

Verification Report for Black Warrior Solid Waste Disposal Authority Coker, Alabama

Climate Action Reserve

September 2009

**Prepared by: First Environment, Inc.
91 Fulton Street
Boonton, New Jersey 07005**



1. Introduction

This report is provided to Black Warrior Solid Waste Disposal Authority (BWSWA) as a deliverable of the Climate Action Reserve's (CAR) project verification process. This report covers the verification of emission reductions from the capture and destruction of landfill gas (LFG) for the period of March 1, 2009 through June 30, 2009 at the Black Warrior Solid Waste Disposal Authority Landfill (the Project) in Coker, Alabama. First Environment, Inc. (First Environment) conducted the verification August 2009.

2. Objectives

The purpose of this verification was, through review of appropriate evidence, to establish that:

- the Project conforms to the requirements of the verification criteria discussed in Section 4 of this report; and
- the data reported are accurate, complete, consistent, transparent, and free of material error or omission.

3. Verification Scope

Specific scope metrics for the verification are outlined in the table below:

Geographic Boundary	Black Warrior Solid Waste Disposal Authority Landfill, Coker, Alabama
Greenhouse Gases Verified	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e) resulting from methane destruction
Reporting Period	March 1, 2009 through June 30, 2009
Data Sources	Metered Data and Emissions reduction calculations

4. Standards Used to Verify Emissions (Criteria)

The following table outlines the guidance and protocols used to conduct this verification:

Standard of Verification	Climate Action Reserve Landfill Project Reporting Protocol, Version 2.0, November 2008 (CAR Protocol)
Verification Process	Climate Action Reserve Landfill Verification Protocol, Version 2.0, November 2008
Level of Assurance	Reasonable assurance
Materiality	Misstatements greater than five percent of the emissions reductions assertion are considered material

5. Overview of the Verification Process

To review the Project's GHG information, the following verification process was used:

- conflict of interest review;

- selection of Audit Team;
- interaction with BWSWA's contact;
- development of the verification and sampling plan;
- review and evaluation of raw data and calculations for period under review;
- follow-up interaction with BWSWA's contact for corrective action or supplemental data as needed; and
- final statement and report development.

The verification process was utilized to gain an understanding of the Project's emission sources and reductions (including the risk for leakage), to evaluate and verify the collection and handling of data, the calculations that lead to the results, and the means for reporting the associated data and results.

Conflict of Interest Review

Prior to beginning any verification project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the Project. No potential conflicts were found for this Project. First Environment also received a determination of a low potential for conflict of interest from CAR prior to initiating verification activities.

Audit Team

First Environment's Audit Team consisted of the following individuals who were selected based on their verification experience as well as familiarity with landfill operations.

Lead Verifier - Michael Carim
Verifier - Ellen Reid
Internal Reviewer - Jay Wintergreen

Audit Kick-off

The verification audit was initiated with an exchange of emails between First Environment and the primary BWSWA contact, Ken Thrasher. The communication focused on confirming the scope and schedule and identifying the data required for the verification. A kickoff meeting was held on August 5, 2009.

Development of the Verification Plan

The team formally documented its verification plan as well as determined the data-sampling plan.

Site Visit

Michael Carim and Ellen Reid conducted a site visit on May 6, 2009 to assess the project's data management systems and interview personnel relevant to the project. Because First Environment was able to confirm during the kickoff meeting that changes to neither the project's LFG collection and destruction systems nor its data management systems occurred during this reporting period, a subsequent site visit was deemed unnecessary.

Emissions Reduction Data and Calculation Assessment

This assessment used information and insights gained during the previous steps to evaluate the collected data and the reported emissions reduction quantities, and identify if either contained material or immaterial misstatements.

Corrective Actions and Supplemental Information

The team requested supplemental information and requested corrective actions during the verification process. The corrective actions requested and the responses provided are summarized in Section 7.

Verification Reporting

Verification reporting, represented by this report, documents the verification process and identifies its findings and results. Verification reporting consists of this report for BWSWA and a verification statement and attestation to be submitted to the Climate Action Reserve.

6. Site's Conformance with Verification Criteria

Site Overview

The landfill, located at 3301 Landfill Drive in Corker, Alabama, is owned and operated by the BWSWA. The site originally opened in 1978 and was operated by a solid waste authority chartered by the City of Tuscaloosa. This entity was dissolved in 1994 and the BWSWA was established to upgrade environmental controls and operate the landfill. The site began accepting waste as a Subtitle D landfill in January 1994. The construction of lined cells began in 1996 and the first municipal solid waste went into the lined cells on January 26, 1997. The facility consists of approximately 60 acres of constructed landfill (seven cells) with 127.5 acres permitted. There are approximately 336 acres within the boundaries of the facility. At present, the site accepts primarily municipal solid waste, with smaller amounts of industrial and construction and demolition waste also deposited.

BWSWA began the installation of an active gas collection and combustion system in July 2008. First Environment reviewed design plans for the system dated 2008 to confirm that the project meets the CAR Protocol's criteria for start date after January 1, 2001. The system—consisting of 43 vertical wells and one horizontal well, along with eight tie-ins to leachate cleanouts—came online on January 14, 2009. The collection system routes gas to a 14-inch header pipe at the southern end of the site. Gas passes through a knockout tank that removes condensates and moisture, and then through two blowers and finally to an open flare where it is combusted.

The landfill's design capacity is larger than 2.5 million megagrams and is therefore subject to NSPS regulations. Tier II testing in May 2006 showed non-methane organic compounds (NMOC) emission rate to be 13.06 megagrams per year, well below the 50 megagrams threshold that would mandate gas collection and control at the landfill. The summary from the Tier II test report, along with BWSWA's attestation of regulatory compliance, including local air and water quality rules, are provided in Attachments A and B.

BWSWA owns all environmental attributes associated with landfill gas destruction. An attestation of title is provided in Attachment C.

Data Collection and Monitoring Processes

The Audit Team discussed the following topics with site staff during the initial site visit in May 2009 and confirmed the information during this verification process:

- the data collection process; and
- internal documents and protocols that set guidelines for the data collection process.

Information gathered during these discussions was used to assess the Project's GHG information system and its controls for sources of potential errors and omissions.

Total landfill gas flow was monitored continuously by a Thermal Instruments ST-95 mass flow meter during the verification period. The meter standardizes flow readings to a pressure of one atmosphere and a temperature of 70°F. The flow meter is located downstream of the blowers and upstream of the flare, sufficiently placed to ensure laminar flow at the point of measurement. Proof of factory calibration of the flow meter during the current verification period is provided in Attachment D.

A Yokagowa data logger records gas flow rates continuously.¹ For each interval, a minimum and maximum flow rate is recorded; the two values are averaged to determine the flow rate during a given interval. The landfill manager, along with TTL, Inc. (TTL), a BWSWA contractor, is responsible for obtaining gas flow data from the Yokagowa instrument. They swap an external flash card from the data recorder with a blank one and download the previous week's gas flow data to spreadsheets. Flow data is archived electronically at the site and by TTL and CDG Engineers (CDG), another contractor is responsible for maintenance and other aspects of the project.

The site has a CAI continuous gas analyzer to monitor methane concentration of the landfill gas. For each interval, a minimum and maximum methane concentration is recorded; the two values are averaged to determine the methane concentration during a given interval. The landfill manager, along with TTL, is responsible for obtaining the methane concentration data from the CAI instrument. They change out the external flash card from the data recorder with a blank one and download the previous week's data to spreadsheets. The methane data is archived at the site and by TTL and CDG. However, the instrument was determined to be unreliable for the

¹ During the period from March 1st to approximately noon on March 12th, gas flow was recorded in four minute intervals; from approximately noon on March 12th to early afternoon on May 14th, flow was recorded in one minute intervals; from approximately early afternoon on May 14th to the end of the reporting period, flow was recorded in four minute intervals.

periods March 1, 2009 through March 28, 2009; April 19, 2009 through May 9, 2009; and May 17, 2009 through May 23, 2009, based on review of the data recorded and auto calibration results. The data logged by the CAI device is recorded and displayed in spreadsheets with gas flow data from the Yokagowa data logger, it is included in the scope of the verification for the timeframes not previously mentioned as unreliable.

