

Verification Report for Black Warrior Solid Waste Facility—CAR 403 Coker, Alabama

Climate Action Reserve

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1. Introduction

This report is provided to Black Warrior Solid Waste Disposal Authority (BWSWA) as a deliverable of the Climate Action Reserve (CAR) project verification process. This report covers the verification of the Black Warrior Solid Waste Facility – CAR403 (the Project) for the period from July 1 through December 31, 2010. First Environment, Inc. (First Environment) conducted the verification from December 2010 through February 2011.

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 Boundaries	Black Warrior Solid Waste Facility
Greenhouse Gases Verified	Emissions reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e) resulting from methane destruction; Project emissions of CO ₂ from purchased electricity and fossil fuel combustion
Reporting Period	July 1, 2010 – December 31, 2010
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); Climate Action Reserve Landfill Project Protocol Version 2.0 Errata & Clarification, January 4, 2011 (Errata and Clarification); Climate Action Reserve Program Manual, March 2010
Verification Process	Climate Action Reserve Landfill Verification Protocol, Version 2.0, November 2008; Climate Action Reserve Verification Program Manual, June 2009; ISO 14064-3; Specification with guidance for the validation and verification of greenhouse gas assertions, 2006.
Level of Assurance	Reasonable assurance
Materiality	Misstatements greater than five percent of the Project's emission reductions assertion are considered material; Qualitative non-conformities with the verification criteria are also 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;
- initial interaction and kickoff meeting with primary BWSWA contact;
- development of the verification plan;
- site visit;
- review and evaluation of raw data and calculations for period under review;
- follow-up interaction with BWSWA 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, 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.

5.1 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 authorization to continue verification services for BWSWA from CAR in a notification dated December 6, 2010.

5.2 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 – Ellen Reid
Verifier – Mike Carim
Internal Reviewer – Jay Wintergreen

5.3 Audit Kick-off

The verification audit was initiated with a kick-off meeting on December 10, 2010 with the primary BWSWA contact. The meeting focused on confirming the scope, schedule, and data required for verification.

5.4 Development of the Verification Plan

The team formally documented its verification plan as well as determined the data-sampling plan. The verification plan was developed based on the discussion of key elements of the project verification process during the kick-off meeting. BWSWA was afforded the opportunity to comment on the key elements of the plan for verification. Based on items discussed and agreed upon with the BWSWA, the plan identified the First Environment project team members, project level of assurance, materiality threshold, and standards of evaluation and reporting for

the verification. It also provided an outline of the verification process, established project deliverables, and presented a data-sampling plan designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

5.5 Site Visit

A site visit by Ellen Reid was performed on January 5, 2011 to assess the Project's data management systems and interview personnel relevant to the project for the verification period.

5.6 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.

5.7 Corrective Actions and Supplemental Information

The team issued requests for corrective action and clarification during the verification process. BWSWA provided sufficient responses to all corrective action and clarification requests.

5.8 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, a verification statement, and a list of findings to be submitted to the Climate Action Reserve.

6. Site's Conformance with Verification Criteria

6.1 Project Description

The Black Warrior Solid Waste Facility is an active municipal landfill located at 3301 Landfill Drive in Coker, Alabama. 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 and currently consists of Cells 1 thru 7.

The project collects and combusts landfill gas in an open flare. No combustion devices existed on site prior to the initiation of the project activity.

The baseline scenario, defined as the total release of LFG to the atmosphere, was verified during the project's initial reporting period.

6.2 Eligibility

The Black Warrior Solid Waste Facility meets the eligibility requirements set forth in the CAR Protocol. The project is located within the United States and has a start date after January 1, 2001. The start date of the project was January 14, 2009. The project's start date was confirmed during the initial verification for the Project.

BWSWA owns the landfill and gas collection and control system that constitute the project, and therefore holds title to emission reduction credits associated with the project. Ownership of the project was verified through a review of operating permits held by BWSWA. The CAR Attestation of Title has also been completed by BWSWA for the reporting period and is on file with CAR. First Environment reviewed the Attestation of Title during the verification process and confirmed that it was completed correctly.

First Environment reviewed the applicable regulatory permits and performed an online regulatory review using an Alabama Department of Environmental Management (ADEM) database for the Black Warrior Solid Waste Facility to assess compliance with relevant laws and regulations. This cursory review of permits and regulations indicated that the site was in compliance and no violations of permits occurred during the reporting period. Additionally, BWSWA has completed the CAR Attestation of Regulatory Compliance for the reporting period. First Environment confirmed that the form is on file with CAR and was completed correctly; the Attestation indicates no dates of material non-compliance during the reporting period.

6.3 *Additionality*

The Project consists of the LFG collection and combustion system and therefore exceeds the performance standard defined by the CAR Protocol, specifically Scenario 1 from the list provided in Section 3.3.1 of the CAR Protocol, because LFG was not collected or destroyed in the baseline scenario. Therefore, the project gas collection system and combustion system passes the CAR Protocol's Performance Standard.

The Black Warrior Solid Waste Facility is subject to New Source Performance Standards (NSPS) requiring the facility to conduct Non-Methane Organic Compound (NMOC) emission rate testing. The most recent Tier II Test was conducted in May 2006, with the NMOC emission rate results calculated to be 13.06 Mg/yr, below the 50 Mg/yr threshold that would require the installation of a gas collection and control system.

To inform the assessment of regulatory additionality, First Environment also reviewed the landfill's Title V permit from ADEM dated January 30, 2007 that states the GCCS does not require an Air Permit Amendment in accordance with ADEM Administrative Rule R. 335-3-10-.02(75) and that the landfill is currently not subject to the standards of Subpart WWW. This cursory review of laws and regulations indicated that the project is not required by regulation; therefore, the Project passes the CAR Protocol's Legal Requirements Test.

