The sampling system yields O_2, and CO, concentrations on a dry gas basis.

Calibration gases consisted of CO, and O_2 standards in nitrogen. All calibration gases were certified NBS traceable, Protocol 1.

5.4 Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer--EPA Method 25A

A Flame Ionization Analyzer (FIA) is used to monitor Volatile Organic Compounds (VOC) concentrations based on propane calibrations. Results are reported as ppm carbon. A Ratfisch Model RS55 analyzer with heated components was used for the testing.

A schematic of the sample system is provided in Figure 4. Sample gases are continuously removed through a probe and heat traced TEFLON sample line maintained at approximately 300°F. They pass through a non-reactive diaphragm sample pump and are then directed to the analyzer and analyzer bypass through a second heat traced line. Propane calibration gases are injected through a motorized three-way valve at the probe exit so that they "see" the same sample system as source gases. Three calibration gases plus a zero air gas are utilized for the sample range of interest (0 - 100 ppm, 0 - 1000 ppm, and 0 - 10000 ppm).

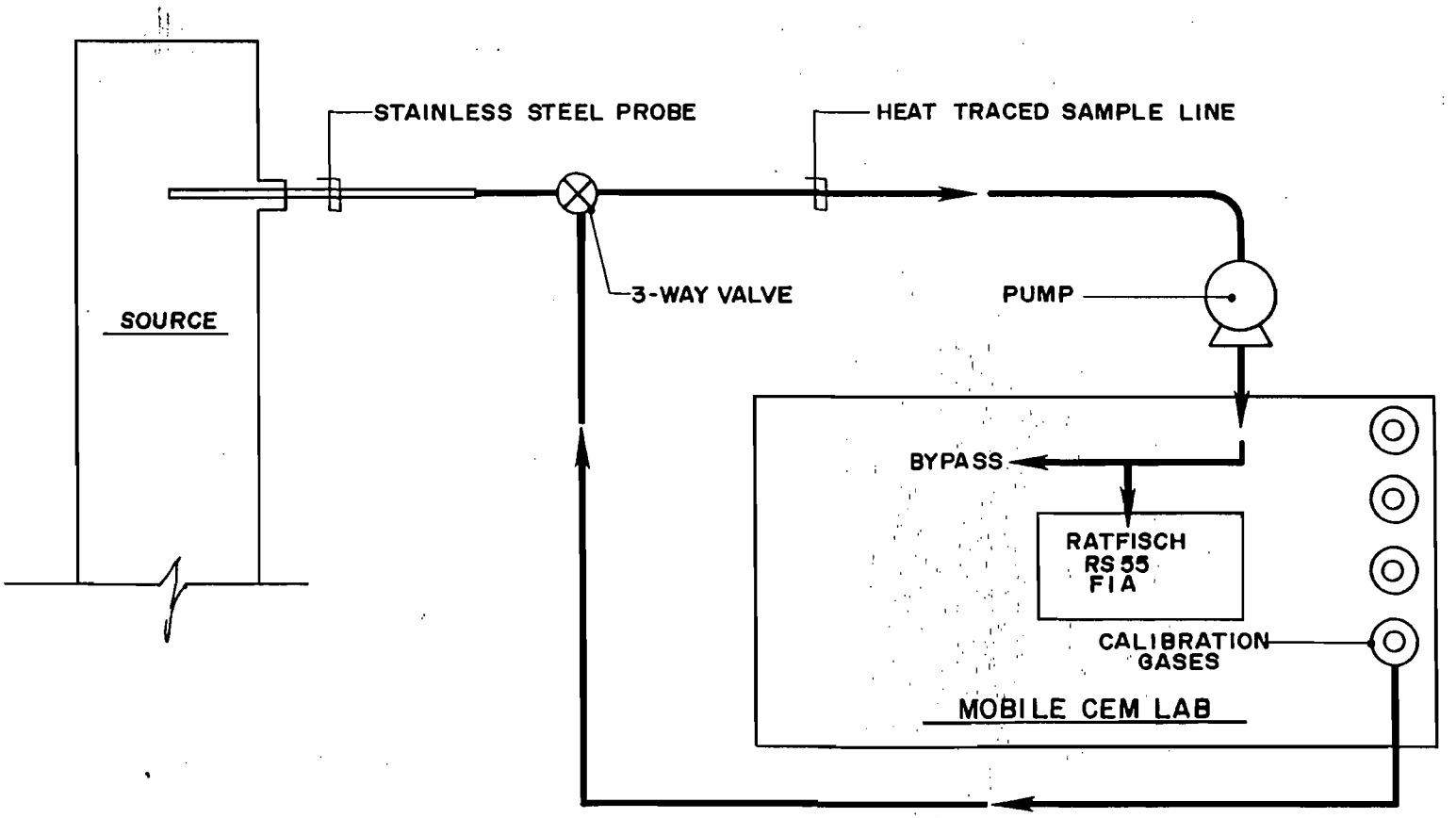

FIGURE 4
EPA-25A
RATFISCH RS55 FIA

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Before testing a calibration error test is conducted after adjustment of zero and span gas values by injecting the remaining two gases into the sample system. These gases must demonstrate a linearity of within 5% of the calibration gas values.

After each test run (or hourly), a propane and zero gas are injected to demonstrate the drift rate. Both gases should demonstrate a drift of $\leq 3\%$ of range.

Since all source gases are sampled on a wet basis, final concentrations must be divided by the source dry gas fraction to correct values to a dry gas basis. Total mass emissions as carbon are then determined by multiplying these concentrations by the source standard hourly flow rate.

APPENDIX A

COMPLETE EMISSION DATA AND SAMPLE CALCULATIONS

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Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/25/93
Stack: Contaminated Soil Incinerator Run: 1 From 1819 to 1926

Y Factor	1.006		Nozzle Diameter	0.375	In
Total Time	60	Min	Nozzle Area	0.000767	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	30.22	In Hg
Stack Temperature	1630.6	°F	Meter Temperature	74.2	°F
Stack Pressure	30.20	In Hg	Meter Orifice Diff	3.311	In H_2O
Stack Avg √ Vel Head	1.099	In H_2O	Meter Volume	57.842	CF
			Condensate Volume	417.0	ml

1.	Volume Water Vapor Sampled	19.628 SCF
2.	Volume Standard Dry Gas Sampled	58.539 SCF
3.	Total Standard Sample Volume	78.167 SCF
4.	Percent Moisture	25.111
5.	Percent Dry Air	74.889
6.	Molecular Weight of Dry Flue Gas	29.768
7.	Molecular Weight of Wet Flue Gas	26.813
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen [O_2]	7.00
10.	Percent Carbon Dioxide [CO_2]	9.30
11.	Percent Excess Air	46.367
12.	Velocity of Flue Gas	126.814 FPS
13.	Actual Volumetric Flow Rate	45196.7 ACFM
14.	Dry Volumetric Flow Rate	33847.5 ACFMD
15.	Standard Volumetric Flow Rate	8628.6 SCFMD
16.	Emission Concentration	0.02894 gr/SCF
17.	Emission Concentration	0.00553 gr/ACF
18.	Emission Rate	2.141 lbs/Hr
19.	Percent Isokinetic	87.6

Probe/Nozzle Wash	33.00 mg
Filter	76.80 mg
Total	109.80 mg

*Included in emission averages because isokinetic rate is >80% and emission is <80% of allowable.

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 2 From 0908 to 1023

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1614.1	°F	Meter Temperature	78.4	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.682	In H_2O
Stack Avg √ Vel Head	0.914	In H_2O	Meter Volume	31.093	CF
			Condensate Volume	259.0	ml

1.	Volume Water Vapor Sampled	12.191 SCF
2.	Volume Standard Dry Gas Sampled	30.785 SCF
3.	Total Standard Sample Volume	42.976 SCF
4.	Percent Moisture	28.367
5.	Percent Dry Air	71.633
6.	Molecular Weight of Dry Flue Gas	29.804
7.	Molecular Weight of Wet Flue Gas	26.456
8.	Specific Gravity Flue Gas	0.92
9.	Percent Oxygen [O_2]	6.30
10.	Percent Carbon Dioxide [CO_2]	9.70
11.	Percent Excess Air	39.683
12.	Velocity of Flue Gas	106.196 FPS
13.	Actual Volumetric Flow Rate	37848.3 ACFM
14.	Dry Volumetric Flow Rate	27111.9 ACFMD
15.	Standard Volumetric Flow Rate	6913.3 SCFMD
16.	Emission Concentration	0.03569 gr/SCF
17.	Emission Concentration	0.00652 gr/ACF
18.	Emission Rate	2.115 lbs/Hr
19.	Percent Isokinetic	107.8

Probe/Nozzle Wash	51.40 mg
Filter	19.80 mg
Total	71.20 mg

AIR CONSULTING AND ENGINEERING, INC.

Complete Emission Results

Plant: D R E
Location: Boca Grande, Florida
Date: 02/26/93
Stack: Contaminated Soil Incinerator Run: 3 From 1056 to 1220

Y Factor	1.006		Nozzle Diameter	0.250	In
Total Time	72	Min	Nozzle Area	0.000341	Ft^2
Stack Area	5.940	Ft^2	Barometric Pressure	29.99	In Hg
Stack Temperature	1635.4	°F	Meter Temperature	74.0	°F
Stack Pressure	29.97	In Hg	Meter Orifice Diff	0.849	In H_2O
Stack Avg √ Vel Head	1.020	In H_2O	Meter Volume	34.335	CF
			Condensate Volume	255.5	ml

1.	Volume Water Vapor Sampled	12.026 SCF
2.	Volume Standard Dry Gas Sampled	34.288 SCF
3.	Total Standard Sample Volume	46.314 SCF
4.	Percent Moisture	25.967
5.	Percent Dry Air	74.033
6.	Molecular Weight of Dry Flue Gas	29.812
7.	Molecular Weight of Wet Flue Gas	26.745
8.	Specific Gravity Flue Gas	0.93
9.	Percent Oxygen [O_2]	6.50
10.	Percent Carbon Dioxide [CO_2]	9.70
11.	Percent Excess Air	41.605
12.	Velocity of Flue Gas	118.402 FPS
13.	Actual Volumetric Flow Rate	42198.4 ACFM
14.	Dry Volumetric Flow Rate	31240.7 ACFMD
15.	Standard Volumetric Flow Rate	7885.3 SCFMD
16.	Emission Concentration	0.04235 gr/SCF
17.	Emission Concentration	0.00791 gr/ACF
18.	Emission Rate	2.862 lbs/Hr
19.	Percent Isokinetic	105.3

Probe/Nozzle Wash	67.50 mg
Filter	26.60 mg
Total	94.10 mg

Plant: D R E
Date: 02/25/93
Stack: Contaminated Soil Incinerator
Run Number: 1

Average √ Velocity Head = 1.099
Velocity Head Inputs:

1.1000	0.8800	0.4500	1.2000	0.8900	1.1000
1.4000	1.5000	1.6000	1.4000	1.0000	0.9000
1.2000	1.5000	1.3000	1.3000	1.2000	1.0000
1.1000	1.5000	1.5000	1.5000	1.5000	1.4000

Average Orifice Pressure = 3.311
Orifice Pressure Inputs:

3.6000	3.4000	1.8500	3.4000	3.4000	3.4000
3.4000	3.4000	3.4000	3.4000	3.4000	3.3200
3.5000	3.4000	3.4000	3.4000	3.3000	3.3000
3.3000	3.3000	3.3000	3.3000	3.3000	3.3000

Average Stack Temperature = 1630.6
Stack Temperature Inputs:

1700.0	1826.0	1650.0	1592.0	1586.0	1621.0
1633.0	1627.0	1622.0	1618.0	1620.0	1622.0
1473.0	1654.0	1654.0	1636.0	1654.0	1580.0
1519.0	1654.0	1649.0	1669.0	1623.0	1652.0

Average Meter Temperature = 74.2
Meter Temperature Inputs:

75.0	75.0	75.0	75.0	75.0	74.0
75.0	75.0	75.0	75.0	75.0	75.0
74.0	74.0	74.0	74.0	74.0	73.0
73.0	73.0	73.0	73.0	73.0	73.0

Plant: D R E
Date: 02/26/93
Stack: Contaminated Soil Incinerator
Run Number: 2

Average √ Velocity Head = 0.914
Velocity Head Inputs:

1.1000	1.2000	1.2000	1.2000	1.1000	0.9000
1.1000	1.1000	1.1500	1.1000	0.9500	0.7400
0.6000	0.6000	0.5800	0.5600	0.5600	0.5800
0.6500	0.7000	0.6800	0.7000	0.6600	0.7600

Average Orifice Pressure = 0.682
Orifice Pressure Inputs:

0.8800	0.9600	0.9600	0.9600	0.8800	0.7200
0.8800	0.8800	0.9200	0.8800	0.7600	0.5900
0.4800	0.4800	0.4600	0.4500	0.4500	0.4600
0.5200	0.5600	0.5400	0.5600	0.5300	0.6100

Average Stack Temperature = 1614.1
Stack Temperature Inputs:

1644.0	1693.0	1606.0	1616.0	1632.0	1632.0
1634.0	1633.0	1635.0	1640.0	1679.0	1644.0
1654.0	1673.0	1691.0	1595.0	1586.0	1562.0
1554.0	1663.0	1510.0	1468.0	1471.0	1624.0

Average Meter Temperature = 78.4
Meter Temperature Inputs:

75.0	75.0	75.0	76.0	76.0	77.0
77.0	78.0	79.0	79.0	80.0	80.0
80.0	80.0	80.0	80.0	80.0	80.0
80.0	79.0	79.0	79.0	79.0	79.0

Plant: D R E
Date: 02/26/93
Stack: Contaminated Soil Incinerator
Run Number: 3

Average √ Velocity Head = 1.020
Velocity Head Inputs:

0.8100	0.7900	0.7700	0.8300	0.6700	0.9400
1.5000	1.7000	1.7000	1.6000	1.5000	1.5000
0.8500	0.8000	0.9000	0.9500	0.9000	0.8600
0.8800	1.1000	1.0000	1.0000	1.0000	0.9200

Average Orifice Pressure = 0.849
Orifice Pressure Inputs:

0.6480	0.6320	0.6160	0.6640	0.5360	0.7520
1.2000	1.3600	1.3600	1.2800	1.2000	1.2000
0.6800	0.6400	0.7200	0.7600	0.7200	0.6900
0.7040	0.8800	0.8000	0.8000	0.8000	0.7360

Average Stack Temperature = 1635.4
Stack Temperature Inputs:

1667.0	1661.0	1653.0	1590.0	1760.0	1320.0
1611.0	1654.0	1648.0	1670.0	1684.0	1683.0
1580.0	1547.0	1509.0	1559.0	1680.0	1726.0
1705.0	1695.0	1677.0	1676.0	1694.0	1600.0

Average Meter Temperature = 74.0
Meter Temperature Inputs:

75.0	75.0	75.0	75.0	75.0	75.0
74.0	74.0	74.0	74.0	74.0	74.0
74.0	74.0	73.0	73.0	73.0	74.0
73.0	73.0	74.0	74.0	74.0	74.0

Sample Calculations Run 1

Plant: D R E
Date: 02/25/93
Stack: Contaminated Soil Incinerator

Vwv Volume Water Vapor Sampled
Vwv = 0.04707 X 417.000 = 19.628 SCF

VMstd Volume Standard Dry Gas Sampled
VMstd = 17.64 X 57.842 X 1.006 X
[30.22 + (3.311 / 13.6)] / (74.2 + 460) = 58.539 SCF

Vt Total Standard Sample Volume
Vt = 19.628 + 58.539 = 78.167 SCF

W Percent Water = (19.628 / 78.167) X 100 = 25.1 %

FDA Percent Dry Air = (1 - 0.251) X 100 = 74.9 %

Md Molecular Weight of Dry Stack Gas
Md = (0.44 X 9.30 $\%CO_2$) + (0.32 X 7.00 $\%O_2$) +
[0.28 X (83.70 $\%N_2$+ 0.00 %CO)] = 29.77

MS Molecular Weight of Wet Stack Gas
MS = (29.768 X 0.749) + (18 X 0.251) = 26.813

SG Specific Gravity Stack Gas
SG = 26.813 / 28.84 = 0.93

Ea Percent Excess Air

$$Ea = \frac{[(\ 7.00\ \%O_2)-(\ 0.00\ \%CO\ /\ 2)]\ X\ 100}{(\ .264\ X\ (\ 83.70\ \%N_2)) - ((\ 7.00\ \%O_2)+(\ 0.00\ \%CO\ /\ 2))}$$

EA = 46.367

Vs Velocity of Stack
Vs = (85.49 X 0.84 X 1.099) X [(1630.6 +460) /(30.20 X 26.81)]
Vs = 126.814

Qa Actual Volumetric Flow
Qa = (5.940 X 126.814 X 60) = 45196.7 ACFM

Qd = Dry Volumetric Flow
Qd = (45196.7 X 0.749) = 33847.5 ACFMD

Qsd Standard Volumetric Flow
Qsd = 45196.7 X 0.749 X [528 / (1630.6 +460)] X
(30.20 / 29.92) = 8628.6 SCFMD

Sample Calculations Run 1

Plant: D R E
Date: 02/25/93
Stack: Contaminated Soil Incinerator

ESTP Emission Concentration
gr/SCF = [0.01543 X (33.0 + 76.8)] / (58.539)
gr/SCF = 0.0289

Lbs/Hr Emission Rate
Lbs/Hr = (0.0289 / 7000) X 8628.6 X 60 = 2.14

I Percent Isokinetic
I = 100 X (1630.6 +460) X [(.002669 X 417.0) + (57.842 X 1.006 /
(74.2 + 460)) X (30.22 + (3.311 / 13.6))] /
(60 X 60.00 X 126.814 X 30.20 X 0.000767)
I = 87.6 %

Table 1

Summary of Particulate Matter Emissions

D R E
Boca Grande, Florida
Contaminated Soil Incinerator
Date: 02/25/93

Run No.	Stack Gas Flow Rate (SCFMD)	Stack Gas Temperature (Deg F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/SCF)	Particulate Matter Emission Rate (Lbs/Hr)
1	8628.6	1630.6	25.1	0.0289	2.14
2	6913.3	1614.1	28.4	0.0357	2.11
3	7885.3	1635.4	26.0	0.0423	2.86
AVG	7809.0	1626.7	26.5	0.0357	2.37

APPENDIX B
FIELD DATA SHEETS

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.

2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA 32606

TEST ID R-1
PAGE 1 OF 2

PLANT CSX - DRE
SOURCE Contaminated Soil incinerator
PLANT LOCATION
TYPE OF SAMPLING TRAIN EPA M5
TYPE OF SAMPLES M5 - Particulate
DATE 25 Feb 93 RUN NO. 1P
TIME START 1617 TIME END 1924
SAMPLE TIME 24 / 2.5 (min/pt)= 60 Total min
ASSUMED MOISTURE 15 % FDA .85
NOMOGRAPH C_f ~~5.247~~ PITOT CORR. .84
P_b 30.22 "Hg P_s 30.20 "Hg
WEATHER TEMP °F
METER BOX NO. 1 H 2.115 Y 1.000C
NOZZLE CAL. .375 .375 .375 = .375
STACK DIMENSIONS
STACK AREA 5.94 ft.² EFFECTIVE 5.94 ft.²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. 1 DNSTRM. 3
PORT SIZE in. NIPPLE LENGTH 2.75 in.
U CORD LENGTH 50'
REMARKS:

58.72 ~~0~~
~~56.556~~ S.CF
FDM = .743
7587 FPM
~~4508~~ ACFM
~~8538~~ SCFMD
8616
~~85.5~~ % ISO
88.8%

342 93 01
,030

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 224.372 ft.³
166.530 INITIAL ~~57.842~~ 57.704 ft.³
NET ~~166.530~~ ft.³
FILTER NO. 4272 IMP. VOL. GAIN 405 ml.
SIL GEL NO. 2 WT. GAIN 12 ml.
TOTAL CONDENSATE 417 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					9.3
% O_2					7.0
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE dead cfm 15 "Hg POST .016 cfm 10 "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 55 PRE-TEST OK
POST-TEST(+) 2.9 / 0/5 H_2O/Sec
POST-TEST(−) 3.4 / 0/15 H_2O/Sec
PYROMETER NO.
BOX OPERATOR M. Wascott PROBE HOLDER S Carter

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT.³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP F	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1	.693	1621	~~166.530~~ ~~166.668~~	1.01	5.17	3.6	1700	270	61	75	10
1-2	2.21	1623 30	171.095	.88	3.6	3.4	1626	268	60	75	10
1-3	3.69	1626	173.335	.45	1.65	1.65	~~1650~~	268	55	75	10
1-4	5.84	1628 30	175.145	1.02	4.92	3.4	1592	265	56	75	10
1-5	8.25	1631	177.385	.89	3.65	3.4	1586	270	56	75	10
1-6	11.75	1633 30	179.790	1.01	4.51	3.4	1692	269	57	74	10