TTL also takes weekly measurements of the methane content through a sampling port just downstream of the blowers where gas is pushed past the flow meter and into the flare, using a GEM-2000 hand held gas analyzer. TTL's procedure includes calibration of the device against a reference gas of known concentration prior to each use. The GEM-2000 and the Yokagowa flow meter are also sent to the manufacturer for calibration. The CAI instrument is set to auto calibrate on a daily basis.

For the purposes of emission reduction reporting, BWSWA used weekly measurements taken by TTL in its calculations for the weeks identified in the preceding paragraph where reading from the CAI device were determined to be unreliable. The CAI continuous gas analyzer data was used for the remainder of the verification period.

Two thermocouples are used to monitor the temperature within the flare shroud in order to detect flame presence and determine operating hours of the flare. The project's operating system has several alarms and an auto-dialer that alerts field personnel if an alarm is triggered. Alarms trigger if the flame temperature falls below 800°F or if the flame is extinguished and fails to relight after three attempts. The system automatically shuts down and gas is prevented from flowing to the flare if the flame remains extinguished.

There are two sources of project emissions identified within the project boundaries. Indirect emissions of CO₂ occur from purchased electricity used to power project equipment. Activity data is obtained from monthly utility invoices. Additionally, the site uses a propane tank to assist in igniting the flare should it become extinguished. The site archives propane purchase records in order to estimate project emissions from this source.

BWSWA also developed and implemented a project monitoring plan to track relevant project parameters and data sources. The final monitoring plan submitted during the verification process was found to fully comply with the requirements of the CAR protocol.

Emissions Reduction Calculation Assessment

As part of the emissions reduction calculation assessment, the Project's assumptions and calculations were reviewed. Because no pre-existing combustion devices existed at the site, per the CAR protocol, the baseline scenario is defined as the total release of LFG to the atmosphere.

Emission reduction calculations, provided in Attachment E, were reviewed to ensure accuracy in the formulas used and the raw data used as inputs. The formulas were tested to ensure they were consistent with the calculation methodology described in the CAR Protocol. In accordance with the protocol, a 10 percent discount is applied to the total quantity of methane destroyed during the periods the site employed weekly methane measurements in its calculations. A 96 percent destruction efficiency is assigned to the project's combustion device and applied accordingly in emission reduction calculations. Because the landfill does not have a synthetic

liner, a 10 percent discount is applied to the baseline scenario for bacterial oxidation of methane under the cap.

The amount of methane destroyed was calculated from metered data for landfill gas collected. As described in the previous section, continuously monitored gas flow data is downloaded from the Yokagawa data logger. Since the volume of gas flow metered by the Thermal Instruments flow meter is recorded at a temperature of 70°F and one atmosphere, the flow readings were adjusted to a standard temperature and pressure of 60°F and one atmosphere per the Protocol's requirement. The average flow rates for each interval are multiplied for the length of the interval and then summed to determine total volumetric gas flow on a daily basis. This volume is converted to a mass flow using the density of methane at 60°F and one atmosphere of pressure.

Where the continuous gas analyzer is used for methane data, emission reductions are calculated in daily intervals. For periods that apply weekly measurements of methane concentration, reductions are calculated in weekly intervals. The total amount of methane destroyed by the Project is then aggregated to monthly totals.

Project emissions were subtracted from total volume of methane destroyed. Project emissions for BWSWA consisted of indirect emissions of CO₂ from electricity consumption and direct emissions of CO₂ from the combustion of propane to assist the flare. Project emissions were calculated from the product of activity data by an appropriate emission factor.

Copies of the raw data used in the calculations, including flow data, methane content data, and utility and other fossil fuel invoices, were compared with the data used in the final calculations and tested for transcription or mathematical errors. The short timeframe being verified allowed for inclusion of all raw data sources over the entire verification period. Calculations for the entire period were reviewed as well.

7. Audit Results

BWSWA provided good documentation for their emissions estimates as well as its procedures surrounding the data collection process. The verification process focused on verifying the data and quantification methodology that was used by BWSWA to calculate the emissions reductions, as shown on the spreadsheets in Attachment E.

To complete the verification process, First Environment requested several clarification and supplemental document requests, as well as one corrective action request. BWSWA's response to the corrective action request was sufficient to resolve the issue.

During the verification process, minor transcription errors were also identified, however, these errors did not have a material impact on the project's emission reduction assertion and therefore did not require corrective action.

Verified results show 23,733.08 metric tonnes of CO₂e eligible for registration with CAR.

8. Verification Conclusion

Based on the assessments performed and the evidence collected, First Environment concludes that the Project GHG emissions reductions, due to the capture and combustion of methane gas for the period of March 1, 2009 through June 30, 2009, can be considered to a reasonable level of assurance:

- consistent with the Project Methodology,
- without material discrepancy, and
- meeting the minimum level of accuracy of at least 95 percent.

Verified results show:

	Total
Baseline Emissions (tCO ₂ -e)	23,756.49
Project Emissions (tCO ₂ -e)	23.41
Emissions Reductions* (tCO ₂ -e)	23,733.08

*as measured and calculated in accordance with the Project Methodology

As per CAR requirements, only a CAR-approved verifier can provide an independent assessment of projects applying for approval under the CAR Landfill Project Reporting Protocol. First Environment currently has accreditation from CAR.

9. Lead Verifier Signature



Michael M. Carim

10. Independent Internal Review Signature



James T. Wintergreen

ATTACHMENT A

TIER 2 TESTING REPORT

Black Warrior Solid Waste Facility

Facility No. 413-0084

prepared by:

TTL, Inc.

TTL Project No. 0601-009

May 31, 2006

TTL

geotechnical • analytical • materials • environmental



geotechnical . analytical . materials . environmental

3516 Greensboro Avenue (35401)

Room 1128

Montgomery, Alabama 35403

Telephone 205.345.0816

Facsimile 205.345.0992

www.TTLINC.com

Decatur . Florence . Montgomery . Tuscaloosa . ALABAMA

Albany . Valdosta . GEORGIA

May 31, 2006

Mr. Aaron Schilke
Air Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110

Re: Black Warrior Solid Waste Disposal Authority
Facility No. 413-0084
Tier 2 Testing Results

Dear Mr. Schilke:

Transmitted herewith are two copies of the Tier 2 testing results for the above referenced site. Table 1 is included following this cover letter and summarizes the Method 25-C testing results and calculates the average NMOC concentration in the new section and the old section of the landfill. Please note that the results of samples NS-11, NS-28, and OS-5 were not included in the average NMOC concentrations because the N_2 and O_2 concentrations as measured by Method 3-C exceeded the Method 25-C criteria of 20% for N_2 and 5% for O_2 .

With the results of the Tier 2 testing, the site's NMOC emissions rate was recalculated using the EPA Landfill Gas Emissions Model (LandGEM) version 3.02. Default values of 0.05 l/yr for k and 170.00 m^3/Mg for L_0 were used in the calculation. The default NMOC concentration of 4000 ppmv was replaced with the site specific test value of 206.76 (average NMOC ppm as Hexane for the new section) and 168.07 (average NMOC ppm as hexane for the old section). As shown by the LandGEM results that follow, the site is well below the 50 Mg/yr NMOC threshold rate and is expected to remain below the threshold throughout the next 5 years. The current (2005) NMOC emission rates for the old and new sections are 2.59 Mg/yr and 10.46 Mg/yr, respectively. Therefore, the total NMOC emissions from the landfill are 13.05 Mg/yr.