Additionally, First Environment relied in part on the Attestation of Voluntary Implementation completed by BWSWA for the current reporting period. The Attestation is on file with CAR and was reviewed to confirm that it was completed correctly.

6.4 *Project Performance Against CAR Protocol and Project Management System*

The project was implemented in conformity with the CAR Landfill Project Reporting Protocol, Version 2.0.

The Black Warrior Solid Waste Facility monitoring system consists of a flow meter, gas analyzer, and a thermocouple. A Thermal Instruments ST-95 mass flow meter continuously measures differential pressure, temperature, and pressure of the gas stream. The meter

standardizes flow readings from ambient conditions to a pressure of one atmosphere and a temperature of 60°F.

A CAI continuous gas analyzer measures gas composition for methane, oxygen, and carbon dioxide content. The candlestick flare incorporates two thermocouples within the shroud designed to shutdown the flare when the flare temperature drops below the set point of 800°F. BWSWA provided evidence of quarterly factory calibrations of the flow meter during the reporting period. The gas analyzer performs an auto-calibration function on a daily basis. All calibrations showed monitoring equipment to be operating accurately. First Environment determined the monitoring system to meet the protocol requirements based upon observations made during the site visit and review of relevant project documentation.

There are two sources of project emissions identified within the project boundary. 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. First Environment reviewed all relevant activity data for the current verification period.

BWSWA developed and implemented a Monitoring Plan to track relevant project parameters and data sources. The Monitoring Plan was reviewed to determine compliance with the protocol requirements. Based on observations made during the site visit and review of relevant project documentation, First Environment found the Monitoring Plan to meet the requirements set forth by the CAR Protocol and the project to be implemented in accordance with the Monitoring Plan.

6.5 Emissions Reduction Calculation Assessment

The emission reduction calculations were reviewed to ensure accuracy in the formulas used and raw data used as inputs. The formulas were tested to ensure they were consistent with the calculation methodology described in the CAR Protocol. Because the landfill is still receiving waste and is not capped, a 10 percent oxidation factor was applied to account for methane oxidation in the cover soil. A 96 percent destruction efficiency is assigned to the project's open flare. The destruction efficiency is applied accordingly in emission reduction calculations.

The amount of methane destroyed was calculated from metered data for landfill gas collected. Totalized flow was calculated from data obtained in approximately four-minute intervals from the Yokogawa Digital Chart Recorder, which continuously records the flow rate correcting for temperature and pressure of the LFG. Total flow in a given interval was computed by multiplying the flow rate by the length of the interval. Metered gas flow volumes are automatically corrected by the instruments from ambient conditions to standard conditions of one atmosphere of pressure at 60°F. Flow readings with a corresponding temperature of less than 500°F are excluded from calculations as a quality control measure.

The fraction of methane in landfill gas during a given interval was calculated from data obtained in approximately four-minute intervals. GEM2000 weekly readings were used in lieu of continuous gas analyzer data for the period of July 25 to August 14, 2010 during the reporting period. The appropriate uncertainty discount of 10 percent was applied to the emission reductions during the identified period. Data was unavailable due to failure of the CAI continuous gas analyzer to accurately record methane concentrations or maintenance of the

instrument. The methane concentrations are recorded on an external flash card by a Yokogawa Digital Chart Recorder.

The total volume of methane destroyed by the Project is computed in daily intervals and converted to a mass flow using the density of methane at 60°F and one atmosphere of pressure.

Project emissions were subtracted from total quantity of methane destroyed. Project emissions were calculated by multiplying activity data by an appropriate emission factor. Project emission sources consisted of purchased electricity to power the gas collection system and stationary combustion of propane. Because the site has not purchased a new propane tank since the start of the previous reporting period for the project, it was estimated that half of the tank's capacity was consumed in the current reporting period. This consumption estimate was deemed reasonable for the purposes of emission reduction calculations.

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. All raw data sources and calculations over the entire verification period were reviewed. First Environment performed recalculations of emission reductions for the entire reporting period to assess whether they were free of material misstatement. First Environment found the emission reduction calculations to be free of material misstatement.

6.6 *Approved Variance or Deviations*

BWSWA did not request any variances or deviations from the CAR protocol for the verification period.

6.7 *Changes Due to Errata & Clarifications Issued by CAR*

The issuance of the Errata & Clarification resulted in a change to the Attestation forms that the project developer submitted to CAR. First Environment reviewed the Attestation of Voluntary Implementation and the Attestation of Regulatory Compliance forms and confirmed that these forms were completed correctly and are on file with the CAR.

The Errata and Clarification did not result in any other changes to the verification process.

7. *Audit Results*

BWSWA provided good documentation for its emissions estimates, as well as its procedures surrounding the data collection process. To complete the verification process, First Environment requested corrective action and additional clarification from BWSWA. The responses given by BWSWA were sufficient to resolve the issues raised by the Audit Team.

Minor calculation errors were identified during the verification process; however, the misstatement was immaterial and therefore did not require corrective action.

Verified results show 35,621 metric tonnes of CO₂e from Vintage 2010 from the project reporting period of July 1 through December 31, 2010 eligible for registration with the Climate Action Reserve.

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 July 1 to December 31, 2010, can be considered with 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:

Reporting Period: July 1, 2010 to December 31, 2010	Total
Baseline Emissions (tCO ₂ e)	35,658
Project Emissions (tCO ₂ e)	37
Emissions Reductions (tCO ₂ e)	35,621

*as measured and calculated in accordance with the Project Methodology

9. Lead Verifier Signature



Ellen R. Reid
Senior Geologist

10. Senior Internal Reviewer Signature



James T. Wintergreen
Senior Associate