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID R1

PAGE 2 OF 2

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-7	21.25	1830	182.088	1.4	5.74	3.4	1633	267	58	75	10
1-8	24.75	1838.30	184.425	1.5	6.15	3.4	1627	278	58	75	10
1-9	27.16	1841	186.785	1.6	6.56	3.4	1622	268	59	75	10
1-10	29.12	1843.30	189.175	1.4	5.74	3.4	1618	266	59	75	10
1-11	30.79	1846	191.650	1.0	4.10	3.4	1620	267	60	75	10
1-12	32.31	1848.30	193.25	.9	3.32	3.32	1622	263	60	75	10
		1852	196.24								
2-1		1856	198.615	1.2	4.92	3.5	1473	258	59	74	10
2-2		1858.30	200.80	1.5	6.15	3.4	1654	246	57	74	10
2-3		1901.30	203.325	1.3	5.33	3.4	1654	247	58	74	10
2-4		1903.30	205.665	1.3	5.33	3.4	1636	243	59	74	10
2-5		1906	207.90	1.2	4.92	3.3	1654	238	59	74	10
2-6		1908.30	210.32	1.0	4.10	3.3	1580	242	60	73	10
2-7		1911	212.66	1.1	4.51	3.3	1519	249	60	73	10
2-8		1913.30	215.00	1.5	6.15	3.3	1654	248	60	73	10
2-9		1916	217.325	1.5	6.15	3.3	1649	249	61	73	10
2-10		1918.30	219.675	1.5	6.15	3.3	1669	252	61	73	10
2-11		1921	221.02	1.5	6.15	3.3	1623	255	62	73	10
2-12		1923.30	224.372	1.4	5.74	3.3	1652	258	62	73	10
				1.1			1631				

1.01

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA · 32606

TEST ID CSX-2 R-2
PAGE 1 OF 2

PLANT CSX
SOURCE Contaminated Soil Incinerator
PLANT LOCATION Boca Grande - Fla
TYPE OF SAMPLING TRAIN EPA M5
TYPE OF SAMPLES Particulate
DATE 2-26-93 RUN NO. #1
TIME START 0908 TIME END 1023
SAMPLE TIME 24 / 3 (min/pt) = 72 Total min
ASSUMED MOISTURE 25 % FDA 75
NOMOGRAPH C_f 0.8 PITOT CORR.
P_b 29.99 "Hg P_s 29.97 "Hg
WEATHER CLOUDY TEMP. °F
METER BOX NO. 1 H 2.115 Y 1.006
NOZZLE CAL. .250 .250 .250 = .250
STACK DIMENSIONS 33" ϕ
STACK AREA 5.94 ft² EFFECTIVE 5.94 ft²
STACK HEIGHT 20 ft.
STACK DIAMETER: UPSTRM. 1 DNSTRM. 3
PORT SIZE 4" ID In. NIPPLE LENGTH 2.75 In.
U CORD LENGTH 501
REMARKS:

3051

11.7

42.2

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 255.688 ft³
INITIAL 224.595 ft³
NET 31.093 ft³
FILTER NO. 4279 IMP. VOL. GAIN 246 ml.
SIL GEL NO. 102 WT. GAIN 13 ml.
TOTAL CONDENSATE 259 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					9.7
% O_2				6.3	
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE lead cfm 15 "Hg POST 0.00 cfm 5 "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 55 PRE-TEST OK
POST-TEST(+) 1.3 / 0.3 / 15 H_2O/Sec
POST-TEST(-) 2.2 / 0 / 15 H_2O/Sec
PYROMETER NO. ATKINS 1
BOX OPERATOR CARLOS PROBE HOLDER WALTON
WESCOTT/NORK

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT.³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP F	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		0908	220.10	1.1	.88	.88	1644	259	61	75	3.5
1-2		0914	227.60	1.2	.96	.96	1693	260	50	75	4.0
1-3		0917	229.11	1.2	.96	.96	1606	261	50	75	4.0
1-4		0920	230.66	1.2	.96	.96	1616	257	46.3	76	4.0
1-5		0923	232.14	1.1	.88	.88	1632	255	48	76	4
1-6		0924	233.45	.90	.72	.72	1432	258	48	77	3.5

1.17

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID RM 2

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP (°F)	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
1-7		0929	234.99	1.1	.88	.88	1634	259	50	77	4
1-8		0932	236.47	1.1	.88	.88	1633	264	50	78	4
1-9		0935	237.95	1.15	.92	.92	1635	263	51	79	4
1-10		0938	239.42	1.1	.88	.88	1640	272	52	79	4
1-11		0941	240.83	.95	.76	.76	1679	270	54	80	3.5
1-12		0944	242.05	.74	.59	.59	1644	271	55	80	3.5
2-1		0950	243.15	.60	.48	.48	1654	259	58	80	3
2-2		0953	244.25	.60	.48	.48	1673	240	56	80	3
2-3		0956	245.31	.58	.46	.46	1691	232	55	80	3
2-4		0959	246.39	.56	.45	.45	1595	230	52	80	3
2-5		1002	247.46	.56	.45	.45	1586	227	58	80	3
2-6		1005	248.55	.58	.46	.46	1562	230	58	80	3
2-7		1008	249.71	.65	.52	.52	1554	230	58	80	3.5
2-8		1011	250.89	.70	.56	.56	1663	230	57	79	3.5
2-9		1014	252.06	.68	.54	.54	1510	234	55	79	3.5
2-10		1017	253.25	.70	.56	.56	1468	241	55	79	3.5
2-11		1020	254.43	.66	.53	.53	1471	246	54	79	3.5
2-12		1023	255.688	.76	.61	.61	1624	242	54	79	3.5

R-3

STACK SAMPLING FIELD DATA SHEET

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N. W. 67th PLACE · Suites 9 & 10
GAINESVILLE, FLORIDA · 32606

TEST ID CSX-2
PAGE 1 OF 2

PLANT CSX
SOURCE Contaminated Soil Incinerator
PLANT LOCATION Boca Grande, Fla
TYPE OF SAMPLING TRAIN EPA M5
TYPE OF SAMPLES Particulate
DATE 2-26-93 RUN NO. 2
TIME START 1056 TIME END 1220
SAMPLE TIME 24 / 3 (min/pt) = 72 Total min
ASSUMED MOISTURE 25 % FDA 75
NOMOGRAPH C_s .88 PITOT CORR.
P_b 29.99 "Hg P_g 29.89 "Hg
WEATHER RAIN TEMP. °F
METER BOX NO. 1 H 2.115 Y 1.0096
NOZZLE CAL. .250 .250 .250 = .250
STACK DIMENSIONS 33" ID
STACK AREA 5.94 ft² EFFECTIVE 5.94 ft²
STACK HEIGHT ft.
STACK DIAMETER: UPSTRM. 1 DNSTRM. 3
PORT SIZE In. NIPPLE LENGTH 2.75 In.
U CORD LENGTH
REMARKS:

34.30
FPA .74
708Y FPM
42074 ACFM
7851S SCFM
105.7 0/0 H2O

MAT'L PROCESSING RATE
GAS METER READINGS: FINAL 290.195 ft³
INITIAL 255.860 ft³
NET 34.335 ft³
FILTER NO. 4275 IMP. VOL. GAIN 245 ml.
SIL GEL NO. 250 WT. GAIN 10.5 ml.
TOTAL CONDENSATE 255.5 ml.

ORSAT

	1	2	3	4	AVG.
% CO_2					9.7
% O_2					6.5
% CO					
% N_2					

F_O = F_O RANGE =
ORSAT ANALYZER

LEAK CHECKS
PRE dead cfm 15 "Hg POST 0.00 cfm 5 "Hg
METER BOX/PUMP GAS SAMPLE SYST.
ORSAT BAG
PITOT TUBE NO. 55 PRE-TEST OK
POST-TEST(+) 29 / 0/5 H_2O/Sec
POST-TEST(-) 34 / 0/05 H_2O/Sec
PYROMETER NO.
BOX OPERATOR PROBE HOLDER

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (FT³)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O) CALC.	METER ORIFICE PRESS. DIFF. ("H_2O) ACTUAL	STACK GAS TEMP (°F)	SAMPLE BOX TEMP (°F)	LAST IMPINGER TEMP F	DRY GAS METER TEMP (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
1-1		1059	257.18	.81	.648	.648	1677	258	58	75	3.0
1-2		1102	258.43	.79	.632	.632	1661	256	60	75	3.0
1-3		1105	259.685	.77	.616	.616	1653	255	56	75	3.0
1-4		1108	260.78	.83	.664	.664	1590	255	55	75	3.0
1-5		1111	262.175	.67	.536	.536	1760	266	54	75	3.0
1-6		1114	263.515	.94	.752	.752	1320	268	54	75	3.0

Best Available Copy

ACE AIR CONSULTING & ENGINEERING, INC.

TEST ID R-3

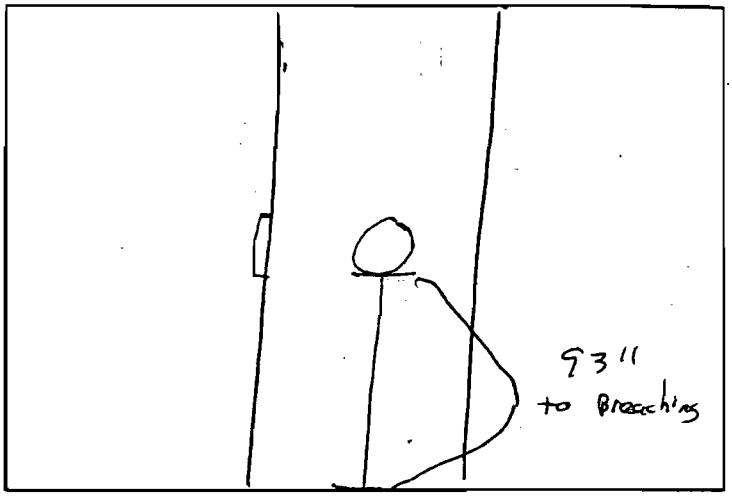
PAGE 2 OF 2

PORT AND TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE STACK WALL /COMMENTS	CLOCK TIME	GAS METER READING (ft^3)	STACK VELOCITY HEAD	METER ORIFICE PRESS. DIFF. ("H_2O)		STACK GAS TEMP. (°F)	SAMPLE BOX TEMP. (°F)	LAST IMPINGER TEMP. (°F)	DRY GAS METER TEMP. (°F)	VACUUM ON SAMPLE TRAIN ("Hg)
					CALC.	ACTUAL					
	Power Interruption *	1118	265.240	1.5	1.2	1.2	1411	263	53	74	4.5
		1121	267.03	1.7	1.36	1.36	1654	265	53	74	5.0
		1124	268.850	1.7	1.34	1.36	1648	261	52	74	5.0
		1127	270.610	1.6	1.28	1.28	1670	258	54	74	5.0
		1130	272.335	1.5	1.26	1.20	1684	265	54	74	5.0
		1133	274.08	1.5	1.2	1.20	1683	262	54	74	5.0
		1147	275.48	.55	.68	.68	1580	263	53	74	5.0
		1150	276.625	.80	.64	.64	1547	267	55	74	5.0
		1153	277.955	.9	.72	.72	1509	266	55	73	5.0
		1156	279.290	.95	.76	.76	1559	265	55	73	5.0
		1159	280.580	.90	.72	.72	1680	270	55	73	5.0
		1202	281.90	.86	.68	.69	1726	268	58	74	5.0
		1205	283.15	.88	.704	.704	1705	265	59	73	3.5
		1208	284.60	1.1	.88	.88	1695	260	60	73	3.5
		1211	285.95	1.0	.80	.80	1677	[illegible]	60	74	3.5
		1214	287.40	1.0	.80	.80	1676	265	60	74	3.5
		1217	288.835	1.0	.80	.80	1694	261	61	74	3.5
		1220	290.175	.92	.736	.736	1660	267	58	74	3.5
				1.07			1639				
							1629				

PRELIMINARY VELOCITY TRAVERSE

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N.W. 67th PLACE-Suites 9&10
GAINESVILLE, FLORIDA-32606
(904)335-1889

PLANT CSX - DRE
DATE 25 Feb 92
SOURCE Contaminated Soil Incinerator
STACK I.D. 33" STACK AREA 5.94 ft²
BAROMETRIC PRES., in. Hg 30.22
STATIC PRES. in H_2O -.27 STACK PRES. in. Hg. 30.20
PORT DIAM. _____ NIPPLE LENGTH 2.75
PITOT TUBE NO. 57 TYPE S
OPERATORS S. Car



SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s) in H_2O	STACK TEMPERATURE (T_s, °F)	DISTANCE FROM INSIDE STACK WALL	TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s in. H_2O	STACK TEMPERATURE (T_s, °F)
1-1	.33	1633				
1-2	.42	1634				
1-3	.47	1629				
1-4	.46	1622	5925 FPM			
1-5	.48	1619	35193 ACFM @		1590 °F	
1-6	.55	1615	7778 SCFMD			
1-7	.96	1617				
1-8	1.1	1619				
1-9	1.4	1466				
1-10	1.1	1447				
1-11	.68	1540				
1-12	.53	1524				
2-1	.30	1586				
2-2	.53	1592				
2-3	.61	1595				
2-4	.73	1597				
2-5	.82	1602				
2-6	.98	1603				
2-7	1.1	1604				
2-8	1.1	1608				
2-9	1.2	1617				
2-10	1.4	1619				
2-11	1.4	1618				
2-12	.85	1547				
	.886	1590				
AVERAGE				AVERAGE		

APPENDIX C
LABORATORY ANALYSIS

AIR CONSULTING & ENGINEERING, inc. — PARTICULATE LAB DATA

SOURCE DRE Contaminated Soil Incinerator

PROBE RINSE	RUN 1P	RUN 2	RUN 3	BLANK	
CONTAINER NUMBER	38	39	46		
TOTAL VOLUME (ml)	176	142	105	82	LIQUID LEVEL ✓
1st GROSS WEIGHT (g)	102.8601	105.6382	105.8796	106.4207	DATE & TIME: 3/1/92 0910
2nd GROSS WEIGHT (g)	102.8601	105.6385	105.8799	106.4205	DATE & TIME: 3/1/92 1530
AVERAGE GROSS WEIGHT (g)	102.8601	105.6384	105.8798	106.4206	
TARE WEIGHT (g)	102.8271	105.5870	105.8123	106.4197	
SUB NET WEIGHT (g)	0.0330	0.0514	~~0.0665~~ 0.0675 D.N.R.	0.0009	
ACETONE BLANK (g)	—	—	—	—	
TOTAL NET WEIGHT (mg)	33.0	51.4	66.5 67.5	0.9	

NOTE: In no case should a blank residue >0.01 mg/g or 0.001% of the weight of acetone used be subtracted from the sample weight.

FILTER	RUN 1	RUN 2	RUN 3	BLANK	
FILTER NUMBER	4272	4273	4275		
1st GROSS WEIGHT (g)	0.4714	0.4162	0.4248		DATE & TIME: 3/1/92 0910
2nd GROSS WEIGHT (g)	0.4713	0.4163	0.4248		DATE & TIME: 3/1/92 1530
AVERAGE GROSS WEIGHT (g)	0.4714	0.4163	0.4248		
TARE WEIGHT (g)	0.3946	0.3965	0.3982		
SUB NET WEIGHT (g)	0.0768	0.0198	0.0266		
TOTAL NET WEIGHT (mg)	76.8	19.8	26.6		