The landfill gas samples were collected by **TTL, Inc.**, on April 25, 26, and 27, 2006. Laboratory analyses were performed for **TTL** by Triangle Environmental Services, Inc. Sample collection and analyses were performed in accordance with the Tier 2 Testing Protocol prepared by **TTL** and submitted to the Air Division of ADEM on April 6, 2006.

The overall area that was tested was separated into two areas designated "old section", with sample numbers preceded by "OS", and "new section", with sample numbers preceded by "NS". The area of the old section at the time of testing was approximately 19 acres, or 7.7 hectares; while the area of the new section at the time of the testing was approximately 54.1 acres, or 21.9

hectares. Since the overall area of the landfill with waste that has been in place for greater than 2 years is greater than 25 hectares, a total of 50 samples were collected from the landfill. 37 samples were collected from the new section while 13 samples were collected from the old section.

Documentation for sample collection is in Attachments A through D. Attachment A is a site map that shows the general locations where samples were collected. Attachment B contains the field data sheets. Attachment C contains the chain-of-custody form and sample-data sheets that identify each tank and the sample collected in it. Attachment D contains calibration data for the field analyzer.

Analytical results are in Attachment E, which is divided into tabbed sections for the two types of analysis performed: Method 25-C and Method 3-C. Results are compiled in two tables, one for each type of analysis, located in the first few pages of Attachment E, prior to the first tabbed section.

If you have questions or need additional information, please call me at 205-345-0816 or contact me by email at smcmillan@ttlinc.com.

Sincerely,

TTL, Inc.



Scott A. McMillan, P.E.
AL License No. 25425

Enclosures

cc: Ken Thrasher - Black Warrior Solid Waste Landfill
Mark Pugh - CDG Engineers

ATTACHMENT B

Project Developer's Regulatory Attestation

Reference is made to the Terms of Use (the "Terms of Use") by and between [Black Warrior Solid Waste Disposal Authority], a [Alabama nonprofit public corporation] (the "Project Developer"), and the Climate Action Reserve, a California nonprofit public benefit corporation (the "Reserve"), with respect to [Black Warrior Solid Waste Disposal Authority Project] (the "Project") located at [3301 Landfill Dr, Coker, AL] (the "Property"). The undersigned, [Ken Thrasher], in [his/her] capacity as an officer of the Project Developer, in the name and on behalf of the Project Developer, hereby attests, certifies, represents and warrants to the Reserve, as of the date set forth below, as follows:

1. The Project was implemented and established voluntarily and, at all times thereafter, has been operated and conducted voluntarily. None of such implementation, establishment, operation or conduct of the Project are or at any time have been required by any law, statute, rule, regulation, ordinance, court order, governmental agency action, enforcement action, or other legally binding mandate, including without limitation any of the foregoing issued, enacted or otherwise rendered effective by any federal, state, local or foreign governmental or regulatory agency, commission, department, board, court or other authority having jurisdiction over the Project ("Law").
2. Except as otherwise expressly permitted under the protocol developed by the Reserve that applies to the Project, the Project was not established or implemented and has not at any time been operated or conducted in anticipation of, or to avoid or satisfy the anticipated requirements of, any Law that would require or would have required the Project Developer to use the Property in the manner contemplated by the Project.
3. The Project is in material compliance with all Laws.
4. The Project Developer has disclosed to the Project Verifiers in writing any and all instances of non-compliance of the Project with any Law. For purposes hereof, "Project Verifiers" shall mean any and all third party verifiers approved by the Reserve and assigned to the Project.
5. The undersigned is the duly elected, qualified and acting [Executive Director] of the Project Developer and is authorized to execute and deliver this Attestation in the name and on behalf of the Project Developer, thereby rendering this Attestation binding on the Project Developer.

The Project Developer recognizes, acknowledges and agrees that (i) this Attestation may be relied upon by the Reserve and/or any user of the Climate Action Reserve program of the Reserve (the "Program"), and each of their successors and assigns (including, without limitation, reliance in connection with the issuance and transfer of CRTs (as defined in the Terms of Use) in respect of the Project); (ii) the statements set forth in paragraphs 1 through 5 hereof shall, for all purposes of the Terms of Use, be deemed to be additional representations and warranties made thereunder by the Project Developer to the Program; (iii) in the event of any breach of any of any paragraphs 1 through 5 hereof, the Reserve shall be entitled to pursue any rights and remedies available at law or in equity (including, without limitation, rights to indemnification pursuant to the Terms of Use) in any court of competent jurisdiction; and (iv) if at any time the Reserve determines, in its sole discretion, that any such breach has occurred, the Reserve shall have the right to immediately close the Project Developer's account on the Program.

[Signatures on Next Page]

IN WITNESS WHEREOF, the undersigned, in the name and on behalf of the Project Developer, has executed this Attestation this 18 day of Sept, 2009.

PROJECT DEVELOPER¹

By: Ken Thrasher
Name: Ken Thrasher
Title: Executive Director
Address: BWSW DA
3301 Landfill Dr
Coker, AL 35452

¹ If the Project Developer is a corporation, partnership or other legal entity, this Attestation must be executed by an officer of the Project Developer. If the Project Developer is an individual, this Attestation must be executed by the individual and revised accordingly.

ATTACHMENT C

Project Developer's Attestation of Title

The undersigned, on behalf of Black Warrior Solid Waste Disposal Authority, (the "Project Developer"), represents and warrants to the California Climate Action Registry ("California Registry"), as of the date set forth below, and throughout the period during which the Carbon Reduction Tons ("CRTs") related to Black Warrior Solid Waste Facility (the "Project") are posted on the California Registry's Climate Action Reserve ("Reserve"), that:

1. it is the owner of full, unencumbered legal and beneficial title to CRTs registered in its name;
2. it has the right to sell and shall convey good title to the CRTs and will transfer the CRTs to a buyer via the Reserve only;
3. it agrees that all emission reductions related to the Project that are submitted for registration on the Reserve will be independently verified by a California Registry accredited third party verifier ("Verifier"), and will meet all the California Registry's requirements and protocols;
4. it has not made or provided knowingly false, fraudulent or misleading statements or information to the Verifier or the California Registry;
5. the Project has not been required to be implemented and maintained by any law, statute, regulation, court order, or other preexisting legally binding mandate;
6. for all vintage years that the Project is registered with the Reserve by the Project Developer, any CRTs issued by the California Registry for the Project, or the greenhouse gas emission reductions or removals associated with the CRTs issued for the Project, have not been, nor will be, registered with or claimed by other registries or under a different project title or location or previously sold to any third party prior to registration with the Reserve; and
7. for all vintage years that the Project is registered with the Reserve by the Project Developer, it has not, and will not in the future, retire, sell, claim, represent elsewhere, or use to satisfy obligations outside of the Reserve any of the CRTs issued by the California Registry for the Project or the greenhouse gas emission reductions or removals associated with the CRTs issued for the Project that would create the relevant CRTs unless retired through the Reserve for that purpose.

The following attestations apply to projects that: (a) have previously been registered with other registries, registry entities or similar systems; or (b) have generated emission reductions that were previously sold to a third party:

8. it will complete and sign the Project Transfer Form.
9. it agrees that the Project and all emission reductions must be verified by a Verifier per the relevant California Registry project protocol in order to be registered on the Reserve.

I declare that all statements contained herein are true and correct, to the best of my knowledge, and are made with full knowledge that the California Registry and all users of the Reserve rely upon the truth of the statements contained in this attestation. I am authorized to make this declaration on behalf of Project Developer. I understand and acknowledge that if any of the above representations made by or on behalf of the Project Developer in or pursuant to this Attestation of Title is false in any material respect when made or deemed repeated upon the making of each request for the CRTs to be issued for the Project or posted on the Reserve, Project Developer may be subject to penalties and potential indemnification damages under the Terms of Use, and that the California Registry would have the right to close Project Developer's account on the Reserve.

PROJECT DEVELOPER¹

Black Warrior Solid Waste Disposal Authority

Signature: Ken Thrasher

By: Ken Thrasher
Name: _____

Executive Director
Title: _____

3301 Landfill Drive, Coker, Alabama 35452
Address: _____

9/30/2008
Date: _____

¹ If Project Developer is a corporation, partnership or other legal entity, this Consent must be executed by a company officer of the Project Developer. If Project Developer is an individual, this Consent must be executed by the individual.

ATTACHMENT D

CALIBRATION CERTIFICATION

We certify that the calibration accuracies listed below are obtained on equipment, and with methods, that can be traced directly to the US National Institute of Standards and Technology.

FLOWRATE READOUT ACCURACY: $\pm 1\%$ Full Scale

PRESSURE TESTED AT: 150 psig

METER SERIAL NUMBER: 2008455

MODEL NUMBER: 62-9/9500

The calibration listed above was performed under the following conditions:

0 to 1500 SCFM WASTE GAS

40 to 200°F

0 to 15 PSIG

LINE SIZE: 6" SCH 10

Signature *Joseph E. Churn* Date Nov 19, 2008

THERMAL INSTRUMENT COMPANY, INC.

217 Sterner Mill Road, Treviso, PA 19053

Phone: 215-355-8400 Fax: 215-355-1789

Web: www.thermalinstrument.com

CALIBRATION CERTIFICATION

We certify that the calibration accuracies listed below are obtained on equipment, and with methods, that can be traced directly to the US National Institute of Standards and Technology.

FLOWRATE READOUT ACCURACY: $\pm 1\%$ Full Scale

PRESSURE TESTED AT:

METER SERIAL NUMBER: 2008455

MODEL NUMBER: 62-9/9500

The calibration listed above was performed under the following conditions:

0 to 1500 SCFM WASTE GAS

40 to 200° F

0 to 15 PSIG

6" SCH 10 Line

Signature



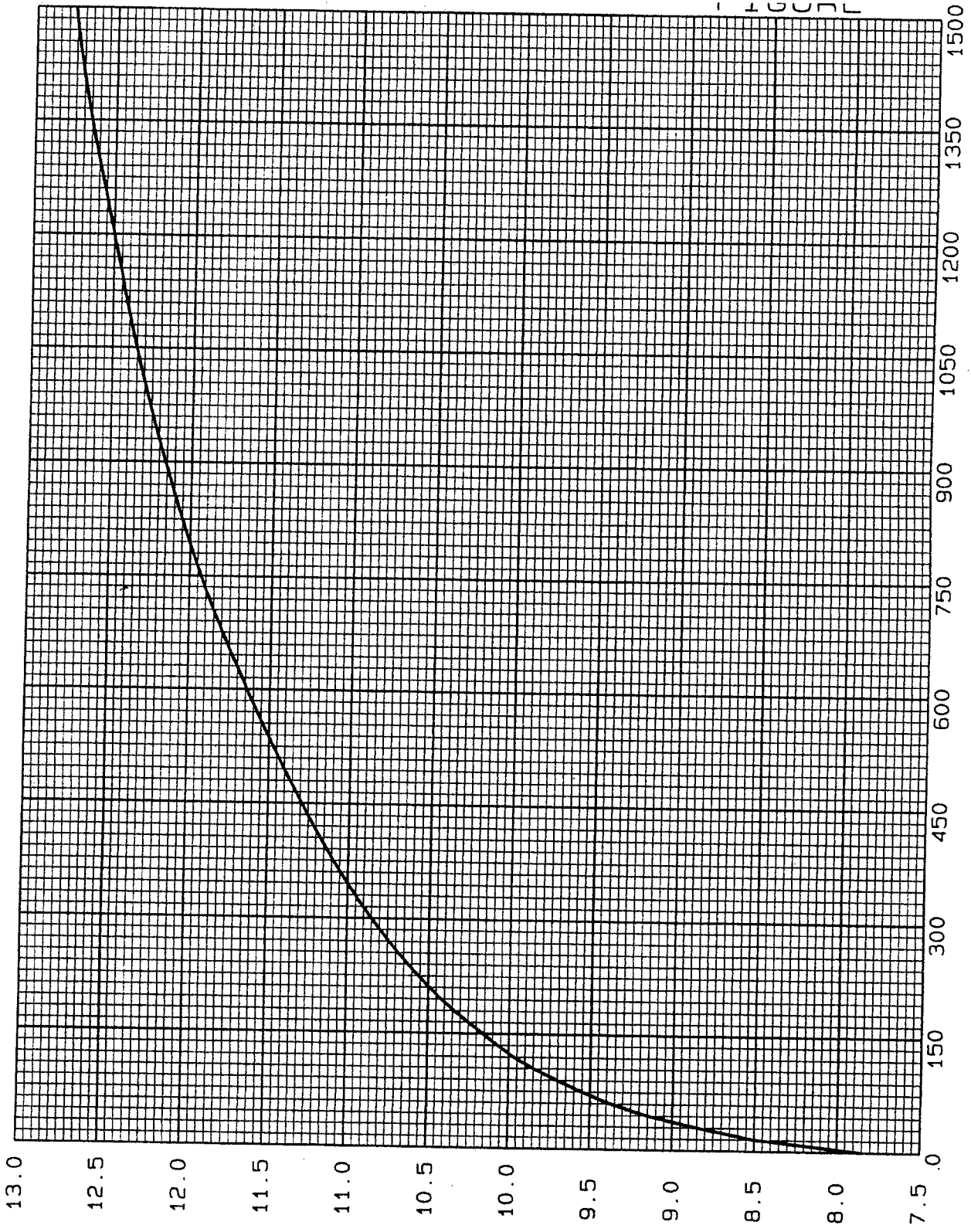
Date: April 16, 2009

THERMAL INSTRUMENT COMPANY, INC.