TARE BALANCE CHECK

SEE LAB BOOK

1st GROSS WEIGHT BALANCE CHECK

0 — 10.0g 10.0001

0.5g 0.5002 100.0g 99.9999

%RH 42 DATE 3/1/93

Signature Charles P Swearingen

2nd GROSS WEIGHT BALANCE CHECK

0 — 10.0g 10.0001

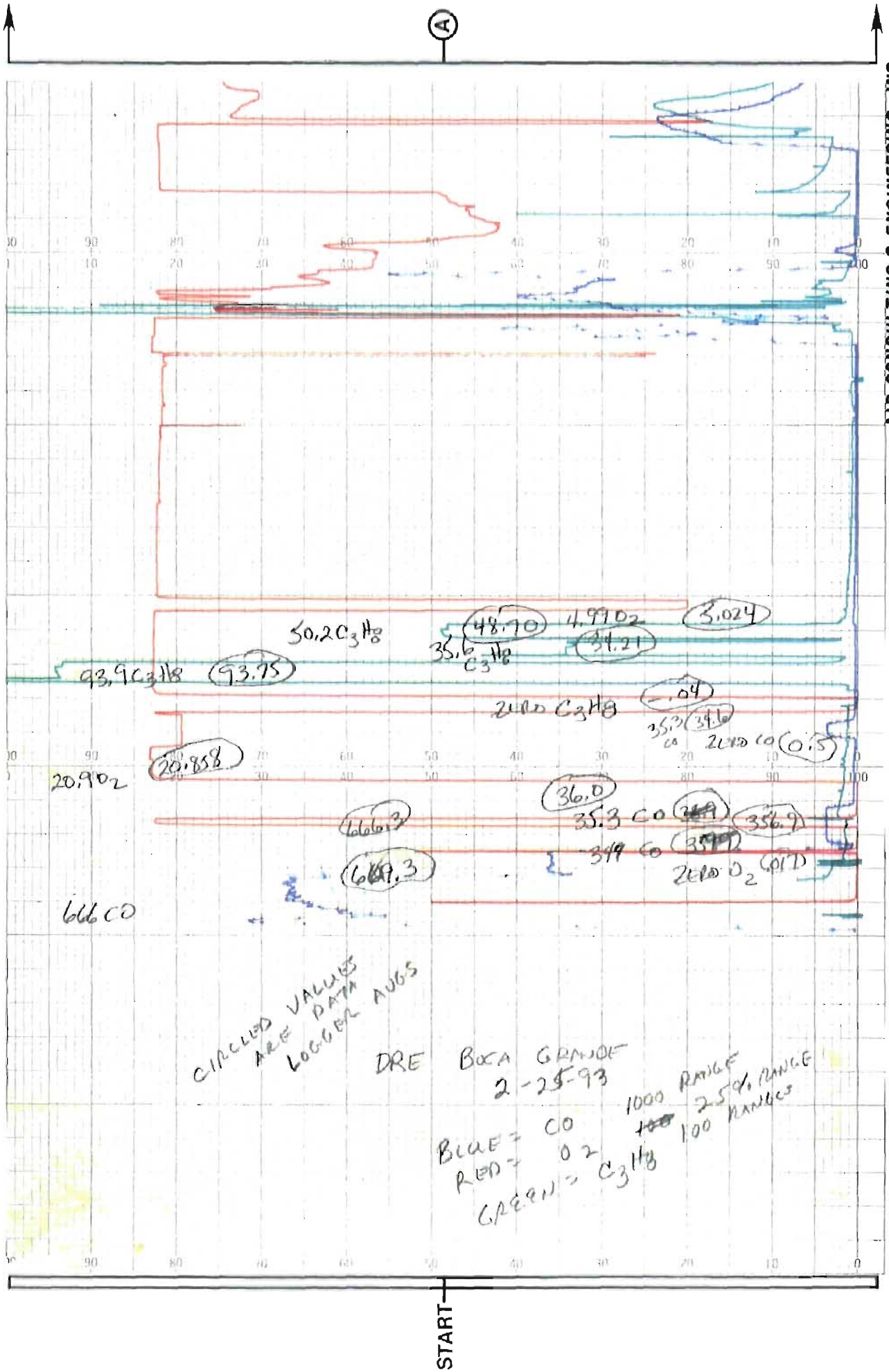
0.5g 0.5002 100.0g 99.9999

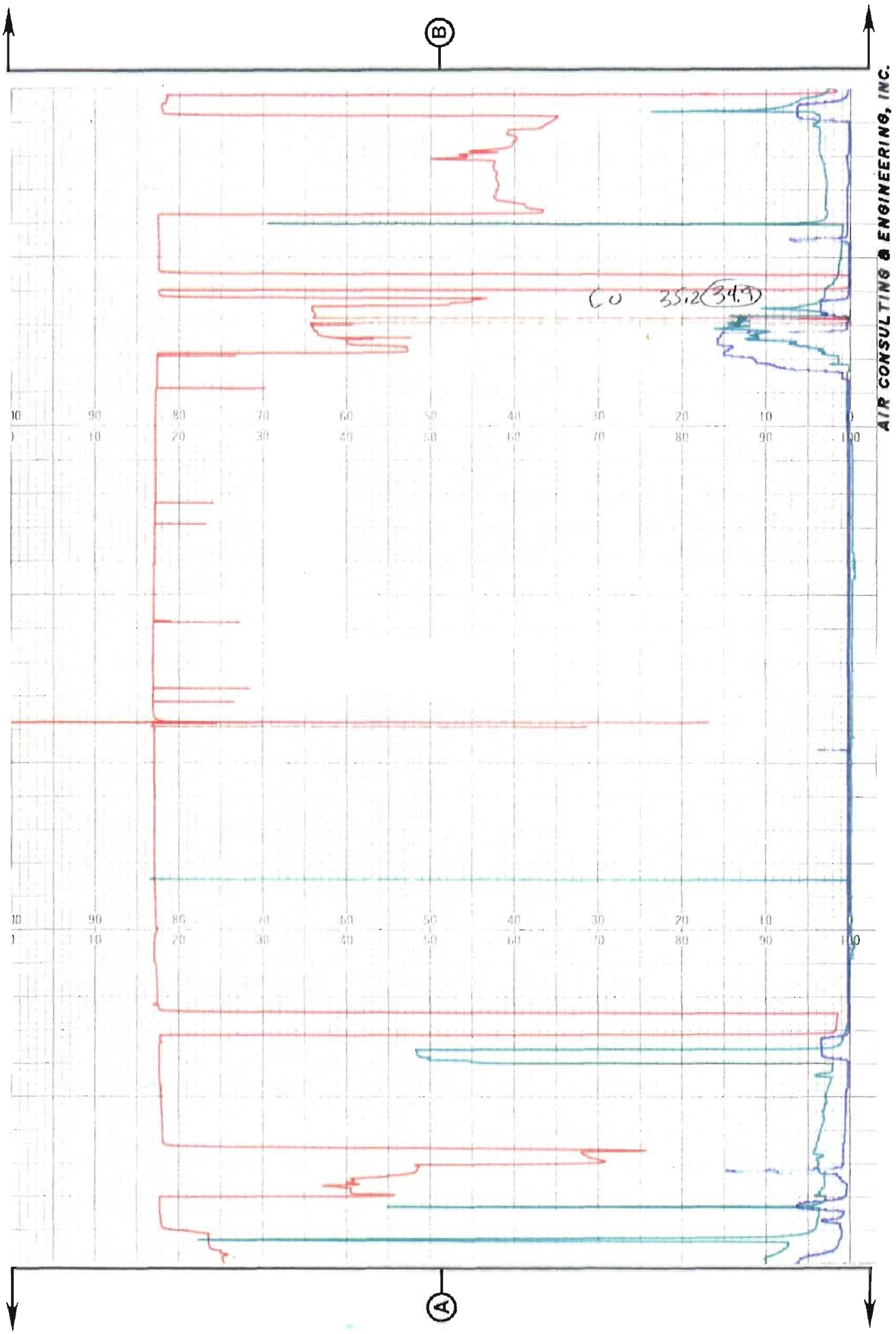
%RH 45 DATE 3/1/93

Signature Charles P Swearingen

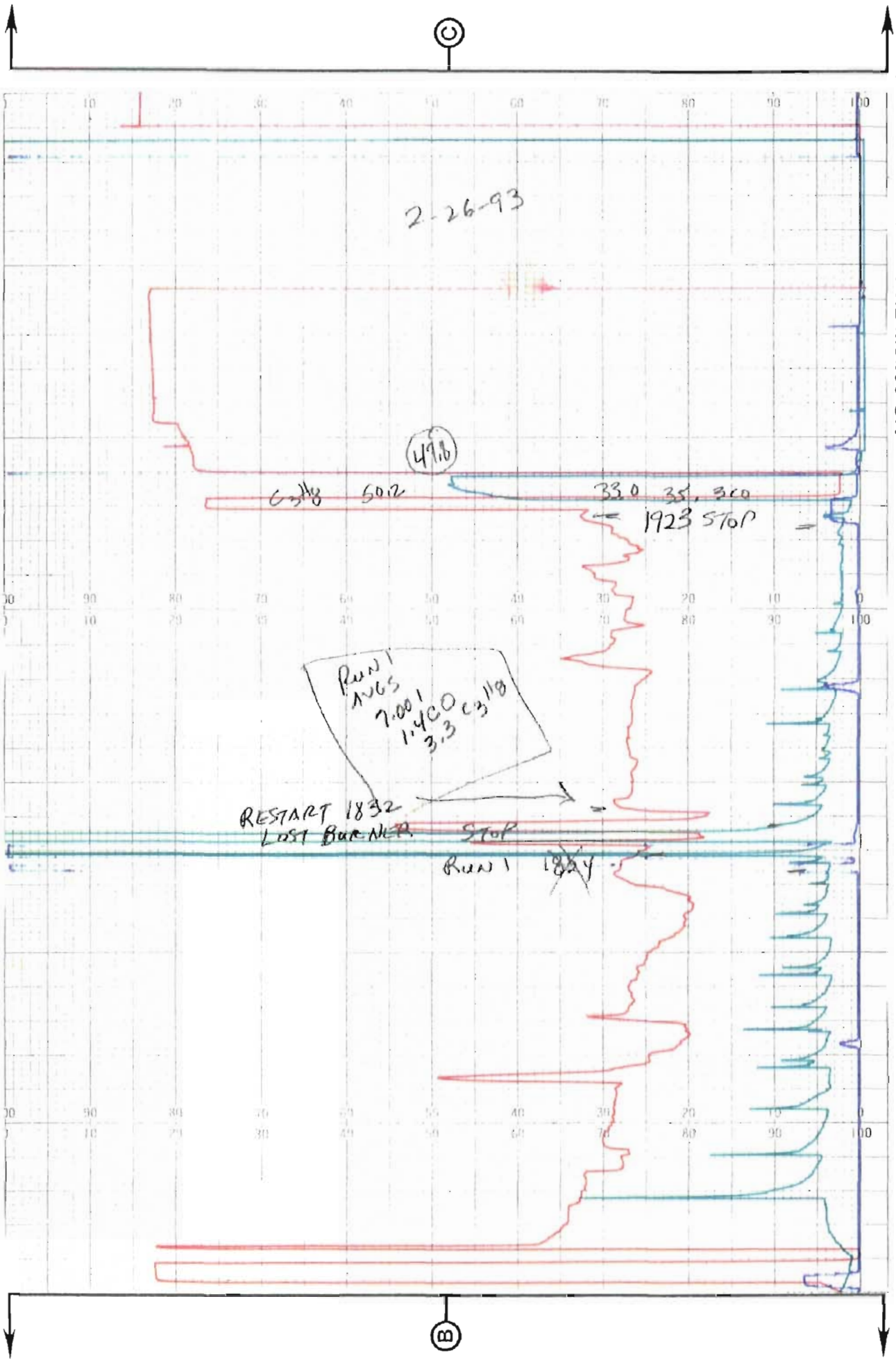
APPENDIX D

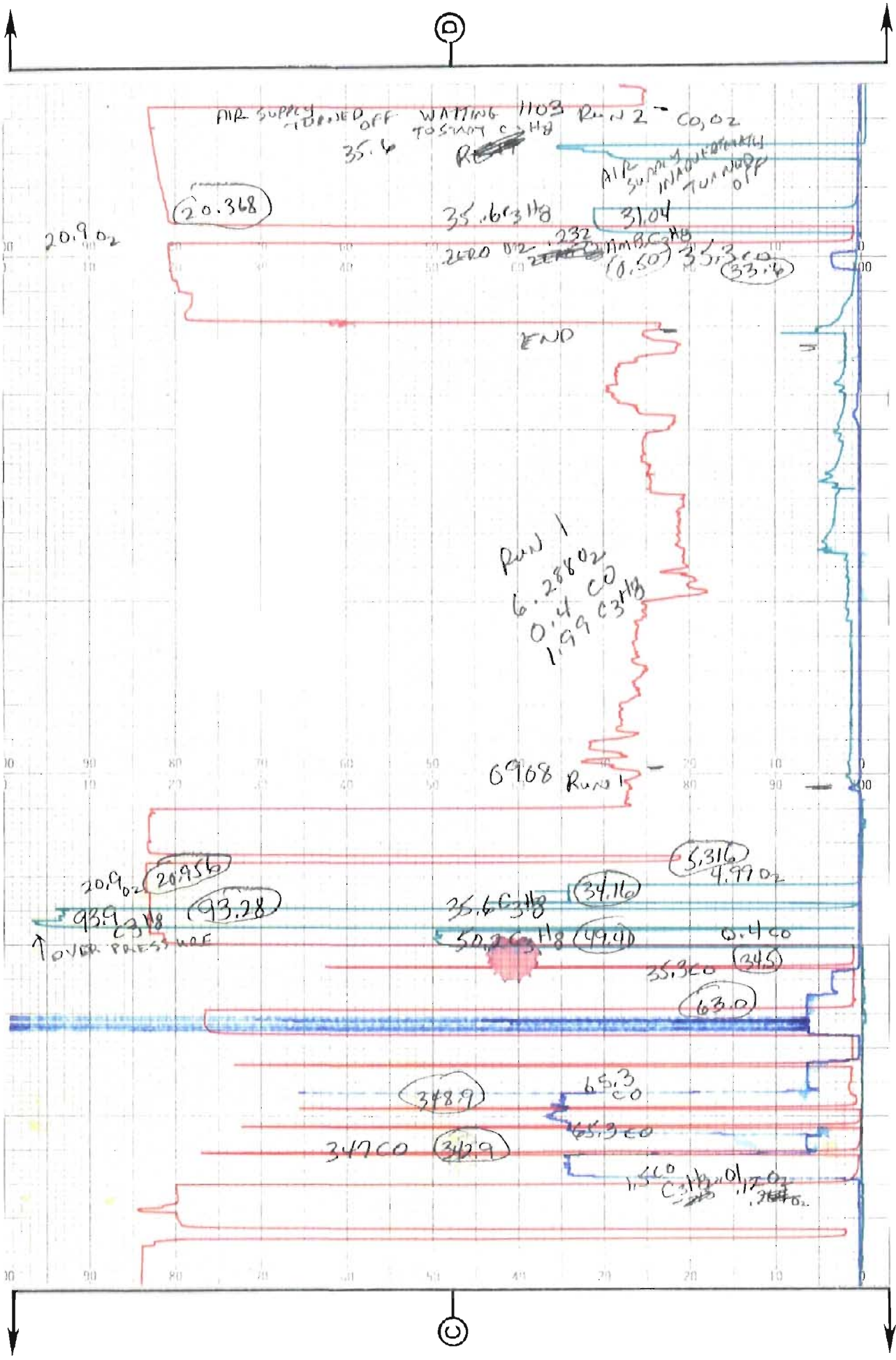
STRIP CHART COPIES


A
START
AIR CONSULTING & ENGINEERING, INC.
50.2 C_3H_8
48.70
4.99 O_2
3.024
35.6 C_3H_8
34.21
93.9 C_3H_8
93.75
ZERO C_3H_8
-.04
35.3 CO
ZERO CO (0.5)
20.858
20.9 O_2
36.0
35.3 CO
356.9
666.3
349 CO
669.3
ZERO O_2 (0.1)
666 CO
CIRCLED VALUES ARE DATA LOGGER AUGS
DRE BOCA GRANDE
2-25-93
1000 RANGE
250 RANGE
100 RANGES
BLUE = CO
RED = O_2
GREEN = C_3H_8

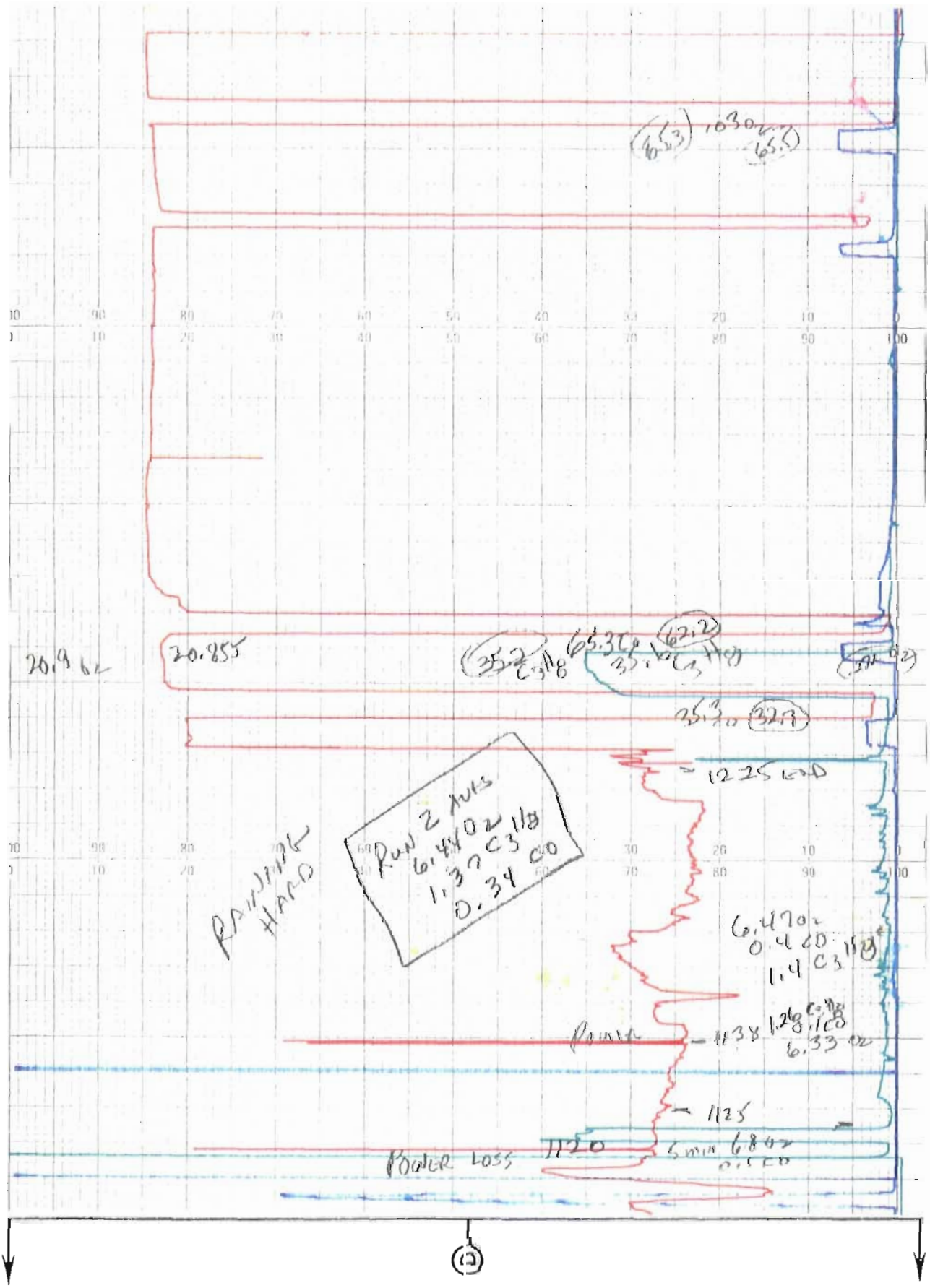


AIR CONSULTING & ENGINEERING, INC.




AIR SUPPLY TURNED OFF WAITING TO START C3H8
1103 Run 2 - CO, O2
35.6
AIR SUPPLY INADVERTENTLY TURNED OFF
31.04
20.368
20.9 O2
35.6 C3H8
ZERO O2 .232
(0.50) 35.3 CO
33.6
END
Run 1
6.28 O2
0.41 CO
1.99 C3H8
0908 Run 1
5,316
4.99 O2
20.9 O2
20.956
34.16
35.6 C3H8
93.9 C3H8
93.28
50.2 C3H8
49.90
0.4 CO
35.3 CO
34.5
63.0
OVER PRESSURE
34.89
65.3 CO
65.3 CO
34.7 CO
34.9
1.5 CO
C3H8 .01
.17 O2
AIR CONSULTING & ENGINEERING, INC.

end


20.9 oz
20.855
RAMP HARD
RUN 2 AVGS
6.44 oz
1.37 C3 lb
0.34 CO
6.47 oz
0.420
1.4 C3 lb
6.33 oz
1125
POWER LOSS
1120
5 min 6.8 oz

APPENDIX E

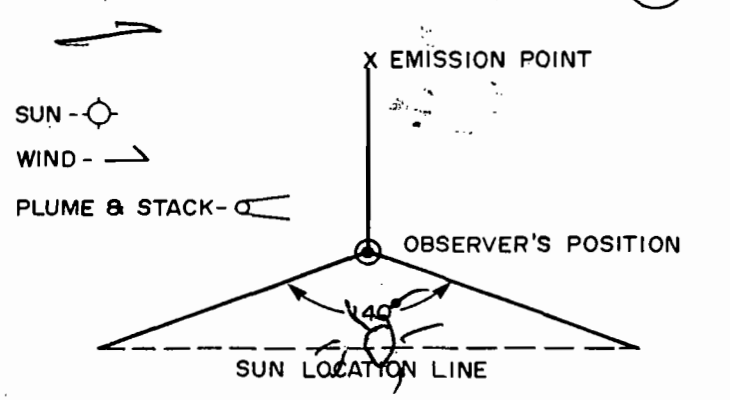
VISIBLE EMISSION DATA

ACE AIR CONSULTING & ENGINEERING, INC.

VISIBLE EMISSION OBSERVATION FORM

SOURCE NAME: DRE		
ADDRESS:		
CITY: BOCA GRANDE	STATE: FL.	ZIP:
PHONE:	SOURCE I.D. NUMBER:	
PROCESS EQUIPMENT: SOIL REMEDIATION	OPERATING MODE:	
CONTROL EQUIPMENT: AFTERBURNER / BAGHOUSE	OPERATING MODE:	
DESCRIBE EMISSION POINT: START OUTLET STACK STOP		
HEIGHT ABOVE GROUND LEVEL: START ≈25' STOP	HEIGHT REL. TO OBSERVER: START STOP	
DISTANCE FROM OBSERVER: START ≈700' STOP	DIRECTION FROM OBSERVER: START STOP	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START NONE STOP	PLUME TYPE: CONT. ☐ FUGITIVE ☐ INTER. ☒	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN PLUME AT WHICH OPACITY WAS DETERMINED: START 3' ABOVE STACK STOP		
DESCRIBE BACKGROUND: START STOP		
BACKGROUND COLOR: START HAZY STOP	SKY CONDITIONS: START PARTLY CLOUDY STOP	
WIND SPEED: START 0-8 MPH STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP: START STOP	WET BULB TEMP.	RH %

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



OBSERVATION DATE	START TIME	STOP TIME
2-26-93	0922	1032

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	5	0	5	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	5	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	5	0	0	5	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	5	0	5	0	38	0	0	0	0
9	0	5	0	0	39	0	0	0	5
10	0	0	0	0	40	0	0	0	0
11	5	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	5	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	5	0	0	0	45	5	0	0	0
16	0	0	0	0	46	0	0	0	0
17	5	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	5	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	5	0
24	0	0	0	0	54	0	5	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	5	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	5	60	0	0	0	5

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE WERE
RANGE OF OPACITY READINGS: MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): Mark M Wescott	
COMMENTS:	OBSERVER'S SIGNATURE: Mark M Wescott — DATE: 26 Feb 93
	ORGANIZATION: Air Consulting + Engineering
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS — SIGNATURE	CERTIFIED BY — DATE
TITLE — DATE	VERIFIED BY — DATE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT

MARK WESCOTT

has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.

THIS CERTIFICATE EXPIRES Aug 19, 1993

CERTIFICATE OFFICER

BEARER'S SIGNATURE

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Mark Prescott

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Lorsbach
President

237289
Certificate Number

Orlando
Test Location

David B. Savage, Jr.
Program Manager

February 18, 1993
Date of Issue

LITHO IN U.S.A.

APPENDIX F

QUALITY ASSURANCE

STANDARD METER CALIBRATION
Meter Number 691751 - N

Air Consulting and Engineering, Inc. (ACE) uses a dry gas meter for the calibration standard. This meter has been calibrated against a wet test meter in triplicate. This data was used to generate a standard meter calibration curve (see next page). Field meter calibrations are corrected to this curve using the following formula:

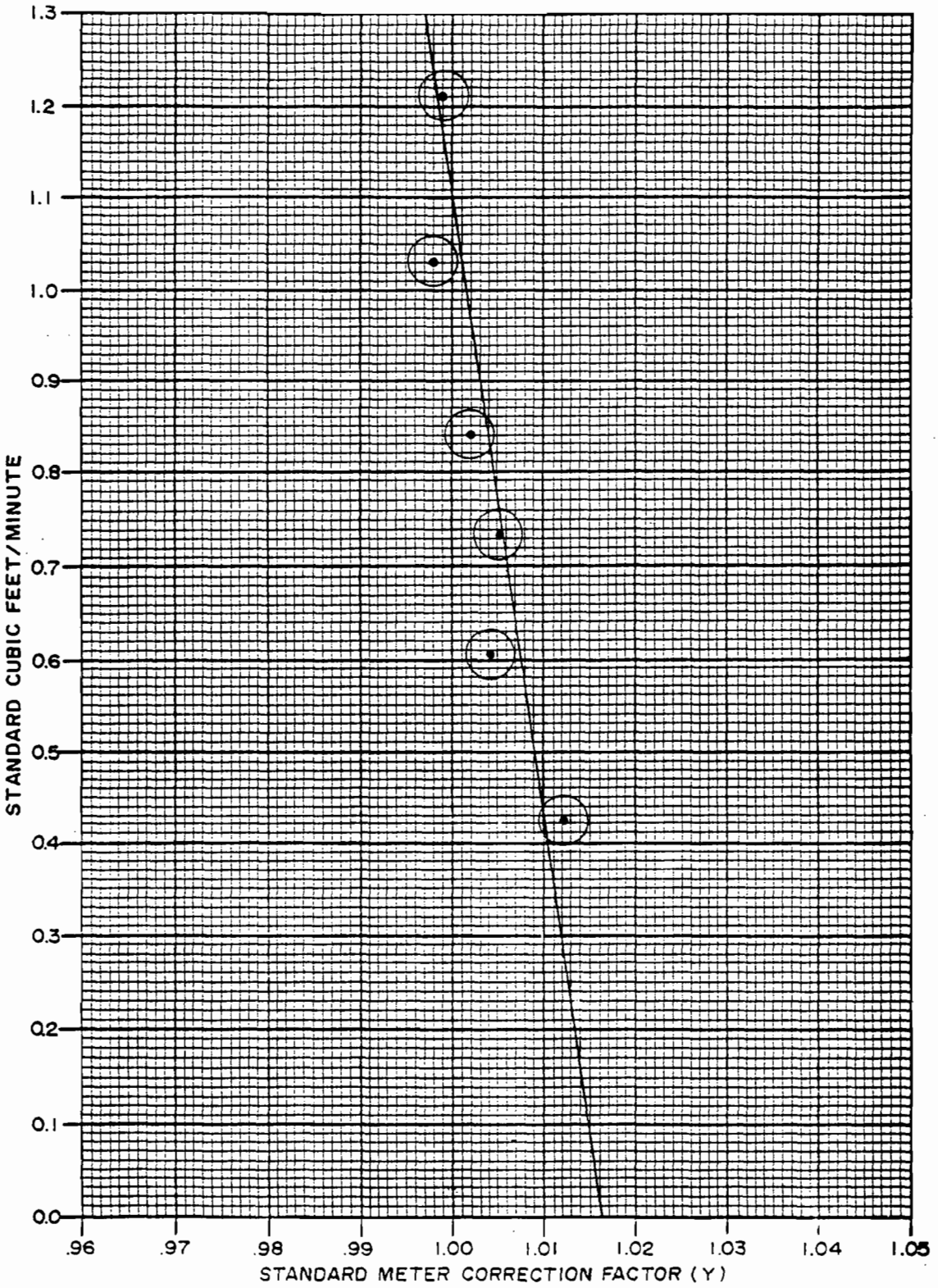
$$Y_a \times Y_s = Y$$

Y_a = actual ratio of field meter to standard meter

Y_s = ratio of standard meter to wet test meter at a given flow rate (from Calibration Curve)

Y = corrected ratio of field meter

The dry standard meter was calibrated on June 18, 1992, and is checked and/or recalibrated at least annually.