217 Sterner Mill Road, Trevoise, PA 19053

Phone: 215-355-8400 Fax: 215-355-1789

Web: www.thermalinstrument.com

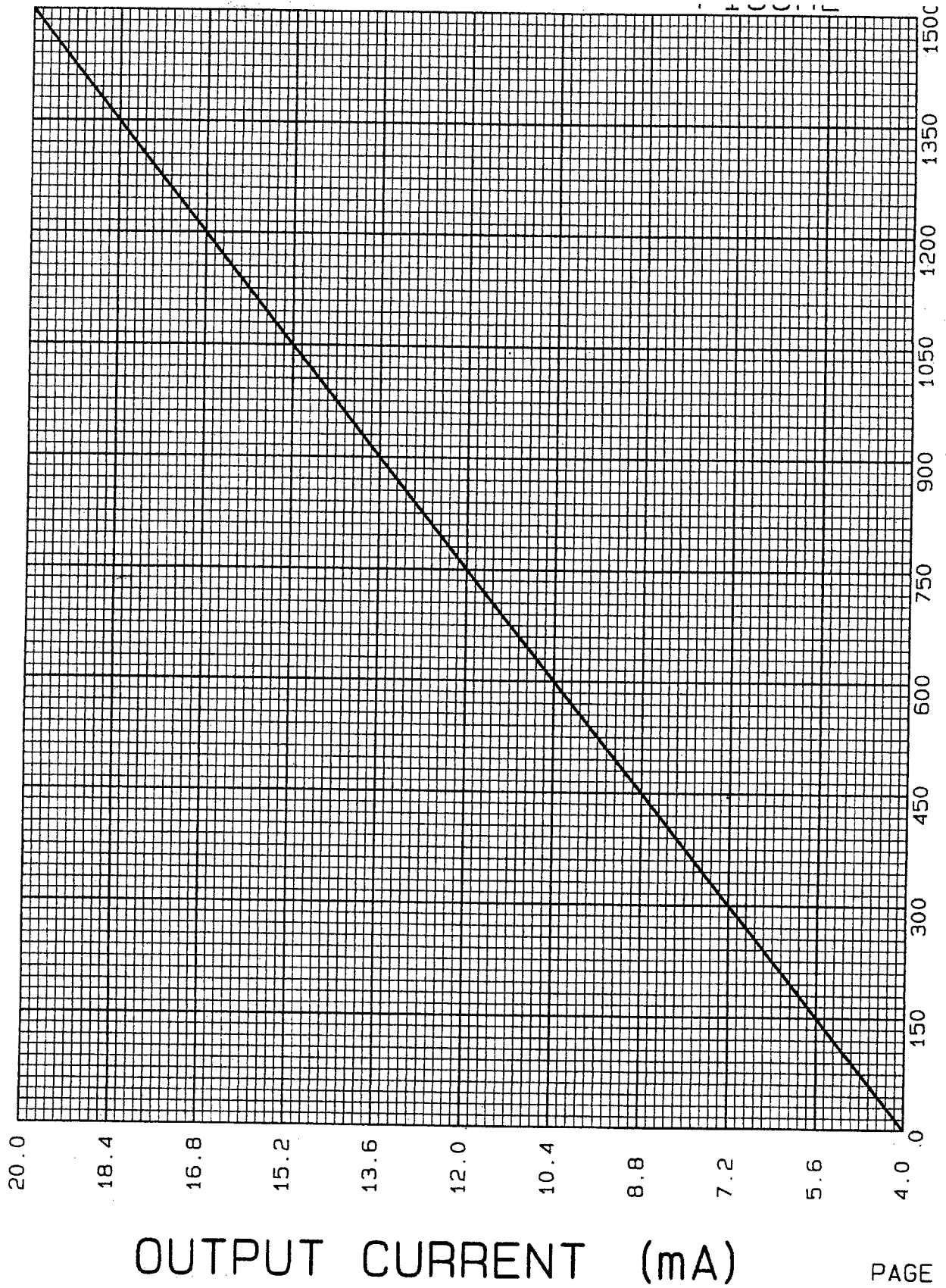


TRANSDUCER VOLTAGE

PAGE

SCFM WASTE GAS 6" SCH 10 LINE

S/N 2008455
04-16-2009



OUTPUT CURRENT (mA)

PAGE

SCFM WASTE GAS 6" SCH 10 LINE

S/N 2008455
04-16-2009

COMPONENT VALUES DETERMINED AT CALIBRATION

Integral Transducer

PCB 100385	PCB 100389
R5 825	R10 1650
R7 800	
R8 100	
R9 909	
R15 5760	

FLOW SENSOR - 50 OHMS NI @ 75 deg F

TEMP SENSOR - 100 OHMS NI @ 75 deg F

CALIBRATION POTENTIOMETERS

TA 366 TC 577

OPERATING RANGE

	minimum	maximum
FLOW	0	1500 SCFM WASTE GAS
TEMPERATURE	40	200 F
PRESSURE	0	15 PSIG

COMMENTS --

METER CALIBRATED FOR 6" SCH 10 LINE
6.357" ID

TOTALIZER = X 10 SCF

METER OUTPUT SIGNAL CALIBRATION

mA	SCFM WASTE GAS	EXC Volts
4	0	7.850
4.32	30	8.850
4.64	60	9.378
4.96	90	9.706
5.28	120	9.970
5.6	150	10.160
7.2	300	10.850
8.8	450	11.290
10.4	600	11.640
12	750	11.930
13.6	900	12.160
15.2	1050	12.350
16.8	1200	12.500
18.4	1350	12.650
20	1500	12.760

9500 EEPROM Setup Data

Maximum Calibrated Flow	1500
Flow FS at 20ma	1500.0
Flow Full Scale Displayed	1500.0
Totalizer Counts per/minute	150
Totalizer Decimal Point	0
Zero Offset	0
Display Cutoff	5% FS
Filter Time Constant	2 Sec

**LOANER
FLOW
METER
SN: 2006555**

CALIBRATION CERTIFICATION

We certify that the calibration accuracies listed below are obtained on equipment, and with methods, that can be traced directly to the US National Institute of Standards and Technology.

FLOWRATE READOUT ACCURACY: 1% Full Scale

PRESSURE TESTED AT: 15 PSIG

METER SERIAL NUMBER: 2006555

MODEL NUMBER: 62-9

The calibration listed above was performed under the following conditions:

0 to 1500 SCFM WASTE GAS

40 to 200° F

0 to 15 PSIG

6" SCH 10 Line

Signature



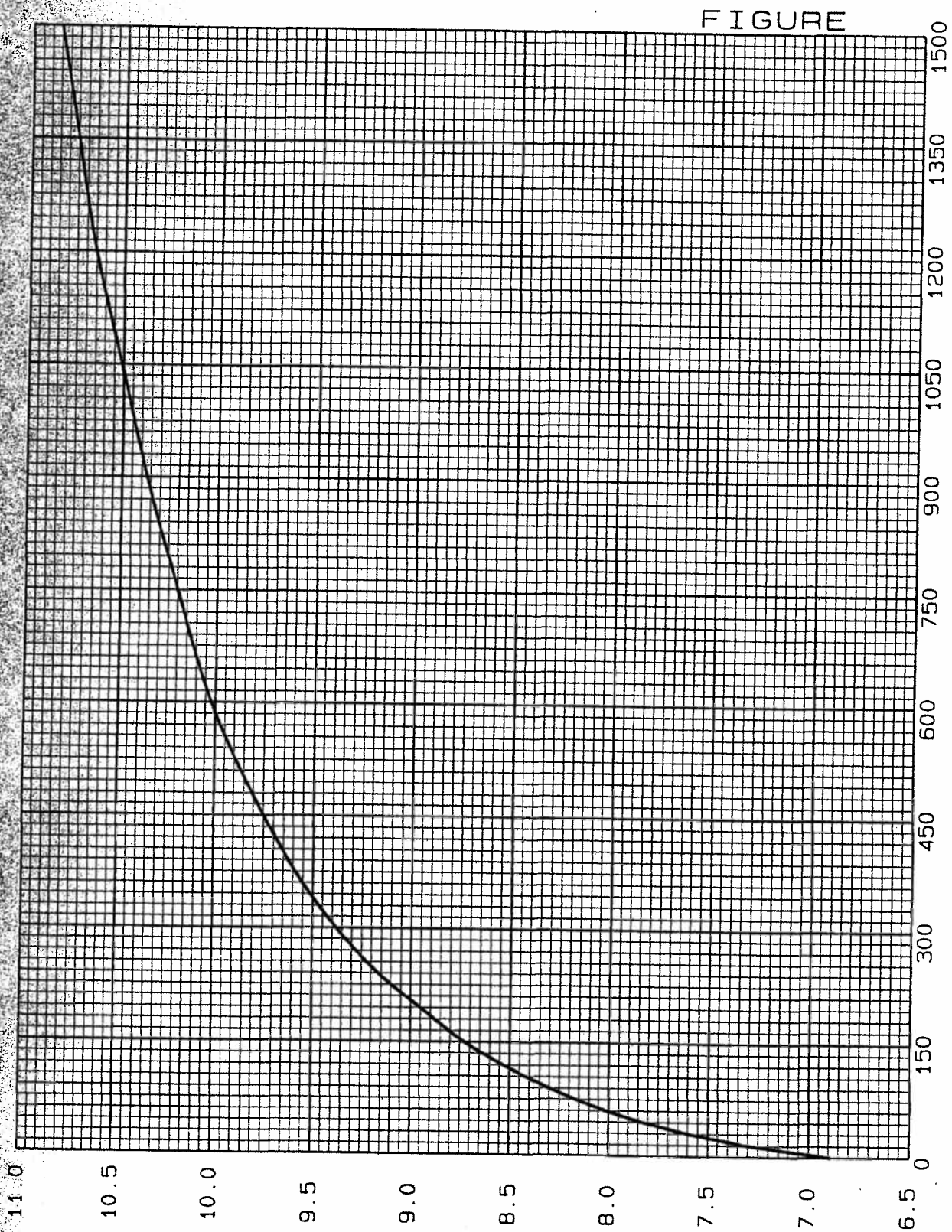
Date: March 24, 2009

THERMAL INSTRUMENT COMPANY, INC.