STANDARD METER CALIBRATION CURVE

JUNE 18, 1992
SERIAL NUMBER 691751

AIR CONSULTING and ENGINEERING

AIR CONSULTING & ENGINEERING — STANDARD METER CALIBRATION

DATE 6-18-92 LEAK CHECK 0.000 CFM at 15 In. Hg.

METER SERIAL NUMBER 691751 BAROMETRIC PRESSURE 30.02 In. Hg.

STD GAS METER TEMPERATURE 72 °F/ ASTM GLASS THERMOMETER TEMPERATURE 72 °F

WET ΔH	STD ΔH	GAS VOLUME, WET TEST METER			GAS VOLUME, STD GAS METER			TEMP WET TEST METER (°F)	TEMP OF STD METER (°F)	TIME (Minutes)
		INITIAL	FINAL	ACTUAL ft³	INITIAL	FINAL	ACTUAL ft³			
-.1	-.77	2.582	8.223	5.641	833.849	839.437	5.588	72	72	13
-.1	-.77	8.223	13.372	5.149	839.437	844.538	5.101	72	72	12
-.1	-.77	13.372	18.491	5.119	844.538	849.602	5.064	72	72	12
-.1	-1.2	9.012	14.502	5.490	850.124	855.602	5.478	72	72	9
-.2	-1.2	14.502	19.988	5.486	855.602	861.078	5.476	72	72	9
-.2	-1.2	19.988	25.445	5.457	861.078	866.532	5.454	72	72	9
-.3	-1.6	6.026	11.192	5.166	867.112	872.274	5.162	72	72	7
-.3	-1.6	11.192	16.356	5.164	872.274	877.435	5.161	72	72	7
-.2	-1.6	16.356	21.501	5.145	877.435	882.578	5.143	72	72	7
-.1	-2.0	3.241	9.158	5.917	884.329	890.266	5.937	72	72	7
-.1	-2.0	9.158	14.229	5.071	890.266	895.363	5.097	72	72	6
-.1	-2.0	14.229	19.324	5.095	895.363	900.476	5.113	72	72	6
-.5	-2.8	0.149	5.338	5.189	901.310	906.546	5.236	72	72	5
-.5	-2.8	5.338	10.526	5.188	906.546	911.774	5.228	72	72	5
-.5	-2.8	10.526	15.719	5.193	911.774	917.024	5.250	72	72	5
-.6	-3.6	3.468	9.512	6.044	944.113	950.211	6.098	71	71	5
-.6	-3.6	9.512	15.586	6.074	950.211	956.347	6.136	71	71	5
-.6	-3.6	15.586	21.660	6.074	956.347	962.487	6.140	71	71	5

George F. Gabel

air consulting and engineering

SCFM											
0.432	1.011	0.607	1.005	0.735	1.005	0.842	1.002	1.033	0.998	1.207	1.000
0.427	1.011	0.607	1.005	0.735	1.005	0.842	1.000	1.033	0.999	1.213	0.999
0.425	1.012	0.604	1.003	0.732	1.004	0.846	1.001	1.034	0.996	1.213	0.998
0.428	1.012	0.606	1.004	0.734	1.005	0.843	1.001	1.033	0.998	1.211	0.999

AIR CONSULTING & ENGINEERING — ANNUAL METER CALIBRATION

DATE 7-17-92 LEAK CHECK 0.000 CFM at 15 In. Hg.

METER BOX NUMBER 1 BAROMETRIC PRESSURE 30.12 In. Hg.

DRY GAS METER TEMPERATURE 92 °F/ASTM GLASS THERMOMETER TEMPERATURE 92 °F

ΔH IS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP STD METER	TEMP OF DRY METER	TIME (Minutes)	TIMER
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
-.05	0.5	925.708	930.873	5.165	467.729	472.876	5.147	92	96	14	14
-.13	1.25	931.127	936.398	5.271	473.121	478.413	5.292	93	96	9	
-.21	2.00	936.725	941.885	5.160	478.733	483.918	5.185	93	97	7	
-.31	2.75	942.212	947.442	5.230	484.238	489.482	5.244	93	97	6	
-.38	3.5	947.812	953.679	5.867	489.851	495.721	5.870	94	98	6	
-.49	4.5	954.073	959.607	5.534	496.118	501.628	5.510	94	98	5	

DELTA H	Ya	SCFM	Ys	Y
2.119	1.010	0.355	1.011	1.021
2.110	0.998	0.563	1.008	1.006
2.127	0.998	0.709	1.006	1.003
2.091	0.998	0.838	1.004	1.002
2.119	0.998	0.938	1.002	1.000
2.126	1.001	1.062	1.001	1.002
MEAN: 2.115	1.000		1.005	1.006

CALIBRATED BY: G. F. Habel

AIR CONSULTING & ENGINEERING, inc. — POST TEST CALIBRATION

DATE 3-1-93 METER BOX NUMBER 1 LEAK CHECK 0.000 CFM at 12 In. Hg.

CLIENT O. R. E. SOURCE INCINERATOR THERMOCOUPLE NUMBER 55 PYROMETER NUMBER ATK-1

FLIGHT SERVICE Pb 30.24 In. Hg. ACE BAROMETER Pb 30.24 In. Hg.

ASTM GLASS THERMOMETER 1618 °F / THERMOCOUPLE 1625 °F ASTM GLASS THERMOMETER 54 °F / METER TEMP 54 °F

ΔHS	AVERAGE ΔHD	GAS VOLUME, STANDARD METER			GAS VOLUME, DRY GAS METER			TEMP. STANDARD METER	TEMP. OF DRY METER	TIME (Minutes)	MAX. VACUUM In. Hg.
		INITIAL	FINAL	ACTUAL ft^3	INITIAL	FINAL	ACTUAL ft^3				
-.13	1.1	203.641	209.088	5.447	297.500	303.178	5.678	54	54	10	5
-.13	1.1	209.088	214.483	5.395	303.178	308.624	5.446	54	56	10	5
-.13	1.1	214.483	219.839	5.356	308.624	314.158	5.534	55	60	10	5

CALIBRATED BY: Fred Baumann

	DELTA H	Ya	SCFM	Ys	Y
	1.998	0.957	0.566	1.001	0.958
	2.028	0.992	0.560	0.996	0.988
	2.050	0.975	0.555	0.993	0.968
MEAN:	2.025	0.974		0.997	0.971

AIR CONSULTING & ENGINEERING, INC. — PITOT TUBE CALIBRATION

DATE CALIBRATED 3-3-92 PITOT TUBE S5

IS PITOT TUBE ASSEMBLY LEVEL YES ARE PITOT TUBE OPENINGS DAMAGED NO

α_1 = 1 °(<10°), α_2 = 2 °(<10°), β_1 = 1 °(<5°), β_2 = 1 °(<5°)

γ = 0 ° θ = 3 ° A = 1.135 in. = (Pa + Pb)

z = A sin γ = 0.019 in.; <0.32/<1/8 in.

w = A sin θ = 0.060 in.; <0.08/<1/32 in.

P_a .5675 in. P_b .567 in. D_t .375

WAS CALIBRATION REQUIRED NO

THERMOCOUPLE CALIBRATION

SOURCE (SPECIFY)	ASTM GLASS THERMOMETER WITH MERCURY (°F)	PYROMETER (°F)	DEGREE DIFFERENCE	PERCENT DIFFERENCE
ICE BATH	46	48	2	0.38
AMBIENT	71	74	3	0.41
HOT OVEN	473	476	3	0.41

CALIBRATED BY: D. L Carter

FDER - MAXIMUM 5° DIFFERENCE

EPA $\left[\frac{(\text{REF. TEMP. °F} + 460°) - (\text{PYROMETER TEMP. °F} + 460°)}{\text{REF. TEMP. °F} + 460°}\right] 100 \leq 1.5\%$

air consulting and engineering

PYROMETER CALIBRATION

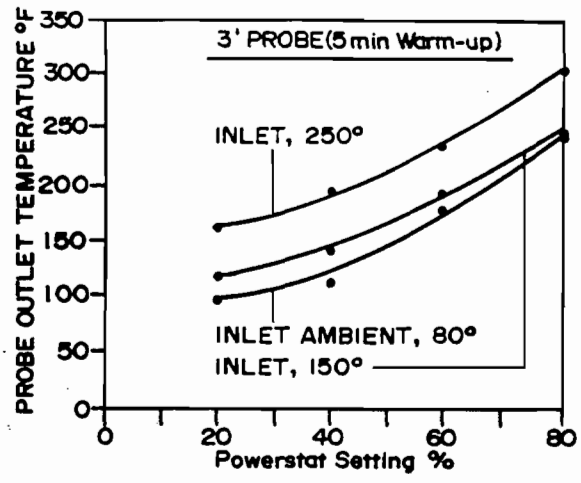
Date 9-13-89 Pyrometer No. ADKINS #1

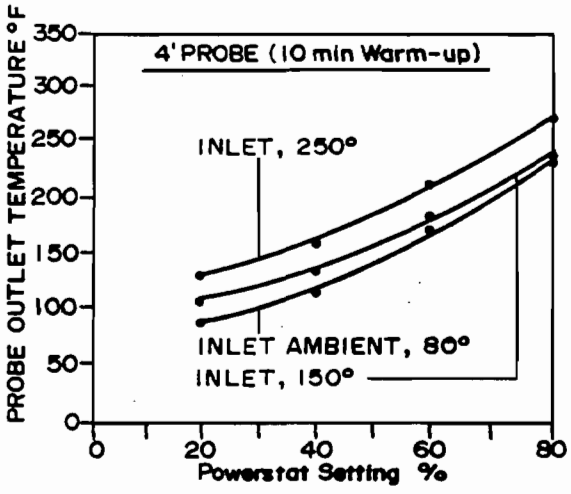
Source (Specify)	Glass Thermometer With NBS Mercury (°F)	Pyrometer (°F)	Degree Difference	% Difference
OVEN	303	303	0	0.0
AMBIENT	87	84.3	2.7	0.5
ICE BATH	34	32.1	1.9	0.4

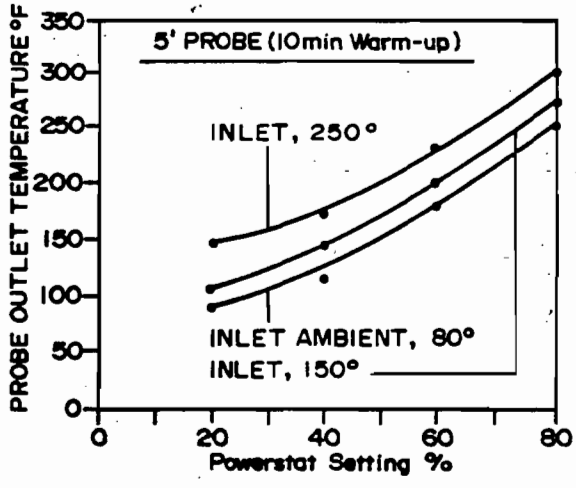
FDER - Maximum 5° difference

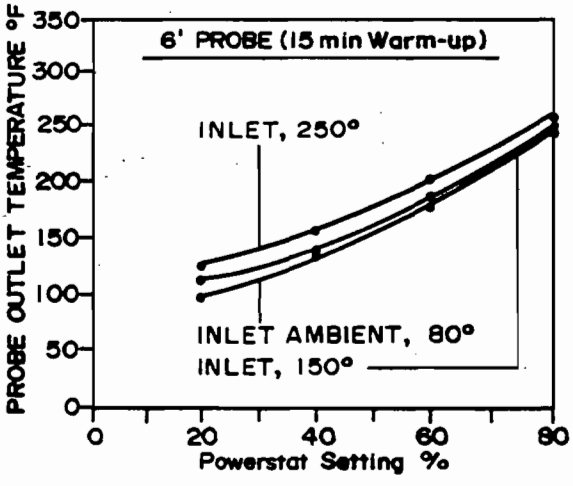
EPA $\left[\frac{\text{(Ref. temp. °F + 460) - (Pyrometer temp. °F + 460)}}{\text{Ref. temp. °F + 460}}\right] 100 \leq 1.5\%$

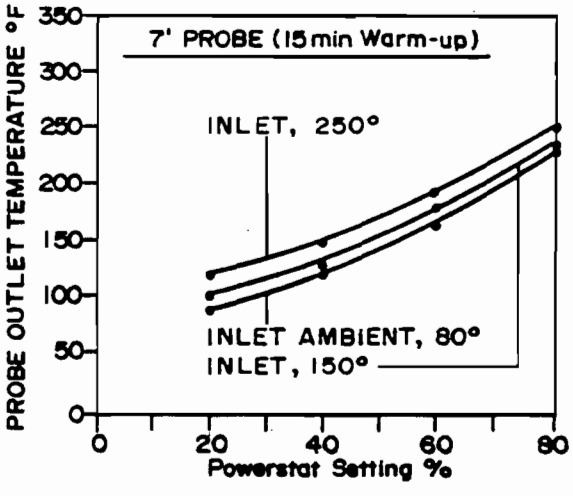
Calibrated by H. F. Gabel











NOTE: Flow rate held constant at 0.75; 50% change in flow rate has little effect on probe temperature.

PROBE GRAPH

AIR CONSULTING and ENGINEERING

AIR CONSULTING AND ENGINEERING, Inc.

SAMPLE RECOVERY AND CHAIN OF CUSTODY

PLANT NAME DRE TEST DATE 2/25-26/93

SOURCE NAME Contaminated Soil Incinerator SAMPLE RECOVERED BY _____

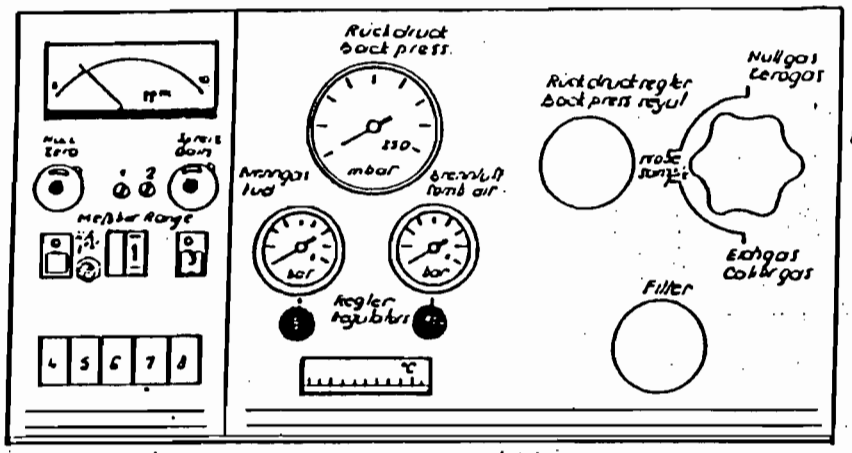
TYPE OF SAMPLE Particulate PARTICULATE ANALYSES BY _____

SAMPLE RECOVERY

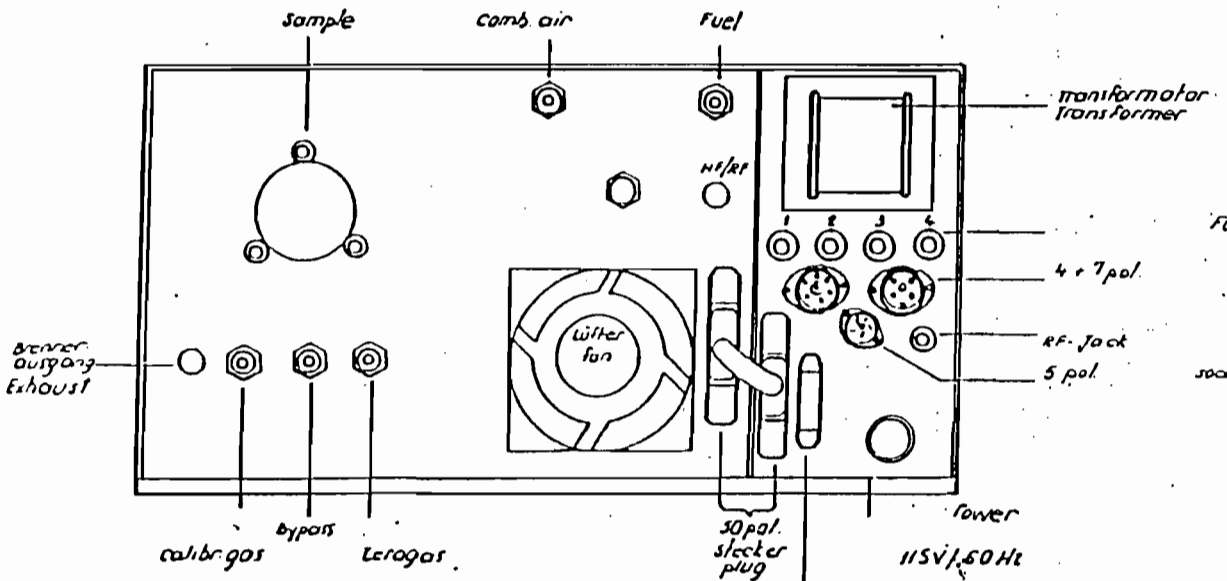
RUN NO.	CONTAINER NO.	LIQUID LEVEL MARKED	COLOR	COMMENTS
1	38	✓	Colorless Red turbidity	176 ml
2	39	✓	↓	142 ml
3	46	✓	↓	105 ml
1	4272	NA	Red/Brown	
2	4273	↓	↓	
3	4275	↓	↓	
	~~#8~~			
ACETONE / WATER BLANK (CIRCLE)	48	✓	Colorless	82 ml
FILTER BLANK				

SILICA GEL

RUN NO.	CONTAINER NO.	FINAL WT. (g)	INIT. WT. (g)	NET WT. (g)	COLOR
~~1~~	2	212.0	200.0	12.0	Blue/Pink
2	102	~~210.5~~ 213.0	200.0	~~10.5~~ 13.0	↓
3	250	210.5	200.0	10.5	↓
			200.0		
			200.0		
			200.0		
			200.0		
			200.0		



1 Potentiometer Temp Ofen
Potentiometer temp oven
2 Potentiometer Temp Sonde
Potentiometer temp sample line
3 Temperatur Sonde
Temperature sample line
4 Netzschalter
Power switch
5 Pumpe
pump
6 Ofenheizer
heater oven
7 Sondenheizer
heater sample line
8 Zündung
Ignition



Ratfisch INSTRUMENTE

FLAMMEN IONISATIONS DETEKTOR
FLAME IONISATION DETECTOR

Manual switching

RS 55

19.04.89

TOTAL HYDROCARBON ANALYZER (FLAME IONIZATION)

SERIAL NO.: 4/5/90 WORK ORDER NO.:

Mains: 115V/60Hz
Recorder Output: 0-10V/4-20mA

Measuring Ranges:			
	I	= 0- 10	PPM C1
	II	= 0- 100	PPM C1
	III	= 0- 1000	PPM C1
	IV	= 0- 10,000	PPM C1

Special Options:

Pressure Adjustment:

H2	0.4 bar (before optimizing)
Comb. air	0.8 bar
Sample	200 mbar

Oven Temperature: 160C

Thermo Electron CORPORATION

Instruments Division

Gas Filter Correlation CO Analyzer

Model 48

For Continuous Ambient Air Monitoring

Thermo Electron's Microprocessor Based Model 48 Ambient CO Analyzer provides unequaled ease of operation, reliability, precision and specificity. The unique Gas Filter Correlation principle of operation offers the significant advantages of unequaled specificity and sensitivity and increased resistance to shock and vibration.

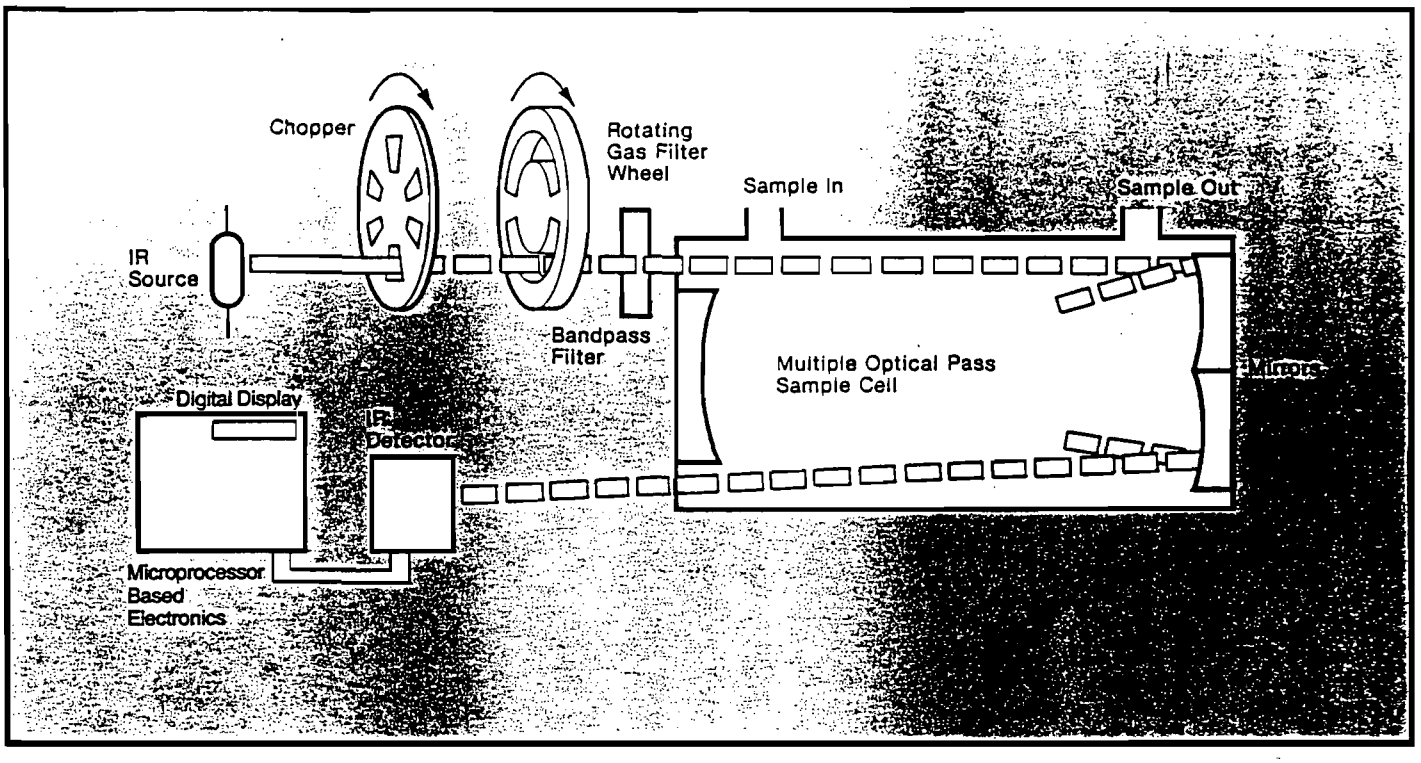
Key Features

- Microprocessor Based
- Automatic pressure and temperature correction
- Dual fully independent outputs standard
- Hourly average output standard
- Lower ranges, wide dynamic range (suitable for both ambient and source)
- Highly specific to CO
- Long term zero and span stability
- Vibration and shock resistant
- Powerful diagnostics made possible by microprocessor
- Linear through all ranges
- Unaffected by changes in flow
- Self-aligning optics
- U.S.A.—EPA reference method RFCA-0981-054, range 0-50ppm time constant — 30 seconds

Model 48 Specifications

Ranges	0-1, 0-2, 0-5, 0-10, 0-20, 0-50*, 0-100, 0-200, 0-500, 0-1000 ppm
Zero Noise	0.05 ppm RMS — With time constant = 30 seconds
Minimum Detectable Limit	0.10 ppm
Zero Drift, 24 Hours	± 0.2 ppm
Span Drift, 24 hours	± 1% Full Scale
Rise/Fall Times (0-95%) (at 1ppm flow, 30 second integration time)	1 minute
Precision	± 0.1 ppm
Linearity	± 1%
Flow Rate	1 lpm standard
Rejection Ratio	Negligible interference from water and CO_2
Operating Temperature	Performance specifications maintained over the range 15–35° C (may be operated safely over the range 5–45° C)
Power Requirements	100 Watts; 105–125 VAC, 60Hz; 220-240VAC 50Hz
Physical Dimensions	17" wide × 8¾" high × 23" deep
Weight	45 lbs.
Dual Outputs (standard)	Selectable to 0-10mV, 0-100mV 0-1V, 0-5V, 0-10V; digital display; 1 hour integrated value. Other outputs available upon request (4-20ma, IEEE488)

* See Federal Register, Tuesday, February 18, 1975, Volume 40, Number 33, Part II for definitions and Federal specifications. Performance specifications over 15-35°C range.



Principle of Operation

The basic components of a Gas Correlation System are illustrated in the above diagram. Radiation from an infrared source is chopped and then passed through a gas filter which alternates between CO and N_2 due to Rotation of the filter wheel. The radiation then passes through a narrow bandpass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The IR radiation exits the sample cell and falls on a solid state IR detector.

The CO gas filter acts to produce a reference beam which cannot be further affected by CO in the sample chamber. The N_2 side of the filter wheel is transparent to IR radiation and therefore produces a measure beam which *can* be absorbed by CO. The chopped detector signal is modulated by the alternation between the two gas filters with an amplitude proportional to the concentration of CO in the sample chamber. Other gases do not cause modulation of the detector signal since they absorb the reference and measure beams equally. Thus, the Gas Filter Correlation System responds solely to CO.

Options

48–001 — Particulate Filter

48–002 — Rack Mounts

48–003 — Remote activation of zero and span solenoids.

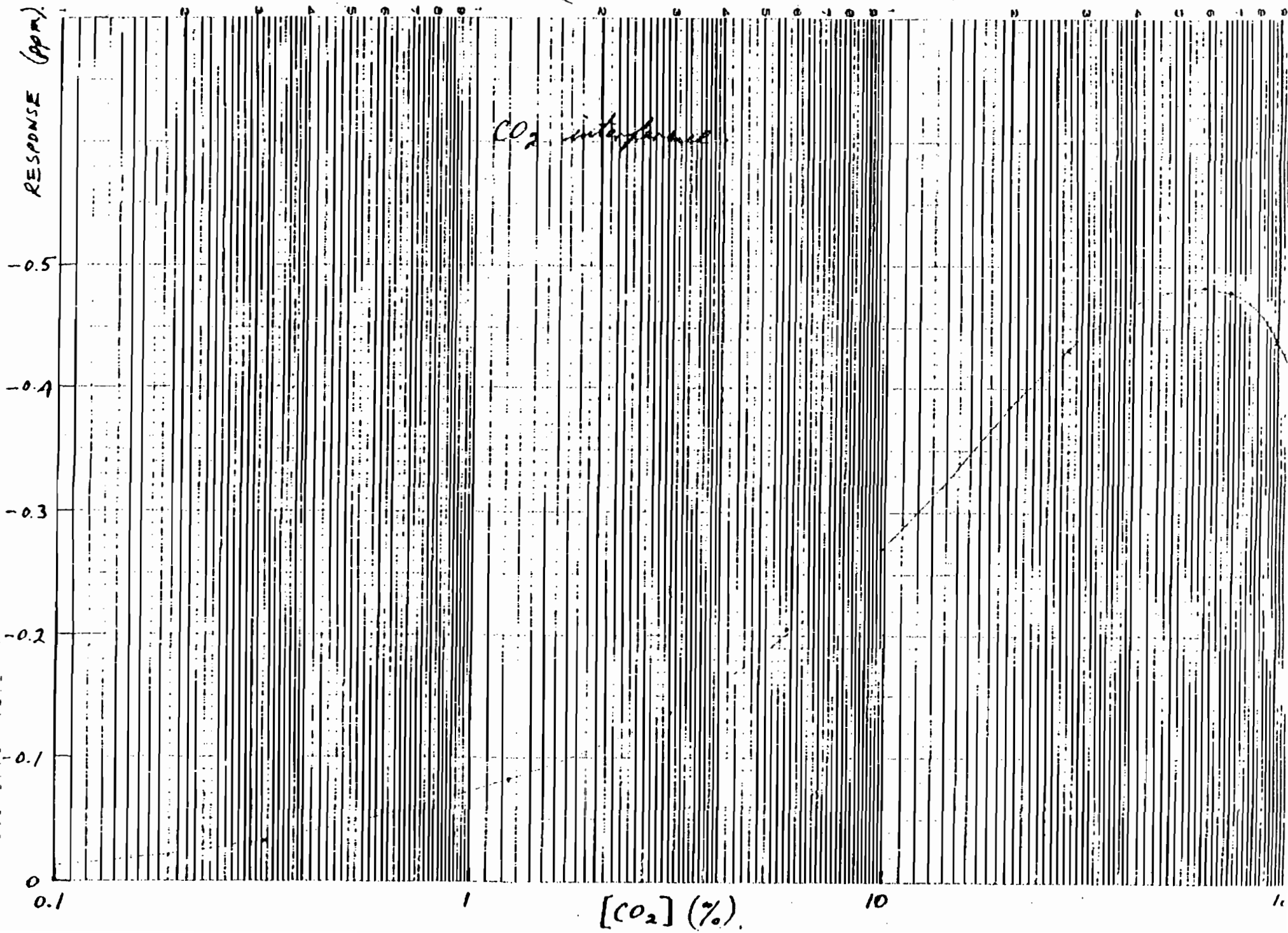
Thermo Electron
CORPORATION

Instruments Division

108 South Street
Hopkinton, Massachusetts 01748
Telephone (617) 435-5321
Telex 948325

Printed in U.S.A. — 1/83 5M

MODEL 48 (Baseline unit). 4/29/87.



SPECIFICATION
FOR
TELEDYNE ANALYTICAL INSTRUMENTS
MODEL 320P-4
PORTABLE OXYGEN ANALYZER
(WITH BUILT-IN PUMP)

Ranges:	0—5, 0—10, 0—25% O_2
Sensitivity:	0—5% of Full Scale
Accuracy:	±1% of full scale at constant temperature; ±5% of reading or ±1% of full scale, whichever is greater, throughout the operating temperature range.
Operating Temperature:	30—125° F.
Response Time:	Class B-1, 90% in less than 5 seconds.
Signal Output:	Internal, high resolution meter External, 0—100 mv DC full Scale
Micro-Fuel Cell:	Class B-1, Life is dependent upon duty cycle (e.g. 2.5 years, assuming 10% duty cycle in air). continuous duty in air 6 months.
Power Requirements:	2 NiCad rechargeable batteries. Batteries fully charged provide 1 month's continuous operation. Charging time overnight (14 hours). Charger built-in requires 115VAC, 50-60 Hz, power.

PUMP SPECIFICATION

Type:	Diaphragm
Duty:	Designed for Intermittant use.
Flow Rate:	3 to 4 scfh (about 1500 - 2000 cc/min) 5 VDC supplied by Amplifier batteries. (30 - 40 hrs. per charge)
Max. Vacuum:	60" water column

NOTE: TELEDYNE DOES NOT PUBLISH INTERFERENCE DATA BUT ACCORDING TO MR. JEFF BURKS OF CORPORATE ENGINEERING, THE B-1 FUEL CELL HAS NO INTERFERENCE, SO_2, NO_x, CO_2, AND CO EFFECT ONLY CELL LIFE, NOT ACCURACY.

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-21798 CYLINDER #: CC109805 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 7-11-94 LAST ANALYSIS DATE: 1-11-93

CUSTOMER: CRYOTECH P.O.# 443
METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1667B

CYL #: CLM5046

CONC.: 47.3 PPM

INSTRUMENT:

BECKMAN
COMPONENT: THC

MODEL #: 400

SERIAL #: 1003052

LAST CAL.: 10-1-92

COMP: C3H8
MEAN CONC: 35.6 PPM

REPLICATE CONC.
DATE: 1-11-93 DATE:
35.6 PPM
35.7 PPM
35.4 PPM

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

BALANCE GAS: AIR

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-21796 CYLINDER #: CC100182 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 7-11-94 LAST ANALYSIS DATE: 1-11-93

CUSTOMER: CRYOTECH P.O.# 443
METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1667B

CYL #: CLM5046

CONC.: 47.3 PPM

INSTRUMENT:

BECKMAN
COMPONENT: THC

MODEL #: 400

SERIAL #: 1003052

LAST CAL.: 10-1-92

COMP: C3H8
MEAN CONC: 50.2 PPM

REPLICATE CONC.
DATE: 1-11-93 DATE:
50.2 PPM
50.0 PPM
50.4 PPM

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

BALANCE GAS: AIR

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-17115037 CYLINDER # CC109378 CYL. PRESSURE: 2000 PSIG

EXPIRATION DATE: 10/29/93 BATCH#: _____ LAST ANALYSIS DATE: 4/29/92

CUSTOMER: ALPHAGAS P.O.# CC21664-978

METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1668B

CYL.#: CLM725

CONC. 95.0 PPM

INSTRUMENT:

COMPONENT: BECKMAN TEC

MODEL #: 400

SERIAL #: 1003052

LAST CAL.: 4/1/92

COMPONENT C3H8
MEAN CONC: 93.9 PPM

REPLICATE CONC.	
DATE: 4/29/92	DATE:
94.1 PPM	
93.9 PPM	
93.8 PPM	

COMPONENT _____
MEAN CONC: _____

REPLICATE CONC.	
DATE:	DATE:

COMPONENT
MEAN CONC

BALANCE GAS AIR

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-21618 CYLINDER #: 103412 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 6-29-94 LAST ANALYSIS DATE: 12-29-92

CUSTOMER: CRYOTECH P.O.# 392
METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1678C

CYL #: FF39524

CONC.: 50.1PPM

INSTRUMENT:

COMPONENT: BECKMAN NDIR

MODEL #: 865

SERIAL #: 0103409

LAST CAL.: 10-1-92

COMP: CO
MEAN CONC: 35.3PPM

REPLICATE CONC.

DATE: 12-21-92	DATE: 12-28-92
35.3PPM	35.2PPM
35.1PPM	35.5PPM
35.4PPM	35.2PPM

COMP:
MEAN CONC:

REPLICATE CONC.

DATE:	DATE:

COMP:
MEAN CONC:

REPLICATE CONC.

DATE:	DATE:

BALANCE GAS: N2

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-21592 CYLINDER #: CC103304 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 6-28-94 LAST ANALYSIS DATE: 12-28-92

CUSTOMER: CRYOTECH P.O.# 392
METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1680B

CYL #: FF34074

CONC.: 477 PPM

INSTRUMENT:
BECKMAN
COMPONENT: NDIR

MODEL #: 865

SERIAL #: 0103409

LAST CAL.: 10-1-92

COMP: CO
MEAN CONC: 345PPM

REPLICATE CONC.

DATE: 12-18-92	DATE: 12-28-92
345PPM	344PPM
346PPM	345PPM
344PPM	344PPM

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

BALANCE GAS: N2

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-21589 CYLINDER #: 103631 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 6-28-94 LAST ANALYSIS DATE: 12-28-92

CUSTOMER: CRYOTECH P.O.# 392
METHOD: EPA PROTOCOL # 3.0.4.G-1

STANDARD:

SRM #: 1681B

CYL #: CLM4470

CONC.: 975PPM

INSTRUMENT:

BECKMAN
COMPONENT: NDIR

MODEL #: 865

SERIAL #: 0103409

LAST CAL.: 10-1-92

COMP: CO
MEAN CONC: 669 PPM

REPLICATE CONC.

DATE: 12-18-92	DATE: 12-28-92
667PPM	671PPM
665PPM	670PPM
668PPM	672PPM

COMP:
MEAN CONC:

REPLICATE CONC.

DATE:	DATE:

COMP:
MEAN CONC:

REPLICATE CONC.

DATE:	DATE:

BALANCE GAS: N2

CONTINUOUS MONITOR ACCURACY CERTIFICATION

BEST AVAILABLE COPY

PLANT: DRE

SOURCE: Afterburner Outlet

DATE: 2/25/93

PAGE _____ OF _____

ACE AIR CONSULTING & ENGINEERING, INC.
2106 N.W. 67th PLACE·Suites 9&10
GAINESVILLE, FLORIDA·32606
(904)335-1889

NO_x / C_3H_8 CALIBRATION GAS	MONITOR VALUE ppm	DIFFERENCE ppm	% SPAN
93.9	93.8	0.1	0.1
50.2	48.7	1.5	1.5
35.6	34.2	1.4	1.4

O_2 CALIBRATION GAS	MONITOR VALUE ppm	DIFFERENCE ppm	% SPAN
20.9	20.9	0	0
4.99	5.02	0.03	0.03

CO CALIBRATION GAS	MONITOR VALUE ppm	DIFFERENCE ppm	% SPAN
666	666.3	0.3	0.03
347	356.9	9.9	0.99
35.3	36.0	0.7	0.07

APPENDIX G

PRODUCTION DATA

BEST AVAILABLE COPY

D. R. E.
ENVIRONMENTAL INC.

PH. (904) 755-3164

FAX (904) 755-5430

Groundwater Remediation Specialists

FACSIMILE TRANSMITTAL

DATE: 3/9/93

MESSAGE TO: STEVE NECK

MESSAGE FROM: Chris Sleyer

NUMBER OF PAGES INCLUDING COVER: 3

SPECIAL INSTRUCTIONS:

Test #1 Feed Rate 18.45 Tons per hour.

Test #2. Feed Rate 19.89 tons per hour

Test # 3 Feed Rate 21.02 tons per hour

Soil Test Data attached

Please call (904) 755-1196 if you do not receive all pages of this FAX.

P.O. BOX 1386
LAKE CITY, FL 32056

RETURN FAX NO: 758-9050

418.1/9073 TOTAL PETROLEUM HYDROCARBONS

WORK ORDER # 2095 IN: 3/1/93

CLIENT: D.R.E. DUE:

PROJECT: # 4015 BG - Stack Tests PAGE 1 OF #1

UNITS: mg/kg	PREBURN #1	POST #1	POST #2	PRE #2	POST #3	PRE #3
Total Petroleum Hydrocarbons	54	< 5.0	< 5.0	50.5	< 5.0	54
pH Checked				-		
DATE EXTRACTED						
AMOUNT EXTRACTED						
FINAL VOLUME						
METHOD						
EXTRACTED BY						
CUSTOMER REFERENCE						
DATE SAMPLED						
MATRIX						
CONTAINER						
LOCATION						
INITIALS						

Q C DATA

Matrix Type	Sample I.D. #	% Recovery	LCS	Accept. Limits	% RPD	Analyst Date

K — A/T = Actual/Theoretical
E — LCS = Laboratory Control Standard
Y — % Recovery = Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Approved by: _____

Data : _____

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

ENCO Laboratories
DHRS Certification No. 83318, 83182

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.2
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and
identified by client as:

Boca Grande
Project #4015
Composite of 3 samples

#1 -	Postburn Test 1	02/25/93	19:30
#2 -	Postburn Test 2	02/26/93	10:20
#3 -	Postburn Test 3	02/26/93	12:23

MANAGER, CLIENT SERVICES

David J. Vesey

ENCO LABORATORIES
REPORT # : 2095.2
DATE REPORTED: March 17, 1993
REFERENCE : Boca Grande
Project #4015
PAGE 2 OF 5

RESULTS OF ANALYSIS

EPA METHOD 8010 - VOLATILE HALOCARBONS	Postburn Composite	units
Dichlorodifluoromethane	BDL(5)	µg/kg
Chloromethane	BDL(5)	µg/kg
Vinyl Chloride	BDL(5)	µg/kg
Bromomethane	BDL(5)	µg/kg
Chloroethane	BDL(5)	µg/kg
Trichlorofluoromethane	BDL(5)	µg/kg
1,1-Dichloroethene	BDL(5)	µg/kg
Methylene Chloride	BDL(5)	µg/kg
t-1,2-Dichloroethene	BDL(5)	µg/kg
1,1-Dichloroethane	BDL(5)	µg/kg
Chloroform	BDL(5)	µg/kg

RESULTS OF ANALYSIS

EPA METHOD 8020 - VOLATILE AROMATICS	Postburn Composite	units
Methyl Tert Butyl Ether	BDL(10)	µg/kg
Benzene	7	µg/kg
Toluene	13	µg/kg
Ethylbenzene	18	µg/kg
m-Xylene & p-Xylene	38	µg/kg
o-Xylene	6	µg/kg
Chlorobenzene	BDL(5)	µg/kg
1,2-Dichlorobenzene	BDL(5)	µg/kg
1,3-Dichlorobenzene	BDL(5)	µg/kg
1,4-Dichlorobenzene	BDL(5)	µg/kg
Surrogate:	**% Recov**	**Limits**
Bromofluorobenzene	102	50-154
Date Analyzed	03/12/93	

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Postburn Composite	units
Total Petroleum Hydrocarbons	<5.0A	mg/kg
Date Analyzed	03/03/93	

A = Average of three determinations
BDL = Below Detection Level; detection level in parentheses
< = Less Than

RESULTS OF ANALYSIS

TOTAL METALS ANALYSIS	Method Number	Postburn Composite	units
Arsenic, As	7061	1.5	mg/kg
Date Analyzed		03/12/93	
Barium, Ba	7080	51.2	mg/kg
Date Analyzed		03/15/93	
Cadmium, Cd	7130	<0.80	mg/kg
Date Analyzed		03/10/93	
Chromium, Cr	7190	12.2	mg/kg
Date Analyzed		03/15/93	
Lead, Pb	7420	11.4	mg/kg
Date Analyzed		03/14/93	
Mercury, Hg	7470	<0.050	mg/kg
Date Analyzed		03/12/93	
Selenium, Se	7741	<0.40	mg/kg
Date Analyzed		03/12/93	
Silver, Ag	7760	<1.6	mg/kg
Date Analyzed		03/11/93	

< = Less Than

ENCO LABORATORIES
REPORT # : 2095.2
DATE REPORTED: March 17, 1993
REFERENCE : Boca Grande
Project #4015