217 Sterner Mill Road, Treviso, PA 19053

Phone: 215-355-8400 Fax: 215-355-1789

Web: www.thermalinstrument.com

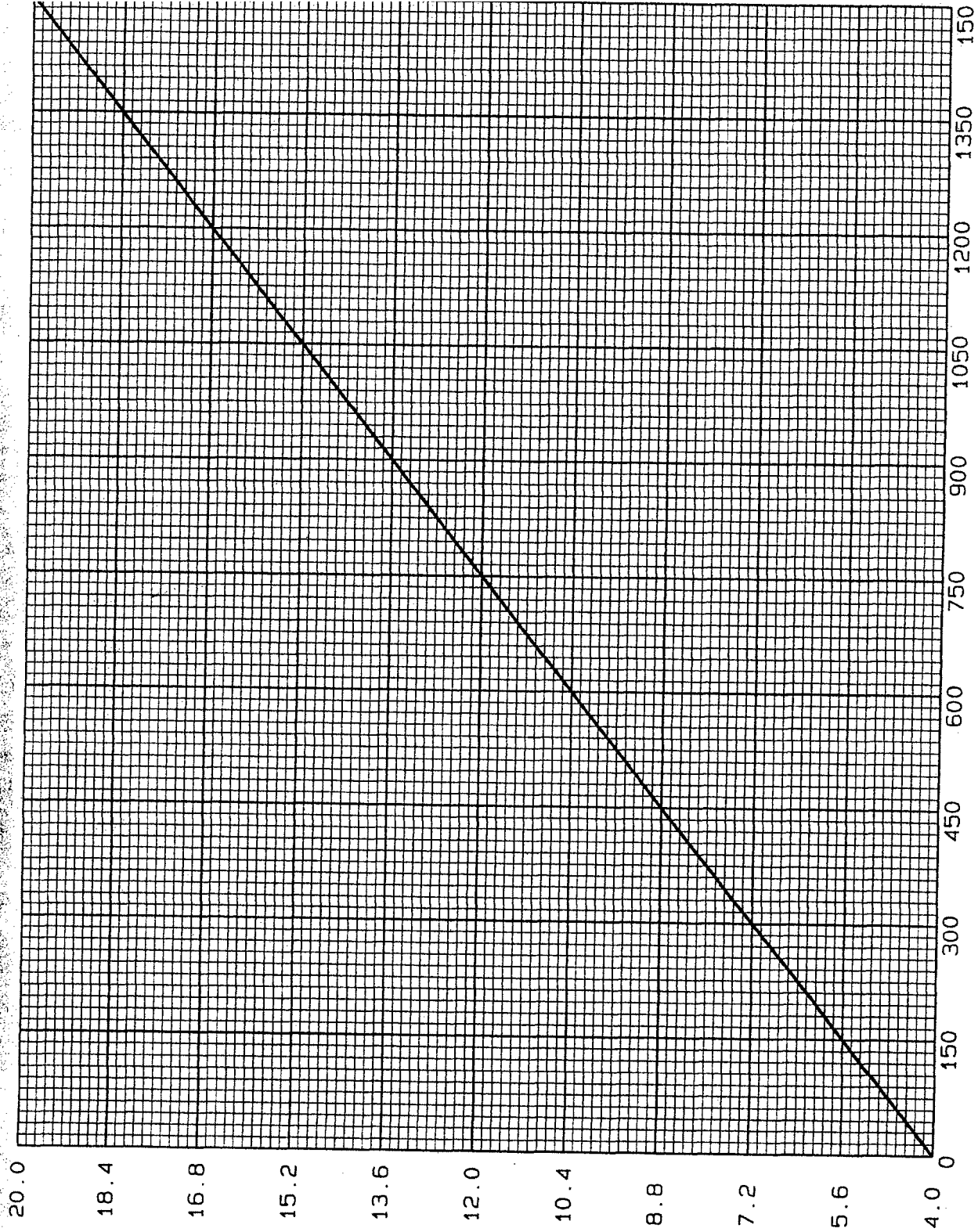


TRANSDUCER VOLTAGE

PAGE

SCFM WASTE GAS

S/N 2006555.0
03-23-2009



OUTPUT CURRENT (mA)

PAGE

SCFM WASTE GAS

S/N 2006555
03-23-2009

COMPONENT VALUES DETERMINED AT CALIBRATION

Integral Transducer

PCB 100385	PCB 100389
R5 750	R10 1580
R7 681	
R8 100	
R9 1000	
R15 5490	

FLOW SENSOR - 50 OHMS NI @ 75 deg F
TEMP SENSOR - 100 OHMS NI @ 75 deg F

CALIBRATION POTENTIOMETERS

TA 821 TC 589

OPERATING RANGE

	minimum	maximum	
FLOW	0	1500	SCFM WASTE GAS
TEMPERATURE	40	200	F
PRESSURE	0	15	PSIG

COMMENTS --

METER CALIBRATED FOR 6" SCH 10 LINE
6.357" ID
TOTALIZER = X 10 SCF

METER OUTPUT SIGNAL CALIBRATION

mA	SCFM WASTE GAS	EXC Volts
4	0	6.890
4.32	30	7.600
4.64	60	8.016
4.96	90	8.302
5.28	120	8.530
5.6	150	8.730
7.2	300	9.380
8.8	450	9.750
10.4	600	10.020
12	750	10.200
13.6	900	10.370
15.2	1050	10.510
16.8	1200	10.650
18.4	1350	10.750
20	1500	10.850

9500 EEPROM Setup Data

Maximum Calibrated Flow	1500
Flow FS at 20ma	1500.0
Flow Full Scale Displayed	1500.0
Totalizer Counts per/minute	150
Totalizer Decimal Point	0
Zero Offset	0
Display Cutoff	5% FS
Filter Time Constant	1 Sec

ATTACHMENT E

Table A.1
Emissions Reduction Summary
Rev: 8-26-09

	Power Used		Invoice Dates		Invoice Days
			Start	End	
February Electric Invoice	7,878.00	kWh	12-Feb	11-Mar	27
March Electric Invoice	7,907.00	kWh	11-Mar	10-Apr	30
April Electric Invoice	9,109.00	kWh	10-Apr	12-May	32
May Electric Invoice	7,047.00	kWh	12-May	9-Jun	28
June Electric Invoice	10,916.00	kWh	9-Jun	13-Jul	34

Indirect Emissions from use of Electricity					
1	EL=	42,857.00 kWh			
2	Reporting Period Days=	122.00 days			
3	Total Days for Elec. Invoices=	151.00 days			
4	Difference=	29.00 days			
5	kWh/Billing Days=	283.82 kWh/day			
6	Reporting Period Reduction=	8,230.81 kWh			
7	Reduced EL for Reporting Period=	34,626.19 kWh			
8	EF _{EL} =	1,490.37 lb/MWh	per Figure III.6.1 and Table C.2		
9	ELCO ₂ =	23.41			

Indirect Emissions from Fossil Fuel Usage					
10	Number of 20 bl. Bottles of Propane=	1.00			
11	Volume per bottle=	4.50 gal			
12	Total volume of propane=	4.50 gal			
13	EF _{FF} =	9.10E-05 kg CH ₄ /gallon			
14	FFCO ₂ =	4.10E-07			