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 8010			
Methylene Chloride	83/109/ 96	48-143	27
Chloroform	108/102/ 86	50-154	6
Carbon Tetrachloride	110/ 97/ 94	58-152	12
Trichloroethene	81/ 87/ 92	58-143	7
Tetrachloroethene	95/102/102	59-151	7
Chlorobenzene	101/ 94/ 99	63-136	7
EPA 8020			
Benzene	107/104/111	59-143	3
Toluene	81/ 80/112	59-137	1
Ethylbenzene	109/110/112	61-135	1
Total Xylenes	107/107/108	56-136	1
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA
TOTAL METALS			
Arsenic, 7061	85/ 90/ 91	63-139	5
Barium, 7080	103/106/ 99	64-135	3
Cadmium, 7130	105/108/106	72-121	3
Chromium, 7190	100/ 99/ 97	63-148	1
Lead, 7420	106/110/ 96	63-135	4
Mercury, 7470	91/ 91/ 91	40-140	<1
Selenium, 7741	98/100/102	58-126	2
Silver, 7760	89/ 90/101	89-112	<1

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

< = Less Than

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # _____

DATE: 25 Feb 93 NAME: _____ SHIFT: _____

CUMULATIVE TONS
Meter Finish: _____
Meter Start: _____
Total Tons: _____

SCALE TONS
Meter Finish: 49.5
Meter Start: 0
Total TOns: 49.5

HOUR METER
Meter Finish: _____
Meter Start: _____
Total Hours: 5.0

FUEL USE IN GALLONS
Tank Finish: 10,710
Tank Start: 12 240
Total Gallons: 1530

Production Time Start: _____ Production Time Finish: 1940

Gallons divided by Billable Tons = 30.9 Gallons Per Billable Ton
Billable Tons Divided by Hours = 13 Billable Tons Per Hour

Water Usage: 3000 Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2883.3
Recycled Tons: 0
Billable Tons: 49.5 2,937.8 BB WR

BILLABLE TONS BURNED TO DATE: ~~1932.7~~

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

W. Daniel Hopkins Gary Collins
CUSTOMER

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR_____ DATE 25 FEB 93
SHIFT_____ LOCATION BOCA GRANDE PROJECT#_____

ARRIVED ON THE SITE_____ LEFT THE SITE_____
END METER READING_____ END TONNAGE_____
START METER READING_____ START TONNAGE 0
TOTAL METER READING_____ TOTAL TONNAGE_____
TOTAL GAS USED _____ REJECT/REBURN_____

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS_____

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @_____ Finish Calibration: @_____
SCALE COUNT READING_____ WEIGH BELT %_____
Started Burners @ 1000 HRS Shut Down Burners @_____
Shut Rig Down @_____ Production Hr._____

STARTED FEED	STOPPED FEED	REMARKS
	1940 Hrs	

BILLABLE TONS -- HOURS = _____ TONS PER HOUR

TONS PER HOUR -- CU. FT. _____ GALLONS PER TON

COMMENTS: WATER START 779900
STACK TEST

OPERATOR'S SIGNATURE_____

D.K.E ENVIRONMENTAL INC. PRODUCTION RE

UNIT #_____

DATE 25 FEB 75

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

HOUR	CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
0100										
0200										
0300										
0400										
0500										
0600										
0700										
0800										
0900										
1000										
1100										
1200										
1300										
1400										
1500										
1600										
1700										
1845	1800	0	5%	1663	404	50%	323	6½"	782	35.0
	1900	0	2%	1714	427	50%	324	6"	775	5T 40.0
1915	2000	0	3%	1631	340	50%	325	9½"	781	44
1930	2100	0	2%	1674	265	50%	301	13"	730	48.
	2200									49.
	2300									
	2400									

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # 4015

DATE: 16 FEB 93 NAME: _____ SHIFT: _____

CUMULATIVE TONS
Meter Finish: _____
Meter Start: _____
Total Tons: _____

SCALE TONS
Meter Finish: 745
Meter Start: 0
Total TOns: 745

HOUR METER
Meter Finish: _____
Meter Start: _____
Total Hours: 4.66

FUEL USE IN GALLONS
Tank Finish: 11,781
Tank Start: 10,710 + 2700
Total Gallons: 1629

Production Time Start: 0750 Production Time Finish: 1230

Gallons divided by Billable Tons = 21.8 Gallons Per Billable Ton
Billable Tons Divided by Hours = 16 Billable Tons Per Hour

Water Usage: _____ Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2932.8

Recycled Tons: 0

Billable Tons: 745

BILLABLE TONS BURNED TO DATE: ~~3007.3~~ 3,012.3 BB WR

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

_____ Gary Collins
CUSTOMER

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR _____ DATE 16 FEB 93
SHIFT _____ LOCATION Boca Grande PROJECT# _____

ARRIVED ON THE SITE _____ LEFT THE SITE _____
END METER READING _____ END TONNAGE 745
START METER READING _____ START TONNAGE 0
TOTAL METER READING _____ TOTAL TONNAGE 745
TOTAL GAS USED _____ REJECT/REBURN 0

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS 74.5

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @ _____ Finish Calibration: @ _____
SCALE COUNT READING 15810 WEIGH BELT % _____
Started Burners @ 0700 Shut Down Burners @ _____
Shut Rig Down @ _____ Production Hr. 4.66

STARTED FEED	STOPPED FEED	REMARKS
0750	1230	RAIN COOLED BAGHOUSE
		STOPPED FEED TO REHEAT
		BETWEEN TESTS
		LOST BOTH DRIER EXIT
		AND BAGHOUSE EXIT THERMO-
		CUPLES TAKING OUT PRIMARY
		BURNER AND I.D. FAN.

BILLABLE TONS -- HOURS = 16.0 TONS PER HOUR

TONS PER HOUR -- CU. FT. 21.87 GALLONS PER TON

COMMENTS: WATER START 787900
RAIN! 1108 Hrs
FINISHED TESING 1210 Hrs 1ST START 0908 FINISH 1020 Hrs
2ND START 1100 Hrs FINISH 1210 Hrs
Machine Planned for Saturday - NO Monday

OPERATOR'S SIGNATURE _____

D.R.E ENVIRONMENTAL INC. PRODUCTION REPORT

UNIT #_____

DATE 25 FEB 93

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

	HOUR	PPM CO	O2	CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
21 HRS	0100	30	5.9	0	2%	1773	321	50%	259	7"	725		69.2
230 Hrs	0200	0			2%	1751	440	10%	254	9"	745		71.6
	0300												74.5
	0400												
	0500												
	0600												
	0700												
	0800	0			2%	1860	413	40%	298	1½"	851		2.8
0815	0900	11	0	6.2	5%	1663	388	40%	305	4½"	780	"	5.7
0830	1000	17	0	7.2	5%	1671	388	40%	308	4½"	776		10.1
0845	1100	18	0	7.7	4%	1648	376	42%	306	7"	714		14.1
0900	1200	22	0	6.4	3%	1650	400	40%	311	5"	766	18.1	18.1
09	1300	26	0	6.6	3%	1696	383	40%	310	4½"	701		22.
0930	1400	0			3%	1699	399	40%	318	4"	764		26.6
09 5	1500	28	0	4.9	3%	1738	390	40%	312	3"	710		30.
1000 Hrs	1600	19	0	5.9	3%	1635	360	40%	302	3"	619	17.1	35.
1015 Hrs	1700	13	0	6.8	4%	1560	346	42%	291	3½"	622		38.
10 0 HRS	1800	15	0	6.7	4%	1663	361	50%	285	6"	700		42.
1045	1900	20	0	5.9	4%	1729	376	50%	289	6½"	765		46.
11 0 HRS	2000	23	0	6.1	3%	1712	367	50%	292	7½"	760	15.9	51.
1115 Hrs	2100	14	0	6.5	3%	1652	404	50%	298	6"	787		54.
1130 Hrs	2200	23	0	5.8	3%	1756	386	50%	309	6½"	963		58.
11 5 Hrs	2300	29	0	6.4	1%	1731	334	50%	295	6"	801		62.
1200 Hrs	2400	26	0	6.3	2%	1778	334	50%	272	6"	941	14.4	65.

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

Environmental Conservation Laboratories
10207 General Drive
Orlando, Florida 32824
407 / 826-5314
Fax 407 / 850-6945

ENCO Laboratories
DHRS Certification No. 83318, E8318

CLIENT : D.R.E. Environmental
ADDRESS: P.O. Box 1386
Lake City, FL 32056-1386

REPORT # : 2095.1
DATE SUBMITTED: March 1, 1993
DATE REPORTED : March 17, 1993

ATTENTION: Chris Sleeper

SAMPLE IDENTIFICATION

Soil samples submitted and identified by client as:

Boca Grande
Project #4015

#1 -	Preburn Test 1	02/26/93	19:30
#2 -	Preburn Test 2	02/26/93	10:20
#3 -	Preburn Test 3	02/26/93	12:23

MANAGER, CLIENT SERVICES David J. Vesey

David J. Vesey

ENCO LABORATORIES
REPORT # : 2095.1
DATE REPORTED: March 17, 1993
REFERENCE : Boca Grande
Project #4015

RESULTS OF ANALYSIS

EPA METHOD 9073 - TOTAL PETROLEUM HYDROCARBONS	Preburn Test 1	Preburn Test 2	Preburn Test 3	units
Total Petroleum Hydrocarbons	54	50.5	54.3	mg/kg
Date Analyzed	03/03/93	03/03/93	03/03/93	

QUALITY CONTROL DATA

Parameter	% Recovery MS/MSD/LCS	Allowable Limits	Relative % Difference
EPA 9073			
Total Petroleum Hydrocarbons	92/ NA/ 99	70-127	NA

Environmental Conservation Laboratories Comprehensive QA Plan #880817G

APPENDIX H

PERMIT NUMBER AC16-187650

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

PERMITTEE:
D.R.E. Environmental, Inc.
1644 Blanding Blvd., Suite 2
Jacksonville, Florida 32210

Permit Number: AC 16-187650
Expiration Date: January 1, 1992
County: Mobile Operation
Project: 35 TPH Mobile Soil Remediation Unit No. 1

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

Authorization to construct a 35 TPH mobile soil remediation unit. The unit consists of a 15 ton bin to receive the contaminated soil, a 24" belt conveyor for transferring up to 35 TPH of wet soil to the kiln, a rotary kiln (5 feet diameter by 28 feet long), a Hauck BH390-8 baghouse, a 98.42% efficient (minimum) Hauck afterburner capable of operating above 1600°F with a 1 second residence time, two propane or natural gas burners (23 MMBtu/hr for kiln and 22 MMBtu/hr for afterburner), a 200 KW generator, and associated controls. The unit is equipped with a stack (3 feet diameter by 30 feet high) that discharges approximately 36,077 acfm at 1600°F to the atmosphere.

The unit may be used throughout the State (all counties) after receiving Department authorization to operate at a new location.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Application received Oct. 9, 1990.
2. DER letter dated Oct. 24, 1990.
3. D.R.E. letter dated Oct. 5, 1990.
4. D.R.E. letter dated Nov. 28, 1990.

PERMITTEE:
D.R.E. Environmental, Inc.

Permit Numbers: AC 16-187650
AC 16-189522
Expiration Date: January 1, 1992

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

GENERAL CONDITIONS:

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a. Have access to and copy any records that must be kept under the conditions of the permit;

b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

GENERAL CONDITIONS:

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

Construction Requirements

1. The construction of this facility shall reasonably conform to the plans and schedule submitted in the application.

2. The stack sampling facilities must comply with F.A.C. Rule 17-2.700(4).

3. The afterburner shall be capable of operating above 1600°F with a 1 second retention time and have a minimum VOC destruction efficiency of 98.42%.

SPECIFIC CONDITIONS:

Emission Restrictions

4. Particulate matter emissions from the afterburner stack shall neither exceed 0.08 grains/dscf corrected to 50% excess air nor 7.4 lbs/hr. Visible emissions from any part of the process shall not exceed 5% opacity.

5. Benzene emissions from the afterburner stack shall not exceed 8.6 lbs/hr. Total VOC emissions shall not exceed 22.1 lbs/hr. Compliance shall be determined from soil analysis, production rate, and the afterburner destruction efficiency.

6. The operation of this source shall not result in the emissions of air pollutants which cause or contribute to an objectionable odor pursuant to F.A.C. Rule 17-2.600(c)2.

Operation Requirements

7. The system shall be properly operated and maintained (F.A.C. Rule 17-2.210(2)). No person shall circumvent any pollution control device or allow the emissions of air pollutants without the applicable air pollution control device operating properly (F.A.C. Rule 17-2.240).

8. Reasonable precautions shall be used to minimize unconfined emissions of particulate matter generated by this operation (F.A.C. Rule 17-2.610(3)). This includes keeping the work areas wet where the soil is being removed and treated.

9. The unit shall not be operated at a location or in a manner that may create a nuisance.

10. Untreated soil removed from the ground shall be stored under waterproof covers and on an impermeable surface.

11. This unit shall be allowed to operate continuously, 8760 hours per year.

12. Maximum soil charging rate to the unit shall not exceed 35 TPH. The soil entering the kiln cannot be larger than 2 inches in diameter. The permittee shall have means to determine the feed or production rate on site.

SPECIFIC CONDITIONS:

13. Only natural gas or propane shall be used as fuel for the kiln and afterburner. Maximum permitted fuel consumption is 45 MMBtu/hr (500 GPH propane).

14. Only soils contaminated with petroleum products (fuels and lubricants) shall be treated in this unit unless otherwise approved by the Bureau of Air Regulation.

Hazardous waste as defined in 40 CFR 261.3 shall not be processed by this unit.

Metals in the untreated soil shall not exceed the following:

Metals	Maximum Concentration TCLP(mg/L)	Total(mg/Kg)
Arsenic	5.0	55
Barium	100.0	2750
Cadmium	1.0	55
Chromium	5.0	275
Lead	5.0	77
Mercury	0.2	17
Selenium	1.0	165
Silver	5.0	165

Total Volatile Organic Aromatics (VOA) constituent in the soil shall not exceed the concentrations that have the potential to exceed the acceptable ambient air concentration or the VOC emission limit for this unit (see Specific Conditions Nos. 5, 17, and 27).

To show compliance with this condition, the permittee shall analyze composite samples of the contaminated soil (see Specific Condition No. 16) by the EPA SW 846 Methods, Test Method for Evaluating Solid Waste Physical/Chemical, for VOA (EPA Method 5030/8020), TRPH (EPA draft Method 9073), and Metals (EPA Method 1311, 3050, 6010, 7040, 7041, 7060, 7061, 7080, 7130, 7131, 7190, 7191, 7420, 7421, 7471, and 7760).

15. The permittee may request, in writing, permission to treat "off-spec" material. The request shall include the history of the site to be treated, an analysis of the contaminants suspected to be in the soil, an estimate of the emissions from the unit while processing the soil, and calculations showing that the ambient air

SPECIFIC CONDITIONS:

impact from the unit will not exceed the acceptable ambient air concentration for any toxic pollutant. The Department will approve or deny each request in writing on a case-by-case basis.

16. Sampling and analysis of the contaminated soil at each site, based on the procedures prescribed in SW-846, shall be conducted prior to remediation. Minimum number of composite samples for analysis at each site prior to remediation shall be as follows:

Soil Quantity ($yards^3$)	No. of Composite Samples
Less than 100	1
100 to 500	3
500 to 1000	5
Each additional 250 yds	1 additional sample

17. Unless the Department has determined other concentrations are required to protect public health and safety, predicted ambient air impact of any toxic pollutant, as determined by the PTPLU 6 model or other DARM approved models, shall not exceed the concentration calculated by the following formula:

$$AAC = \frac{40}{X} \cdot \frac{1}{\text{safety factor}} \cdot (OEL)$$

where,

AAC = acceptable ambient concentration

Safety Factor = 100 for category A substances and
50 for category B substances

X = 40 or the hours/week of actual operation, whichever is larger

OEL - Occupational exposure level such as the TWA-TLV published by the ACGIH, OSHA, and NIOSH published standards for toxic materials.

TWA-TLV is the threshold limit value (8 hrs/day, 40 hrs/wk) maximum exposure concentration considered safe for workers by the ACGIH.
Data in the application shows that, for continuous operation, an emission of 1 gram/sec will have a maximum ambient impact of 6.52×10^{-3} mg/m^3 (8 hr. avg). If the

SPECIFIC CONDITIONS:

stack parameters are different than the values listed in the application, the permittee must determine and use the actual impact factor calculated by the EPA Approved Screen - 1.1 Model.

$$\text{Maximum Allowable Emissions (g/sec)} = \frac{\text{AAC} \quad \text{mg/m}^3}{6.52 \times 10^{-3}}$$

18. Pressure drop across the baghouse shall be recorded hourly and temperature of the afterburner shall be recorded continuously during operations. The instruments used to obtain these measurements shall be properly calibrated, maintained, and in operation any time the unit is in service.

Compliance Requirements

19. This unit must be tested at the maximum process weight rate at which the permittee intends to operate. All compliance tests shall meet the requirements listed in F.A.C. Rule 17-2.700. The unit shall not operate above the maximum permitted rate of 35 TPH.

20. When the Department, after investigation, has good reason (such as complaints, increased visible emissions, or questionable maintenance of control equipment) to believe that any applicable emission standard contained in Chapter 17-2, F.A.C., or in this permit is being violated, it may require the owner or operator of the unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department.

21. The exhaust stack for this process must be tested concurrently for particulate matter and visible emissions by EPA Methods 5 and 9 pursuant to 40 CFR 60, Appendix A, revised as of July 1, 1988, within 5 days after placing the unit in commercial operation under this permit and annually thereafter. Operation at each subsequent site requires an EPA Method 9 test to be performed within 3 days of placing the unit in service.

22. The unit destruction efficiency, benzene, and VOC emissions shall be established by a material balance using a Method 18, or 25 test (40 CFR 60, Appendix A, revised as of July 1, 1988) and soil analysis before and after treatment or other methods as approved by the Department.

SPECIFIC CONDITIONS:

Administrative Requirements

23. The permittee shall furnish the available information listed in Specific Condition No. 24 prior to operating the portable rotary kiln/afterburner system at its initial site. This permit requires compliance with any applicable local (county) regulations.

24. This unit shall not be operated at any new site until the permittee has requested authorization to operate at the new site. Whenever the permittee decides it is feasible, the request shall be at least 15 days prior to operation at the new site. The permittee shall notify the BAR, local government (city and/or county), and Department District office by registered mail at least 3 days prior to moving to the new site. The notification shall provide the permit number of the unit, a copy of the last stack test results, the date of the proposed move, the new site for the unit, and the locations and contamination levels of the soils to be treated. The Department shall notify the permittee of any new air pollutant emission conditions the unit must meet within 3 days of the receipt of the relocation notice. This may include requirements for county operation permits and additional restrictions on the operation of this unit.

25. The permittee shall maintain a log that shows the unit's operation time during the preceeding 12 months. All required records must be available for inspection at the job site for the unit within 3 working days of a request by the Department.

26. The BAR shall be notified in writing at least 15 days in advance of any annual compliance test to be conducted on this source.

27. Any analysis required by Specific Condition No. 16 which indicates a violation of any condition in this permit shall be reported as soon as feasible to BAR. An average concentration of benzene above 7,776 ppm in the soil or total hydrocarbons above 20,000 ppm indicate a violation of this permit. The soil may be decontaminated by operating at less than the 35 TPH production rate, or other means with prior approval of the Department. The permittee must propose the method of compliance with this permit.

28. Records shall be kept on the location, date, time, and number of samples taken for each composite sample. Soil analysis results shall be available for Department inspection during the clean up of the site and for 3 years thereafter. All soil samples taken at the remediation site and exiting the dryer shall be stored in a sealed glass container immediately upon sampling.

SPECIFIC CONDITIONS:

29. Stack test results from PM and VOC shall be submitted to the Department within 45 days of the test.

30. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAR prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

31. An application for an operation permit must be submitted to the BAR at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this _____ day
of _____, 1990

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

APPENDIX I

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

AIR CONSULTING AND ENGINEERING, INC.

Stephen L. Neck, P.E.
Field Testing

Mark Wescott
Field Testing
Visible Emissions Observer

Sidney J. Carter
Field Testing

Fred Bauman
Field Testing

Charles P. Sneeringer
Laboratory Analysis

Dagmar Neck
Report Preparation

Candace V. Taylor
Computer Analysis
Document Production

DRE ENVIRONMENTAL, INC.

Chris Sleeper
Test Coordinator

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # 4016

DATE: 25 Feb 93 NAME: BOCA GRANDE SHIFT: 1

CUMULATIVE TONS
Meter Finish: _____
Meter Start: _____
Total Tons: _____

SCALE TONS
Meter Finish: 49.5
Meter Start: 0
Total TOns: 49.5

HOUR METER
Meter Finish: _____
Meter Start: _____
Total Hours: 3.0

FUEL USE IN GALLONS
Tank Finish: 10,710
Tank Start: 12,240
Total Gallons: 1530

Production Time Start: _____ Production Time Finish: 1940

Gallons divided by Billable Tons = 30.9 Gallons Per Billable Ton
Billable Tons Divided by Hours = 16 Billable Tons Per Hour

Water Usage: 3000 Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2883.3
Recycled Tons: 0
Billable Tons: 49.5 2,937.8 BY WR

BILLABLE TONS BURNED TO DATE: ~~1932.7~~

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

David Hopkins Gary Collins
CUSTOMER

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR GARY COLLINS DATE 25 FEB 93
SHIFT _____ LOCATION BOCA GRANDE PROJECT# _____

ARRIVED ON THE SITE _____ LEFT THE SITE _____
END METER READING _____ END TONNAGE _____
START METER READING _____ START TONNAGE 0
TOTAL METER READING _____ TOTAL TONNAGE _____
TOTAL GAS USED _____ REJECT/REBURN _____

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS _____

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @ _____ Finish Calibration: @ _____
SCALE COUNT READING _____ WEIGH BELT % _____
Started Burners @ 1000 HRS Shut Down Burners @ _____
Shut Rig Down @ _____ Production Hr. _____

STARTED FEED	STOPPED FEED	REMARKS
		1834 TO 1954
		Run #1 STACK TEST
	1940 HRS	

BILLABLE TONS -- HOURS = _____ TONS PER HOUR

TONS PER HOUR -- CU. FT. _____ GALLONS PER TON

COMMENTS: WATER START 779900
STACK TEST.

OPERATOR'S SIGNATURE Gary Collins

D E ENVIRONMENTAL INC. PRODUCTION REPORT

UNIT #_____ DATE 25 FEB 93

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

HOUR	CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
0100										
0200										
0300										
0400										
0500										
0600										
0700										
0800		Warm up & test.								
0900		Waiting on STACK TEST CO								
1000		TO GET STARTED.								
1100										
1200										
1300										
1400										
1500										
1600										
1700										
1800	0	5%	1663	404	50%	323	6½"	782		35.0
1900	0	2%	1714	427	50%	324	6"	775	57	40.0
2000	0	3%	1631	340	50%	325	9½"	781		44.
2100	0	2%	1674	265	50%	301	13"	730		48.
2200										49.
2300										
2400										

1945

1915

1930

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

02/25/93	18:25:00	. 8	423	694	281	1687	5.8	11	15.8	F
02/25/93	18:26:00	. 7	417	720	283	1696	5.7	12	20.8	F
02/25/93	18:27:00	. 6	410	738	283	1718	5.3	13	22.0	F
02/25/93	18:28:00	. 4	413	752	284	1738	5.1	14	18.2	F
02/25/93	18:28:49	Channel no. 7	PV=	425	A2=	360	Set	CALIBRATION of		
02/25/93	18:28:52	Channel no. 7	PV=	OPEN	A1=	-999	Set	CEMS PRIOR TO		
02/25/93	18:29:00	. 6	415	762	284	1600	9.4	TEST. OPENA	18.0	F
02/25/93	18:29:41	Channel no. 7	PV=	536	A1=	-999	Cleared			
02/25/93	18:29:47	Channel no. 7	PV=	340	A2=	360	Cleared			
02/25/93	18:30:00	. 6	412	767	285	1705	3.9	148	18.3	F
02/25/93	18:31:00	. 5	408	768	285	1718	5.3	35	19.3	F
02/25/93	18:31:14	Channel no. 7	PV=	398	A2=	360	Set			
02/25/93	18:31:17	Channel no. 7	PV=	OPEN	A1=	-999	Set			
02/25/93	18:32:00	. 3	415	766	285	1449	12.7	OPENA	16.2	F
02/25/93	18:33:00	. 4	420	762	285	1375	7.6	OPENA	15.1	F
02/25/93	18:33:16	Channel no. 7	PV=	536	A1=	-999	Cleared			
02/25/93	18:33:29	Channel no. 7	PV=	352	A2=	360	Cleared			
— START TEST Run #1										
02/25/93	18:34:00	. 5	428	755	285	1625	3.8	221	19.2	F
02/25/93	18:35:00	. 5	428	751	285	1670	5.9	133	22.4	F
02/25/93	18:36:00	. 6	426	751	285	1632	6.5	90	19.3	F
02/25/93	18:37:00	. 6	420	753	286	1623	6.2	65	9.9	F
02/25/93	18:38:00	. 5	422	757	286	1638	5.9	50	21.3	F
02/25/93	18:39:00	. 5	424	760	286	1648	5.9	40	21.2	F
02/25/93	18:40:00	. 5	413	761	287	1656	5.9	34	22.9	F
02/25/93	18:41:00	. 4	410	765	287	1660	5.9	29	20.1	F
02/25/93	18:42:00	. 2	409	768	286	1667	5.8	26	18.7	F
02/25/93	18:43:00	- . 1	408	770	286	1676	5.7	23	18.0	F
02/25/93	18:44:00	- . 1	415	770	286	1674	5.9	21	15.8	F
02/25/93	18:45:00	. 2	411	770	286	1671	5.9	20	19.6	F
02/25/93	18:46:00	. 2	416	770	286	1668	6.0	19	17.8	F
02/25/93	18:47:00	. 2	416	771	285	1664	6.1	17	17.3	F
02/25/93	18:48:00	. 1	410	771	286	1661	6.1	16	21.9	F

02/25/93	18:50:00		.	2	411	765	286	1657	6.0	15	18.1	F
02/25/93	18:51:00		.	0	413	760	286	1655	6.0	14	20.8	F
02/25/93	18:52:00		.	0	407	755	286	1656	6.1	13	20.8	F
02/25/93	18:53:00		.	1	412	747	285	1655	6.1	13	21.1	F
02/25/93	18:54:00		.	0	415	740	285	1654	6.2	12	21.4	F
02/25/93	18:55:00		.	1	415	738	285	1654	6.1	12	18.1	F
02/25/93	18:56:00		.	3	413	741	285	1654	6.1	12	22.4	F
02/25/93	18:57:00		.	1	413	745	286	1649	6.0	12	17.8	F
02/25/93	18:58:00		.	0	395	746	287	1646	5.7	12	19.7	F
02/25/93	18:59:00	-	.	1	366	740	288	1649	5.5	12	17.5	F
02/25/93	19:00:00		.	0	353	717	287	1613	6.9	13	18.5	F
02/25/93	19:01:00		.	2	375	675	285	1556	7.7	27	15.6	F
02/25/93	19:02:00	-	.	2	404	642	283	1570	7.5	13	15.2	F
02/25/93	19:03:00	-	.	1	422	643	284	1628	6.8	10	15.8	F
02/25/93	19:04:00	-	.	2	436	664	284	1667	6.6	9	18.0	F
02/25/93	19:05:00		.	5	433	693	284	1677	6.6	9	19.0	F
02/25/93	19:06:00		.	1	432	721	285	1683	6.6	9	13.9	F
02/25/93	19:07:00		.	1	435	750	286	1711	5.8	10	21.0	F
02/25/93	19:08:00		.	1	440	783	287	1700	6.2	10	19.0	F
02/25/93	19:09:00		.	1	442	810	288	1692	6.2	10	16.9	F
02/25/93	19:10:00		.	0	442	826	289	1694	6.0	11	20.2	F
02/25/93	19:11:00		.	0	437	833	290	1698	6.0	11	19.6	F
02/25/93	19:12:00	-	.	2	430	836	291	1692	5.9	11	21.1	F
02/25/93	19:13:00	-	.	1	424	834	290	1659	6.5	11	22.1	F
02/25/93	19:14:00	-	.	2	415	827	290	1641	6.5	11	21.0	F
02/25/93	19:15:00	-	.	1	407	816	289	1617	6.7	11	20.1	F
02/25/93	19:16:00		.	0	396	804	288	1591	7.1	12	23.2	F
02/25/93	19:17:00	-	.	2	381	792	286	1571	7.3	13	20.2	F
02/25/93	19:18:00	-	.	1	372	780	285	1613	6.4	11	19.0	F
02/25/93	19:19:00	-	.	1	375	767	284	1671	6.1	11	17.3	F
02/25/93	19:20:00	-	.	3	367	754	283	1705	5.8	11	19.6	F
02/25/93	19:21:00	-	.	3	355	743	282	1701	5.9	10	18.0	F

02/25/93	19:23:00		.4	330	708	280	705	6.5	10	16.7	F
02/25/93	19:24:00	-	.3	315	676	277	1715	6.6	10	15.4	F
02/25/93	19:25:00	-	.3	312	641	274	1707	7.2	9	13.7	F
02/25/93	19:26:00	-	.2	313	633	272	1688	7.6	9	18.8	F
02/25/93	19:27:00	-	.3	309	650	269	1688	7.4	10	19.2	F
02/25/93	19:28:00	-	.3	302	676	268	1724	6.6	11	13.0	F
02/25/93	19:29:00	-	.2	303	697	266	1725	6.9	11	13.4	F
02/25/93	19:30:00	-	.2	311	707	265	1709	7.1	12	19.1	F
02/25/93	19:31:00	-	.2	309	711	263	1695	7.2	13	21.2	F
02/25/93	19:32:00	-	.2	302	714	262	1677	7.4	13	20.4	F
02/25/93	19:33:00	-	.2	303	716	260	1659	7.6	14	19.6	F
02/25/93	19:34:00		.1	305	718	257	1628	7.8	14	19.6	F
	- END OF TEST #1										
02/25/93	19:35:00	-	.1	296	720	256	1584	8.4	17	22.1	F
02/25/93	19:36:00		.0	289	721	254	1561	8.2	16	18.8	F
02/25/93	19:37:00	-	.1	292	718	253	1551	8.2	15	1.5	F
02/25/93	19:38:00	-	.1	312	713	253	1548	8.0	15	1.2	F
02/25/93	19:39:00		.0	337	706	254	1544	8.0	15	1.2	F
02/25/93	19:40:00		.2	307	704	253	1526	8.3	17	1.2	F
02/25/93	19:41:00		.4	293	716	249	1490	10.0	27	.8	F
02/25/93	19:42:00		.4	270	741	245	1482	10.9	16	1.0	F
02/25/93	19:43:00		.2	237	759	242	1494	11.6	10	1.0	F
02/25/93	19:44:00		.4	225	762	238	1342	19.2	183	1.8	F
02/25/93	19:45:00		.6	211	751	236	1199	19.5	110	.7	F
02/25/93	19:46:00		.6	204	732	234	1084	19.5	85	.7	F
02/25/93	19:47:00		.6	197	711	231	991	19.5	84	1.0	F
02/25/93	19:48:00		.7	198	690	228	913	19.5	67	1.0	F
02/25/93	19:49:00		.12	185	668	226	847	19.5	55	1.0	F
02/25/93	19:50:00		.12	177	644	223	789	19.5	39	.7	F
02/25/93	19:51:00		.12	178	618	219	739	19.5	29	.8	F
02/25/93	19:52:00		.25	181	592	217	695	19.5	23	1.0	F
02/25/93	19:53:00		.25	179	565	213	656	19.5	17	1.2	F
02/25/93	19:54:00		.26	174	538	210	621	19.5	13	.7	F

D.R.E. ENVIRONMENTAL, INC.

DAILY PRODUCTION REPORT TIS
JOB # 4015

DATE: 26 FEB 93 NAME: BOCA GRANDE SHIFT: 1

CUMULATIVE TONS
Meter Finish: _____
Meter Start: _____
Total Tons: _____

SCALE TONS
Meter Finish: 74.5
Meter Start: 0
Total TOns: 74.5

HOUR METER
Meter Finish: _____
Meter Start: _____
Total Hours: 4.66

FUEL USE IN GALLONS
Tank Finish: 11,781
Tank Start: 10,710 + 2700
Total Gallons: 1629

Production Time Start: 0750 Production Time Finish: 1230

Gallons divided by Billable Tons = 21.8 Gallons Per Billable Ton
Billable Tons Divided by Hours = 16 Billable Tons Per Hour

Water Usage: _____ Gallons Diesel Fuel Used: _____

RECYCLE AND BILLABLE TONNAGE
Cumulative Tons: 2932.8

Recycled Tons: 0

Billable Tons: 74.5

BILLABLE TONS BURNED TO DATE: ~~3007.3~~ 3,012.3 BB WR

LABOR COSTS
Number of employees: _____ Total Hours: _____
Regular Hours: _____ Overtime Hours: _____

I HEREBY CERTIFY THE ABOVE TONNAGES ARE CORRECT

T.U.S. Hopkins — Gary Collins

CUSTOMER

D.R.E. ENVIRONMENTAL, INC.

DAILY OPERATING LOG
JOB # 4015

OPERATOR_____ DATE 16 FEB 93
SHIFT_____ LOCATION Boca Grande PROJECT#_____

ARRIVED ON THE SITE_____ LEFT THE SITE_____
END METER READING_____ END TONNAGE 745
START METER READING_____ START TONNAGE 0
TOTAL METER READING_____ TOTAL TONNAGE 745
TOTAL GAS USED _____ REJECT/REBURN 0

(Total + 00 X 7.78 = CU. FT.) BILLABLE TONS 74.5

START WEIGH BELT FOR CALIBRATION @ _____
Start Calibration @_____ Finish Calibration: @_____
SCALE COUNT READING 15810 WEIGH BELT %_____
Started Burners @ 0720 Shut Down Burners @_____
Shut Rig Down @_____ Production Hr. 4.66

STARTED FEED	STOPPED FEED	REMARKS
0750	1230	RAIN COOLED BAGHOUSE
		STOPPED FEED TO REHEAT
		BETWEEN TESTS
		LOST BOTH DRUM EXIT
		AND BAGHOUSE EXIT THERMO-
		CUPLES TAKING OUT PRIMARY
		BURNER AND I.D. FAN.

BILLABLE TONS -- HOURS = 16.0 TONS PER HOUR

TONS PER HOUR -- CU. FT. 21,87 GALLONS PER TON

COMMENTS: WATER START 781900
RAIN! 1108 Hrs
FINISHED TESTING 1210 Hrs 1ST START 0908 FINISH 1020 Hrs
2ND START 1100 Hrs FINISH 1210 Hrs
Maintenance planned for Saturday - NW Burner

OPERATOR'S SIGNATURE [signature]

T.E ENVIRONMENTAL INC. PRODUCTION REPORT

UNIT #_____

BEST AVAILABLE COPY

DATE 26 FEB 93

SHIFT____ JOB #____ LOCATION Boca Grande OPERATOR_____

	HOUR	PPM CO	O2 CODE	SCC % OPEN	SCC TEMP	PTU TEMP	PTU % OPEN	B.H. TEMP	B.H. PRESS	SOIL TEMP	TONS PER HR	
215 HRS	0100	30	O 5.9	2%	1773	321	50%	259	7"	725		69.0
230 HRS	0200	0		2%	1751	440	10%	254	9"	745		71.6
	0300											74.3
	0400											
	0500											
	0600											
	0700											
	0800	0		2%	1860	43	40%	298	3½"	851		2.8
0815	0900	11	O 6.8%	5%	1563	388	40%	305	4½"	780	"	5.7
0830	1000	17	O 7.2	5%	1671	388	40%	308	4½"	776		10.1
0845	1100	18	O 7.7	4%	1648	376	42%	306	7"	714		14.1
0900	1200	22	O 6.4	3%	1650	400	40%	311	5"	766	18.1	18.1
0915	1300	26	O 6.6	3%	1696	383	40%	310	4½"	701		22.1
0930 HRS	1400	0		3%	1699	399	40%	318	4"	764		26.6
0945	1500	28	O 4.9	3%	1738	390	40%	312	3"	710		30.1
1000 HRS	1600	19	O 5.9	3%	1635	360	40%	302	3"	619	17.1	35.1
1015 HRS	1700	13	O 6.8	4%	1560	346	42%	291	3½"	622		38.1
1030 HRS	1800	15	O 6.7	4%	1663	361	50%	285	6"	700		42.1
1045	1900	20	O 5.9	4%	1729	376	50%	289	6½"	765		46.1
1100 HRS	2000	23	O 6.1	3%	1712	367	50%	292	7½"	760	15.9	51.1
1115 HRS	2100	14	O 6.5	3%	1652	404	50%	298	6"	787		54.1
1130 HRS	2200	23	O 5.8	3%	1756	386	50%	309	6½"	963		58.1
1145 HRS	2300	29	O 6.4	1%	1731	334	50%	295	6"	801		62.1
1200 HRS	2400	26	O 6.3	2%	1778	334	50%	272	6"	941	14.4	65.5

Codes:
O=Operator
R=Repairs
S=Standby
W=Weather

Fuel_____
Ending_____
Start_____
Total_____

Electric/Diesel
Ending_____
Start_____
Total_____

Tonnage_____
Reject_____
Billable_____
Total_____

02/26/93	07:04:48	Channel no.	7	PV=	370	A1=	-999	Cleared		
02/26/93	07:04:48	Channel no.	7	PV=	370	A2=	360	Set		
02/26/93	07:04:49	Channel no.	7	PV=	331	A2=	360	Cleared		
02/26/93	07:05:00	- . 2	62	62	66	70	28.6	169	.6	F
02/26/93	07:06:00	- . 2	62	62	66	70	26.0	52	.6	F
02/26/93	07:07:00	- . 2	62	62	66	70	23.3	29	.6	F
02/26/93	07:28:00	. 7	230	64	76	72	18.5	30	.8	F
02/26/93	07:29:00	. 6	247	65	83	72	17.6	51	.9	F
02/26/93	07:30:00	. 7	274	67	89	84	16.0	340	1.0	F
02/26/93	07:31:00	. 6	296	71	93	108	15.9	313	1.2	F
02/26/93	07:32:00	.10	315	76	96	141	16.0	280	1.2	F
02/26/93	07:33:00	. 9	331	81	97	186	16.0	229	1.2	F
02/26/93	07:34:00	.10	332	87	103	297	13.5	84	19.6	F
02/26/93	07:35:00	. 9	344	92	108	552	12.3	34	19.6	F
02/26/93	07:36:00	. 9	351	96	113	869	12.1	28	19.6	F
02/26/93	07:37:00	.10	371	100	118	1122	12.2	27	19.6	F
02/26/93	07:38:00	.11	386	103	124	1292	13.9	8	19.6	F
02/26/93	07:39:00	.10	407	105	130	1401	11.9	6	19.6	F
02/26/93	07:40:00	.10	411	107	137	1465	16.4	9	19.6	F
02/26/93	07:41:00	.21	416	108	144	1500	13.6	8	19.6	F
02/26/93	07:42:00	.19	427	108	151	1507	12.6	8	19.6	F
02/26/93	07:43:00	.18	443	108	158	1514	12.6	11	19.6	F
02/26/93	07:44:00	.18	453	108	165	1524	12.5	12	19.6	F
02/26/93	07:45:00	.17	464	107	172	1536	12.4	12	19.6	F
02/26/93	07:46:00	.25	470	106	180	1549	12.3	13	19.6	F
02/26/93	07:47:00	.30	479	105	187	1545	12.7	13	.8	F

BEST AVAILABLE COPY

		DRAFT	PTU	SOIL TEMP	~~SOIL~~ B.H.	AFTER BURNER	O_2	CO	T.P.H.	
[illegible]	07:49:00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
02/26/93	07:50:00	.21	417	120	208	1544	11.7	10	1.9	F
02/26/93	07:51:00	.32	479	120	211	1554	10.9	14	.2	F
02/26/93	07:52:00	.31	480	101	202	1726	[illegible]	[illegible]	[illegible]	F
[illegible]	07:53:00	.29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	F
[illegible]	07:54:00	.27	481	[illegible]	214	[illegible]	[illegible]	[illegible]	[illegible]	F
[illegible]	07:55:00	.29	484	[illegible]	209	1392	12.4	[illegible]	[illegible]	F
02/26/93	07:56:00	.27	487	[illegible]	245	1414	[illegible]	[illegible]	[illegible]	F
START FEED										
02/26/93	07:57:00	.24	414	144	249	1402	11.8	11	[illegible]	F
02/26/93	07:58:00	.12	391	186	251	1724	10.4	17	17.1	F
02/26/93	07:59:00	.11	431	157	255	[illegible]	7.0	17	21.4	F
02/26/93	08:00:00	.1	420	105	256	1379	7.4	23	22.1	F
02/26/93	08:01:00	.8	420	722	260	1321	7.2	30	17.2	F
02/26/93	08:02:00	.7	405	414	261	1840	4.7	47	22.0	F
02/26/93	08:03:00	.4	422	784	262	1867	4.2	49	20.1	F
02/26/93	08:04:00	.3	419	787	264	1903	3.6	54	17.7	F
02/26/93	08:05:00	.2	424	785	265	1900	3.4	58	14.9	F
02/26/93	08:06:00	.2	416	817	265	1944	3.1	60	17.7	F
02/26/93	08:07:00	.1	417	826	266	1940	3.2	61	19.4	F
02/26/93	08:08:00	.0	420	822	267	1905	3.2	61	8.3	F
02/26/93	08:09:00	-.1	425	805	267	1931	4.0	60	11.7	F
02/26/93	08:10:00	-.2	411	786	267	1910	3.6	50	14.4	F
02/26/93	08:11:00	-.1	417	771	269	1872	4.0	46	17.8	F
02/26/93	08:12:00	-.2	419	755	269	1825	4.4	47	14.1	F
02/26/93	08:13:00	.1	420	741	219	1711	5.5	45	[illegible]	F
02/26/93	08:14:00	.2	405	730	269	1525	10.5	117	[illegible]	F
02/26/93	08:15:00	-.1	393	720	217	1402	12.0	308	17.3	F
02/26/93	08:16:00	.2	406	703	269	1473	8.7	207	[illegible]	F
02/26/93	08:17:00	-.1	422	748	269	1514	9.1	7	[illegible]	F
02/26/93	08:18:00	.4	388	754	270	1509	9.2	[illegible]	[illegible]	F
02/26/93	08:19:00	.5	397	764	270	1554	9.2	[illegible]	19.4	F
02/26/93	08:20:00	.4	397	772	270	1563	9.2	11	17.0	F