Period Emissions Reduction Summary					
	ER _{Mar} =	4,738.56			
	ER _{Apr} =	5,221.35			
	ER _{May} =	6,899.32			
	ER _{Jun} =	6,897.26			
	Total for Period	23,756.49			

Net Emission Reductions= 23,756.49 - 23.41 23,733.08					
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Table A.2
GHG Emissions Reduction Calculations
Mar-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_i) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 - 0.000454)$$

OX= 0.10
FFCO2= 0.00
DE= 0.96
FFCH4= 0.00
PRE_{discount}= 0.00

Date	Total Flow	GEM Reading	Methane Flow	CH4Dest _{flare}	CH4Dest _{pr}	DF1	DF2	ER
	SCF/Day		SCF/Day					tCO ₂ /day
3/1/2009	0.00	61.06	0.00	0.00	0.00	0.1	0	0.00
3/2/2009	654,899.39		399,881.57	383,886.30	7.37	0.1	0	125.40
3/3/2009	978,197.29		597,287.27	573,395.78	11.01	0.1	0	187.31
3/4/2009	987,093.85		602,719.51	578,610.73	11.11	0.1	0	189.01
3/5/2009	944,007.10		576,410.73	553,354.31	10.63	0.1	0	180.76
3/6/2009	921,900.20		562,912.26	540,395.77	10.38	0.1	0	176.53
3/7/2009	942,830.97		575,692.59	552,664.89	10.61	0.1	0	180.54
3/8/2009	899,361.34	55.40	498,246.18	478,316.33	9.19	0.1	0	156.25
3/9/2009	918,397.34		508,792.13	488,440.44	9.38	0.1	0	159.56
3/10/2009	917,784.73		508,452.74	488,114.63	9.37	0.1	0	159.45
3/11/2009	904,040.33		500,838.34	480,804.81	9.23	0.1	0	157.06
3/12/2009	908,423.81		503,266.79	483,136.12	9.28	0.1	0	157.82
3/13/2009	913,681.54		506,179.57	485,932.39	9.33	0.1	0	158.74
3/14/2009	920,646.02		510,037.90	489,636.38	9.40	0.1	0	159.95
3/15/2009	908,111.13	62.70	569,385.68	546,610.25	10.50	0.1	0	178.56
3/16/2009	896,873.11		562,339.44	539,845.86	10.37	0.1	0	176.35
3/17/2009	910,818.77		571,083.37	548,240.04	10.53	0.1	0	179.09
3/18/2009	912,170.14		571,930.68	549,053.45	10.54	0.1	0	179.36
3/19/2009	862,302.49		540,663.66	519,037.11	9.97	0.1	0	169.55
3/20/2009	852,894.93		534,765.12	513,374.52	9.86	0.1	0	167.70
3/21/2009	914,396.74		573,326.75	550,393.68	10.57	0.1	0	179.79

Date	Total Flow	GEM Reading	Methane Flow		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
	SCF/Day		SCF/Day									tCO ₂ /day
3/22/2009	920,128.16	59.46	547,108.20		525,223.87		10.09		0.1	0		171.57
3/23/2009	916,408.82		544,896.68		523,100.82		10.05		0.1	0		170.88
3/24/2009	338,058.41		201,009.53		192,969.15		3.71		0.1	0		63.04
3/25/2009	450,967.24		268,145.12		257,419.32		4.94		0.1	0		84.09
3/26/2009	307,535.52		182,860.62		175,546.20		3.37		0.1	0		57.34
3/27/2009	920,781.01		547,496.39		525,596.54		10.09		0.1	0		171.69
3/28/2009	777,371.87		462,225.32		443,736.30		8.52		0.1	0		144.95
3/29/2009	897,465.59	N/A Analyzer Used	479,451.29		460,273.23		8.84		0	0		167.06
3/30/2009	906,561.93		477,410.36		458,313.94		8.80		0	0		166.35
3/31/2009	907,318.86		467,288.91		448,597.36		8.61		0	0		162.82

Totals	25,411,428.66		14,952,104.72								ER _{Mar}	4,738.56
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Table A.3
GHG Emissions Reduction Calculations
Apr-09
Rev. 8-26-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_i) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 \cdot 0.000454)$$

OX= 0.10
FFCO2= 0.00
DE= 0.96
FFCH4= 0.00
PRE_{discount}= 0.00

Date	Total Flow	GEM Reading	Methane Flow		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
	SCF/Day		SCF/Day									tCO ₂ /day
4/1/2009	887,548.51	N/A	480,084.91		460,881.51		8.85		0	0		167.28
4/2/2009	953,569.28		542,003.48		520,323.34		9.99		0	0		188.86
4/3/2009	902,772.90		502,648.59		482,542.65		9.27		0	0		175.14
4/4/2009	895,136.41		501,571.01		481,508.17		9.25		0	0		174.77
4/5/2009	903,349.67	N/A	514,385.94		493,810.50		9.48		0	0		179.23
4/6/2009	928,897.09		516,401.71		495,745.64		9.52		0	0		179.94
4/7/2009	933,424.40		513,264.01		492,733.45		9.46		0	0		178.84
4/8/2009	920,448.69		505,274.44		485,063.46		9.32		0	0		176.06
4/9/2009	886,289.43		478,194.54		459,066.76		8.82		0	0		166.62
4/10/2009	881,983.99		477,160.21		458,073.80		8.80		0	0		166.26
4/11/2009	875,696.91		475,752.27		456,722.18		8.77		0	0		165.77
4/12/2009	859,401.44	N/A	478,409.11		459,272.74		8.82		0	0		166.70
4/13/2009	892,669.78		512,588.03		492,084.51		9.45		0	0		178.61
4/14/2009	885,930.11		494,117.41		474,352.71		9.11		0	0		172.17
4/15/2009	879,658.73		482,699.26		463,391.29		8.90		0	0		168.19
4/16/2009	878,275.95		479,704.32		460,516.15		8.84		0	0		167.15
4/17/2009	735,535.37		418,399.68		401,663.69		7.71		0	0		145.79
4/18/2009	894,148.77		511,391.12		490,935.48		9.43		0	0		178.19

Date	Total Flow	GEM Reading	Methane Flow		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
	SCF/Day		SCF/Day									tCO ₂ /day
4/19/2009	762,942.70	55.45	423,051.73		406,129.66		7.80		0.1	0		132.67
4/20/2009	868,949.87		481,832.71		462,559.40		8.88		0.1	0		151.10
4/21/2009	898,665.77		498,310.17		478,377.76		9.19		0.1	0		156.27
4/22/2009	975,238.81		540,769.92		519,139.12		9.97		0.1	0		169.58
4/23/2009	1,059,148.41		587,297.80		563,805.88		10.83		0.1	0		184.17
4/24/2009	1,056,902.68		586,052.53		562,610.43		10.80		0.1	0		183.78
4/25/2009	1,047,815.17		581,013.51		557,772.97		10.71		0.1	0		182.20
4/26/2009	1,050,921.40	57.95	609,008.95		584,648.60		11.23		0.1	0		190.98
4/27/2009	1,051,773.56		609,502.78		585,122.67		11.24		0.1	0		191.14
4/28/2009	1,055,836.50		611,857.25		587,382.96		11.28		0.1	0		191.88
4/29/2009	1,077,007.31		624,125.73		599,160.70		11.51		0.1	0		195.72
4/30/2009	1,080,070.84		625,901.05		600,865.01		11.54		0.1	0		196.28
Totals	27,980,010.42		15,662,774.15							ER_{Apr}		5,221.35

Table A.4
GHG Emissions Reduction Calculations
May-09
Rev: 8-26-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_t) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 \cdot 0.000454)$$