[illegible]	09:22:00	[illegible]	391	732	271	[illegible]	8.0	[illegible]	F
[illegible]	09:23:00	[illegible]	379	703	271	1590	8.4	11	F
02/26/93	09:24:00	.4	390	709	271	1595	7.3	12	F
02/26/93	09:25:00	.4	389	790	271	1620	8.4	12	F
[illegible]	09:26:00	.12	389	733	271	[illegible]	8.5	12	F
[illegible]	09:27:00	.11	390	730	271	[illegible]	8.1	12	F
[illegible]	09:28:00	.7	391	725	272	1617	7.9	12	F
[illegible]	09:29:00	.9	393	732	272	[illegible]	7.9	11	F
[illegible]	09:30:00	.7	400	752	272	[illegible]	7.9	11	F
[illegible]	09:31:00	.5	404	770	272	1641	7.9	13	F
02/26/93	09:32:00	.7	398	760	272	1651	7.9	12	F
[illegible]	09:33:00	.6	398	775	273	[illegible]	7.9	13	F
02/26/93	09:34:00	.5	392	752	273	[illegible]	7.2	17	F
[illegible]	09:35:00	.4	395	762	270	[illegible]	7.2	17	F
02/26/93	09:36:00	.4	401	751	274	1666	7.2	17	F
02/26/93	09:37:00	.9	392	739	273	1659	7.2	17	F
02/26/93	09:38:00	.6	394	729	273	1653	7.5	17	F
02/26/93	09:39:00	.0	387	719	273	1648	7.2	17	F
02/26/93	09:40:00	.2	384	706	272	1634	7.8	18	F
02/26/93	09:41:00	.5	379	697	272	1626	7.7	18	F
02/26/93	09:42:00	.5	381	693	271	1615	8.1	18	F
02/26/93	09:43:00	.4	387	690	270	1612	8.0	17	F
02/26/93	09:44:00	.2	380	682	272	1607	7.9	17	F
[illegible]	09:45:00	.3	377	427	269	1598	7.9	18	F
02/26/93	09:46:00	.1	382	682	268	1622	7.8	18	F
[illegible]	09:47:00	.4	384	697	268	1621	7.8	18	F
02/26/93	09:48:00	.1	378	697	268	1640	7.7	18	F
02/26/93	09:49:00	.4	384	708	268	1645	7.7	18	F
02/26/93	09:50:00	.4	385	705	268	1651	7.7	18	F
02/26/93	09:51:00	.4	382	707	268	1650	7.8	19	F
02/26/93	09:52:00	.3	384	714	268	1656	7.7	19	F
02/26/93	09:53:00	.3	384	720	267	1657	7.6	19	F

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[illegible]	08:55:00	.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	F
02/26/93	08:56:00	.11	395	741	269	1662	7.5	20	17.4	F
02/26/93	08:57:00	.9	402	747	270	1570	7.5	20	16.9	F
02/26/93	08:58:00	.9	407	752	271	1692	6.9	20	22.1	F
02/26/93	08:59:00	.8	412	756	271	1610	6.9	20	12.9	F
02/26/93	09:00:00	.7	411	757	270	1670	6.7	21	12.1	F
02/26/93	09:01:00	.7	412	756	277	1610	6.6	21	16.9	F
02/26/93	09:02:00	.6	407	755	274	1670	6.5	22	10.8	F
02/26/93	09:03:00	.5	400	770	279	1644	6.5	22	17.2	F
02/26/93	09:04:00	.4	413	750	277	1647	6.4	22	15.7	F
02/26/93	09:05:00	.4	415	744	275	1641	6.0	20	14.4	F
02/26/93	09:06:00	.1	411	734	276	1440	1.4	20	12.8	F
02/26/93	09:07:00	.3	417	711	276	1640	6.4	23	13.7	F
02/26/93	09:08:00	.2	420	724	275	1635	6.4	24	14.0	F
0908 STARTED TEST #2										
02/26/93	09:09:00	.2	395	725	290	1404	6.2	24	22.9	F
02/26/93	09:10:00	.0	365	726	291	1627	6.2	24	22.7	F
02/26/93	09:11:00	.2	351	723	291	1612	6.8	24	24.5	F
02/26/93	09:12:00	.2	342	702	290	1585	7.6	25	21.2	F
02/26/93	09:13:00	.3	344	650	277	1540	4.6	26	24.5	F
02/26/93	09:14:00	.12	362	644	275	1669	7.0	25	13.0	F
02/26/93	09:15:00	.6	369	651	275	1584	7.4	24	17.0	F
02/26/93	09:16:00	.9	378	669	275	1716	6.5	24	20.3	F
02/26/93	09:17:00	.6	384	682	275	1719	6.4	25	17.4	F
02/26/93	09:18:00	.4	395	687	276	1690	6.6	26	15.2	F
02/26/93	09:19:00	.5	398	697	276	1671	6.6	26	[illegible]	F
02/26/93	09:20:00	.5	406	687	277	1647	6.6	22	11.7	F
02/26/93	09:21:00	.7	409	686	274	1662	6.6	15	17.2	F
02/26/93	09:22:00	.7	404	697	278	1664	6.4	17	21.1	F
02/26/93	09:23:00	.7	411	688	279	1674	6.2	17	2.2	F
02/26/93	09:24:00	.6	407	691	279	1661	7.5	8	11.3	F
02/26/93	09:25:00	.6	405	694	280	1636	7.5	9	16.9	F
02/26/93	09:26:00	.4	414	702	281	1663	8.2	9	14.6	F

[illegible]	09:38:00	.8	410	713	292	1694	6.1	19	21.7	F
[illegible]	09:39:00	.6	421	719	291	1695	6.1	22	18.7	F
02/26/93	09:40:00	.9	411	722	291	1693	6.2	24	21.3	F
02/26/93	09:41:00	.3	413	715	290	1694	6.0	25	20.7	F
02/26/93	09:42:00	.3	407	721	291	1695	6.2	24	21.3	F
02/26/93	09:43:00	.7	407	719	287	1679	6.2	21	17.2	F
02/26/93	09:44:00	.7	410	713	287	1696	6.1	24	20.2	F
02/26/93	09:45:00	.7	424	717	279	1696	6.2	21	20.9	F
02/26/93	09:46:00	.9	407	723	281	1695	6.1	24	21.7	F
02/26/93	09:47:00	.7	407	717	284	1711	6.2	22	24.2	F
02/26/93	09:48:00	.9	399	726	284	1695	6.2	24	17.2	F
02/26/93	09:49:00	.11	392	730	284	1694	6.2	24	19.4	F
02/26/93	09:50:00	.10	401	717	283	1727	6.4	24	17.5	F
02/26/93	09:51:00	.7	403	721	284	1715	6.2	25	21.2	F
02/26/93	09:42:00	.8	402	703	283	1775	6.1	27	19.9	F
02/26/93	09:43:00	.8	406	721	283	1776	6.3	29	20.5	F
02/26/93	09:44:00	.10	405	697	282	1779	6.4	29	16.8	F
02/26/93	09:45:00	.7	406	695	283	1767	6.2	29	19.2	F
02/26/93	09:46:00	.9	404	693	282	1753	6.7	27	20.6	F
02/26/93	09:47:00	.6	405	691	281	1745	6.9	28	19.5	F
02/26/93	09:48:00	.7	406	695	281	1763	6.2	29	20.5	F
02/26/93	09:49:00	.6	399	696	281	1742	6.9	29	18.5	F
02/26/93	09:50:00	.9	402	695	280	1725	6.9	29	18.9	F
02/26/93	09:51:00	.9	394	697	280	1734	6.9	29	17.7	F
02/26/93	09:52:00	.11	396	695	279	1736	6.8	29	19.7	F
02/26/93	09:53:00	.5	391	699	278	1724	6.9	28	19.4	F
02/26/93	09:54:00	.9	392	699	277	1738	6.9	32	19.4	F
02/26/93	09:55:00	.9	398	694	277	1748	6.9	32	19.7	F
02/26/93	09:56:00	.8	392	698	277	1748	6.9	31	22.5	F
02/26/93	09:57:00	.8	394	674	278	1756	6.8	32	20.1	F
02/26/93	09:58:00	.9	392	689	276	1758	6.8	32	21.6	F
02/26/93	09:59:00	.6	385	661	276	1713	6.1	32	21.7	F

[illegible]	10:21:00	.10	381	645	273	1569	5.[illegible]	21	17.3	F
02/26/93	10:22:00	.9	372	634	272	1558	5.7	23	20.1	F
02/26/93	10:23:00	.9	370	625	272	1551	5.9	22	19.2	F
02/26/93	10:24:00	.3	369	616	271	1542	5.9	19	18.2	F
02/26/93	10:25:00	.7	366	629	272	1573	5.9	19	21.3	F
02/26/93	10:26:00	.9	367	627	274	1585	5.7	17	22.5	F
02/26/93	10:27:00	.9	361	620	269	1522	5.7	17	21.1	F
02/26/93	10:28:00	.3	367	627	267	1561	5.9	19	17.9	F
02/26/93	10:29:00	.1	364	615	264	1514	5.9	19	17.4	F
02/26/93	10:30:00	.7	357	597	264	1483	5.9	19	15.3	F
02/26/93	10:31:00	.9	353	612	261	1498	5.7	19	17.4	F
02/26/93	10:32:00	.9	361	614	263	1501	5.7	19	18.9	F
02/26/93	10:33:00	.9	357	611	264	1512	5.7	17	20.1	F
02/26/93	10:34:00	.5	362	611	263	1471	5.6	18	22.8	F
02/26/93	10:35:00	.9	358	613	262	1529	5.7	15	19.9	F
02/26/93	10:36:00	.9	359	608	261	1534	5.7	15	21.2	F
02/26/93	10:37:00	.8	358	609	259	1558	7.0	16	21.7	F
02/26/93	10:38:00	.9	356	609	259	1554	6.8	16	17.7	F
02/26/93	10:39:00	.4	354	612	258	1556	6.8	13	17.4	F
02/26/93	10:40:00	.1	361	614	257	1556	6.8	13	16.3	F
— End Test #2										
02/26/93	10:41:00	.1	360	616	256	1550	6.8	13	12.2	F
02/26/93	10:42:00	.3	362	618	256	1579	6.5	13	16.5	F
02/26/93	10:43:00	.1	367	620	255	1621	5.9	13	14.3	F
02/26/93	10:44:00	.2	365	620	255	1580	5.9	13	16.7	F
02/26/93	10:45:00	.4	366	626	254	1591	5.8	14	18.5	F
02/26/93	10:46:00	.4	358	630	253	1580	6.2	15	17.7	F
02/26/93	10:47:00	.3	360	639	252	1572	6.2	14	14.7	F
02/26/93	10:48:00	.2	362	645	251	1587	5.9	15	16.7	F
02/26/93	10:49:00	.3	363	641	251	1592	5.7	15	18.0	F
02/26/93	10:50:00	.4	370	670	252	1670	6.7	15	18.0	F
02/26/93	10:51:00	.2	371	677	253	1651	6.7	15	16.0	F
02/26/93	10:52:00	.4	376	685	252	1644	6.8	15	19.1	F

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]/93	10:34:00	.1	373	699	252	1663	6.2	19	18.9	F
[illegible]/93	10:35:00	.2	379	704	250	1687	6.1	18	18.3	F
02/26/93	10:36:00	.2	376	708	250	1701	6.0	16	18.1	F
02/26/93	10:37:00	.1	380	708	250	1713	5.9	17	18.7	F
02/26/93	10:38:00	.2	378	707	250	1717	5.9	17	17.4	F
[illegible]/93	10:39:20	.3	381	704	252	1721	5.8	17	20.1	F
02/26/93	10:40:00	.3	380	701	251	1725	5.7	17	17.4	F
[illegible]/93	10:41:00	.4	379	709	251	1723	5.7	17	17.4	F
02/26/93	10:42:00	.4	382	700	250	1721	5.8	19	18.9	F
02/26/93	10:43:00	.3	383	700	253	1711	5.7	19	18.7	F
02/26/93	10:44:00	.3	382	714	252	1724	5.7	19	18.2	F
02/26/93	10:45:00	.3	385	721	252	1724	5.7	19	17.8	F
02/26/93	10:46:00	.3	382	720	251	1724	5.8	19	18.4	F
02/26/93	10:47:00	.3	383	725	251	1712	5.7	19	19.5	F
02/26/93	10:48:00	.3	386	741	251	1725	5.8	20	20.7	F
02/26/93	10:49:00	.2	387	748	251	1727	5.8	20	19.7	F
02/26/93	10:50:00	.2	386	755	251	1726	5.9	20	22.2	F
02/26/93	10:51:00	.4	382	761	251	1727	5.9	20	19.4	F
02/26/93	10:52:00	.5	388	765	252	1723	5.8	20	19.8	F
02/26/93	10:53:00	.6	386	768	252	1715	5.8	20	19.5	F
02/26/93	10:54:00	.5	383	768	253	1729	5.8	20	21.8	F
02/26/93	10:55:00	.4	378	766	252	1733	5.8	21	20.0	F
02/26/93	10:56:00	.3	376	763	253	1736	5.9	21	18.5	F
02/26/93	10:57:00	.5	373	759	252	1737	5.8	21	18.9	F
02/26/93	10:58:00	.3	366	754	251	1740	5.9	19	19.6	F
02/26/93	10:59:00	.2	365	752	252	1747	5.9	19	19.4	F
02/26/93	11:00:00	.2	368	749	252	1747	5.8	21	19.1	F
-START TEST #3										
02/26/93	11:01:00	.1	368	747	252	1739	6.0	22	17.7	F
02/26/93	11:02:00	.1	369	746	252	1729	5.9	22	18.7	F
02/26/93	11:03:00	.2	368	749	252	1722	5.9	22	19.2	F
02/26/93	11:04:00	.1	371	743	252	1717	5.9	23	18.0	F
02/26/93	11:05:00	.2	369	740	252	1714	5.9	22	17.7	F

02/26/93	11:07:00	. 0	371	743	252	1709	6.1	23	15.9	F
02/26/93	11:08:00	. 0	377	749	252	1709	6.1	23	15.7	F
02/26/93	11:09:00	- . 1	368	758	251	1702	6.1	24	14.2	F
02/26/93	11:10:00	- . 1	374	764	254	1683	6.6	24	16.2	F
02/26/93	11:11:00	. 3	394	771	256	1640	7.1	23	18.8	F
02/26/93	11:12:00	. 2	374	750	257	1659	6.6	23	16.5	F
02/26/93	11:13:00	- . 2	373	790	260	1751	6.9	24	17.7	F
02/26/93	11:14:00	- . 1	394	789	261	1731	6.4	30	15.7	F
02/26/93	11:15:00	. 2	340	757	261	1737	5.2	33	16.5	F
02/26/93	11:16:00	. 6	390	714	258	1519	8.5	29	17.9	F
02/26/93	11:17:00	. 3	406	809	259	1512	9.5	88	16.2	F
02/26/93	11:18:00	. 4	417	692	260	1521	7.4	.171	16.2	F
02/26/93	11:19:00	. 7	422	722	261	1524	7.2	54	12.5	F
02/26/93	11:20:00	. 6	422	758	263	1638	6.7	21	15.0	F
02/26/93	11:21:00	. 5	426	793	264	1657	6.5	13	15.4	F
02/26/93	11:22:00	. 5	426	822	266	1674	6.5	13	16.0	F
02/26/93	11:23:00	. 4	424	844	267	1690	6.5	13	16.4	F
02/26/93	11:24:00	. 5	426	866	268	1700	6.2	14	16.8	F
02/26/93	11:25:00	. 4	424	890	270	1707	6.2	15	20.4	F
02/26/93	11:26:00	. 3	432	914	270	1713	6.2	16	21.1	F
02/26/93	11:27:00	. 4	425	935	271	1719	6.1	17	22.2	F
02/26/93	11:28:00	. 5	429	954	272	1730	6.1	17	23.3	F
02/26/93	11:29:00	. 5	429	964	273	1740	5.8	19	24.4	F
02/26/93	11:30:00	. 6	415	967	274	1733	6.1	20	20.7	F
02/26/93	11:31:00	. 6	409	964	274	1734	6.1	20	16.7	F
02/26/93	11:32:00	. 7	396	959	273	1740	5.9	21	25.0	F
02/26/93	11:33:00	.11	396	954	273	1749	5.9	22	21.8	F
02/26/93	11:34:00	. 9	386	950	272	1748	6.0	22	20.4	F
02/26/93	11:35:00	.10	405	946	272	1749	6.0	22	20.7	F
02/26/93	11:36:00	.12	400	944	272	1751	5.9	22	20.4	F
02/26/93	11:37:00	.12	397	933	271	1758	5.8	23	20.7	F
02/26/93	11:38:00	. 8	394	915	271	1755	5.8	23	19.4	F

02/26/93	11:40:00	.7	373	873	270	1758	6.5	25	21.4	F
02/26/93	11:41:00	.5	374	856	268	1760	6.6	25	17.5	F
02/26/93	11:41:00	.7	367	841	269	1768	6.5	25	20.6	F
02/26/93	11:43:00	.5	372	825	266	1768	6.6	25	18.9	F
02/26/93	11:44:00	.7	370	811	265	1751	6.1	27	18.7	F
02/26/93	11:45:00	.7	365	791	264	1747	6.1	25	18.3	F
02/26/93	11:46:00	.9	369	795	262	1699	6.5	25	21.0	F
02/26/93	11:47:00	.11	364	790	261	1727	6.4	25	19.5	F
02/26/93	11:48:00	.10	361	786	261	1721	6.5	25	19.4	F
02/26/93	11:49:00	.13	356	788	261	1712	6.7	27	16.6	F
02/26/93	11:50:00	.11	354	785	259	1718	6.8	29	18.5	F
02/26/93	11:51:00	.11	351	784	259	1727	6.8	27	23.3	F
02/26/93	11:52:00	.12	351	786	258	1671	7.1	28	18.3	F
02/26/93	11:53:00	.12	348	791	257	1670	7.4	26	15.3	F
02/26/93	11:54:00	.12	341	799	256	1612	7.7	25	12.1	F
02/26/93	11:55:00	.10	338	806	257	1594	7.8	25	17.3	F
02/26/93	11:56:00	.11	340	822	249	1579	7.9	24	12.9	F
02/26/93	11:57:00	.11	344	842	247	1571	8.1	24	15.0	F
02/26/93	11:58:00	.14	356	859	246	1590	7.8	24	14.4	F
02/26/93	11:59:00	.12	359	873	241	1602	7.7	24	12.9	F
02/26/93	12:00:00	.11	371	897	242	1641	6.8	24	18.6	F
02/26/93	12:01:00	.10	372	913	243	1635	6.5	26	28.9	F
02/26/93	12:02:00	.9	373	925	241	1732	7.0	26	17.4	F
02/26/93	12:03:00	.9	358	930	242	1741	6.9	24	16.6	F
02/26/93	12:04:00	.11	346	929	238	1761	6.1	23	17.7	F
02/26/93	12:05:00	.9	345	915	236	1751	5.9	25	19.9	F
02/26/93	12:06:00	.9	344	900	237	1751	6.2	26	19.1	F
02/26/93	12:07:00	.6	349	884	237	1752	6.0	27	20.0	F
02/26/93	12:08:00	.6	354	861	235	1762	5.9	22	19.1	F
02/26/93	12:09:00	.8	352	835	234	1754	6.1	29	21.3	F
02/26/93	12:10:00	.9	350	810	234	1757	6.0	27	17.8	F
02/26/93	12:11:00	.12	339	753	227	1777	4.1	23	17.3	F

BEST AVAILABLE COPY

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	212	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
02/26/93	12:14:00	.10	337	754	221	1776	6.4	29	10.7	F
02/26/93	12:15:00	.10	334	744	220	1774	7.1	30	10.7	F
02/26/93	12:16:00	.9	330	735	223	1771	6.4	[illegible]	[illegible]	F
02/26/93	12:17:00	.10	328	729	227	[illegible]	[illegible]	[illegible]	[illegible]	F
02/26/93	12:18:00	.11	332	720	227	1757	7.7	[illegible]	17.6	F
02/26/93	12:19:00	.11	330	715	[illegible]	[illegible]	[illegible]	[illegible]	15.9	F
02/26/93	12:20:00	.11	374	706	227	1774	4.7	[illegible]	12.9	F
02/26/93	12:21:00	.11	337	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18.5	F
02/26/93	12:22:00	.12	329	697	[illegible]	1765	6.4	33	17.7	F
02/26/93	12:23:00	.14	329	680	221	1701	7.1	32	16.5	F

1223 Hrs Test over Stopped Feed Test #3

02/26/93	12:24:00	.10	325	656	220	1628	7.7	30	14.4	F
02/26/93	12:25:00	.10	335	677	[illegible]	[illegible]	7.7	28	12.2	F
02/26/93	12:26:00	.15	332	690	217	1438	7.4	32	6.1	F
02/26/93	12:27:00	.12	352	694	217	1457	7.4	32	3.7	F
02/26/93	12:28:00	.13	376	701	216	1627	8.1	31	5.1	F
02/26/93	12:29:00	.14	346	715	215	1616	7.9	31	6.0	F
02/26/93	12:30:00	.6	322	736	212	1665	7.3	31	7.3	F
02/26/93	12:31:00	.7	357	768	219	1840	5.4	30	4.5	F
02/26/93	12:32:00	.8	372	795	212	1772	7.3	32	3.7	F
02/26/93	12:33:00	.8	402	802	210	1711	6.8	36	4.8	F
02/26/93	12:34:00	.8	422	794	209	1979	7.2	32	3.5	F
02/26/93	12:35:00	.10	426	771	209	1965	8.0	29	3.6	F
02/26/93	12:36:00	.11	440	758	209	1849	8.4	28	3.7	F
02/26/93	12:37:00	.12	454	748	211	1825	9.1	27	3.1	F
02/26/93	12:38:00	.13	462	740	211	1808	9.6	27	4.0	F
02/26/93	12:39:00	.12	470	709	213	1722	11.7	27	4.0	F
02/26/93	12:40:00	.10	469	716	217	1673	11.9	27	3.9	F