OX= 0.10
FFCO2= 0.00
DE= 0.96
FFCH4= 0.00
PRE_{discount}= 0.00

Date	Total Flow	GEM Reading	Methane Flow	CH4Dest _{flare}	CH4Dest _{pr}	DF1	DF2	ER
	SCF/Day		SCF/Day					tCO ₂ /day
5/1/2009	1,084,526.48	57.95	628,483.09	603,343.77	11.59	0.1	0	197.09
5/2/2009	1,083,833.37		628,081.44	602,958.18	11.58	0.1	0	196.96
5/3/2009	1,079,394.91	59.75	644,938.46	619,140.92	11.89	0.1	0	202.25
5/4/2009	1,076,775.62		643,373.43	617,638.49	11.86	0.1	0	201.76
5/5/2009	1,081,541.98		646,221.33	620,372.48	11.91	0.1	0	202.65
5/6/2009	1,088,983.10		650,667.40	624,640.71	12.00	0.1	0	204.05
5/7/2009	1,092,693.60		652,884.43	626,769.05	12.04	0.1	0	204.74
5/8/2009	1,097,553.23		655,788.06	629,556.53	12.09	0.1	0	205.65
5/9/2009	1,094,896.14		654,200.45	628,032.43	12.06	0.1	0	205.16
5/10/2009	1,094,871.60	N/A	669,655.00	642,868.80	12.35	0	0	233.34
5/11/2009	1,106,871.45		681,253.62	654,003.47	12.56	0	0	237.38
5/12/2009	1,115,697.32		685,220.18	657,811.37	12.63	0	0	238.76
5/13/2009	1,136,204.47		704,251.92	676,081.84	12.98	0	0	245.39
5/14/2009	1,022,246.64		624,920.60	599,923.78	11.52	0	0	217.75
5/15/2009	1,214,155.38		719,938.57	691,141.03	13.27	0	0	250.86
5/16/2009	1,202,551.17		710,009.82	681,609.43	13.09	0	0	247.40
5/17/2009	1,195,967.60	57.10	682,897.50	655,581.60	12.59	0.1	0	214.15
5/18/2009	1,195,967.60		682,897.50	655,581.60	12.59	0.1	0	214.15

Date	Total Flow	GEM Reading	Methane Flow		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
	SCF/Day		SCF/Day									tCO ₂ /day
5/19/2009	1,192,303.74	57.1	680,805.43		653,573.22		12.55		0.1	0		213.50
5/20/2009	1,197,889.86		683,995.11		656,635.30		12.61		0.1	0		214.50
5/21/2009	1,200,797.78		685,655.53		658,229.31		12.64		0.1	0		215.02
5/22/2009	1,198,412.14		684,293.33		656,921.60		12.62		0.1	0		214.59
5/23/2009	1,202,639.53		686,707.17		659,238.88		12.66		0.1	0		215.35
5/24/2009	1,198,366.98	N/A	700,510.45		672,490.03		12.91		0	0		244.09
5/25/2009	1,196,491.85		694,186.27		666,418.82		12.80		0	0		241.88
5/26/2009	1,193,307.08		684,286.02		656,914.58		12.62		0	0		238.43
5/27/2009	1,190,846.83		685,483.59		658,064.25		12.64		0	0		238.85
5/28/2009	1,190,668.15		679,295.84		652,124.01		12.52		0	0		236.69
5/29/2009	1,188,209.87		669,614.51		642,829.93		12.35		0	0		233.32
5/30/2009	1,190,342.21		680,259.31		653,048.93		12.54		0	0		237.03
5/31/2009	1,190,167.46	N/A	678,954.53		651,796.35		12.52		0	0		236.58
Totals	35,595,175.15		20,859,729.89							ER_{May}		6,899.32

Table A.5
GHG Emissions Reduction Calculations
Jun-09

Variables:

$$ER_y = [CH4Dest_{pr} \cdot 21 \cdot (1 - OX) \cdot (1 - DF)] - FFCO_2 - ELCO_2 - PRE_{discount}$$

$$CH4Dest_{flare} = (Q \cdot DE_i) - FFCH_4$$

$$CH4Dest_{pr} = (CH4Dest_{flare}) \cdot (0.0423 - 0.000454)$$

$$\begin{aligned} OX &= 0.10 \\ FFCO_2 &= 0.00 \\ DE &= 0.96 \\ FFCH_4 &= 0.00 \\ PRE_{discount} &= 0.00 \end{aligned}$$

Date	Total Flow	GEM Reading	Methane Flow	CH4Dest _{flare}	CH4Dest _{pr}	DF1	DF2	ER
	SCF/Day							tCO ₂ /day
6/1/2009	1,188,663.43	N/A	665,847.36	639,213.47	12.28	0	0	232.01
6/2/2009	1,191,408.39		668,446.93	641,709.05	12.32	0	0	232.91
6/3/2009	1,193,754.75		678,261.50	651,131.04	12.50	0	0	236.33
6/4/2009	1,195,223.44		686,092.78	658,649.07	12.65	0	0	239.06
6/5/2009	1,171,818.68		668,185.91	641,458.47	12.32	0	0	232.82
6/6/2009	1,157,265.32		656,282.25	630,030.96	12.10	0	0	228.68
6/7/2009	1,163,974.55	N/A	661,888.95	635,413.39	12.20	0	0	230.63
6/8/2009	1,161,302.24		655,862.34	629,627.85	12.09	0	0	228.53
6/9/2009	1,157,795.46		657,769.79	631,459.00	12.13	0	0	229.19
6/10/2009	1,162,073.90		669,473.07	642,694.15	12.34	0	0	233.27
6/11/2009	1,190,440.39		680,851.50	653,617.44	12.55	0	0	237.24
6/12/2009	1,196,529.16		662,549.81	636,047.82	12.21	0	0	230.86
6/13/2009	1,193,617.31		666,373.66	639,718.71	12.29	0	0	232.19
6/14/2009	1,196,648.93	N/A	666,959.82	640,281.43	12.30	0	0	232.40
6/15/2009	1,199,784.62		675,554.69	648,532.50	12.45	0	0	235.39
6/16/2009	1,197,656.20		669,100.82	642,336.78	12.34	0	0	233.14
6/17/2009	1,180,950.86		664,455.52	637,877.30	12.25	0	0	231.52
6/18/2009	1,174,972.04		667,548.89	640,846.94	12.31	0	0	232.60

Date	Total Flow	GEM Reading	Methane Flow		CH4Dest _{flare}		CH4Dest _{pr}		DF1	DF2		ER
	SCF/Day		SCF/Day									tCO ₂ /day
6/19/2009	1,174,966.15	N/A	657,985.29		631,665.88		12.13		0	0		229.27
6/20/2009	1,162,647.23		643,233.99		617,504.63		11.86		0	0		224.13
6/21/2009	731,895.56	N/A	433,103.74		415,779.59		7.98		0	0		150.91
6/22/2009	1,189,136.63		681,162.67		653,916.16		12.56		0	0		237.35
6/23/2009	1,182,798.50		666,666.03		639,999.39		12.29		0	0		232.29
6/24/2009	1,179,495.91		680,148.75		652,942.80		12.54		0	0		236.99
6/25/2009	1,179,022.71		663,794.70		637,242.91		12.24		0	0		231.29
6/26/2009	1,179,352.58		665,602.61		638,978.51		12.27		0	0		231.92
6/27/2009	1,177,546.17		670,569.22		643,746.45		12.36		0	0		233.65
6/28/2009	1,176,454.47	N/A	671,077.51		644,234.41		12.37		0	0		233.83
6/29/2009	1,176,051.96		669,341.43		642,567.78		12.34		0	0		233.23
6/30/2009	1,194,233.84		670,443.25		643,625.52		12.36		0	0		233.61

Totals	34,977,481.38		19,794,634.78							ER_{Jun}	6,897.26
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