

Five-Year Review Report

Fourth Five-Year Review Report
For
Compass Industries Superfund Site
City of Sand Springs
Tulsa County, Oklahoma

April 2011

PREPARED BY:

United States Environmental Protection
Region 6
Dallas, Texas

and

Oklahoma Department of Environmental Quality
Oklahoma City, Oklahoma

Fourth Five-Year Review
Compass Industries Superfund Site
EPA ID# OKD980620983
Tulsa County, Oklahoma

This memorandum documents the United States Environmental Protection Agency's (EPA's) performance, determinations, and approval of the Compass Industries Superfund Site (site) fourth five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA), 42 United States Code (USC) §9621(c), as provided in the attached Fourth Five-Year Review Report prepared by Oklahoma Department of Environmental Quality (DEQ) and the Environmental Protection Agency.

Summary of Five-Year Review Findings

The fourth five-year review for this site indicates that the current site conditions are protective of human health and the environment. The remedial actions for this site continue to be implemented as set forth in the decision document. This assessment has been made based on a review of data available for the site, a site inspection, technical evaluation, and interviews.

In September 2006, DEQ placed a notice on the deed (Notice of Remediation under CERCLA) for the site. The deed notice is intended as an institutional control to provide notification of the site conditions and remedial actions and to restrict the uses of the land at the site and minimize potential exposure to contaminants.

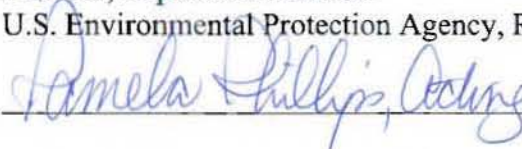
Actions Needed

To address the findings during the fourth five-year review, recommendations and follow-up actions have been identified for the site. The site is currently operating under the Post Closure Operation and Maintenance Plan (O&M) dated August 1991. This document should be reviewed and updated to reflect current site conditions and current procedures used during inspection, sampling, and reporting. The semi-annual inspections performed by the City of Sand Springs, during which the vents are sampled, the vegetative cover is inspected, and the cap/liner system is checked for evidence of damage from brush and burrowing animals should continue. Settlement monuments should continue to be surveyed every five years. Seeps should continue to be inspected during the semi-annual site inspections, and are to be sampled every five years if water is present.

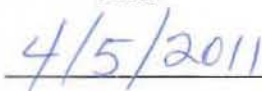
Determinations

I have determined that the remedy for the Compass Industries Superfund Site is protective of human health and the environment.

Samuel Coleman, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency, Region 6



Date



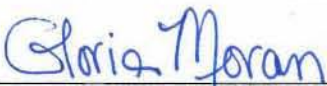
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FOURTH FIVE-YEAR REVIEW Compass Industries Superfund Site EPA ID# OKD980620983

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- Attachment 7 - Deed Search Memorandum
- Attachment 8 - Deed Notice

List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 also known as Superfund: Amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA).
CFR	Code of Federal Regulations
DEQ	Oklahoma Department of Environmental Quality
EPA	United States Environmental Protection Agency
FS	Feasibility study
FR	Federal Register
HDPE	High-density polyurethane
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List: A list of sites identified for remediation under CERCLA.
O&M	Operation and maintenance
OSDH	Oklahoma State Department of Health
OSWER	Office of Solid Waste and Emergency Response
OVA	Organic vapor analyzer
OWRB	Oklahoma Water Resources Board
ppm	parts per million
PRP	Potentially Responsible Parties
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial design/Remedial Action
RI/FS	Remedial investigation/ feasibility study
ROD	Record of Decision: Documents selection of cost-effective Superfund financed remedy.
SARA	Superfund Amendments and Reauthorization Act of 1986. (See CERCLA.)
SWDA	Solid Waste Disposal Act
TBCs	“To Be Considered” information
UAO	Unilateral Administrative Order
USACE	United States Army Corps of Engineers
USC	United States Code
WasteLAN	The Regional database related to CERCLIS

Executive Summary

Pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation & Liability Act (“CERCLA” or “Superfund”), 42 USC § 9621(c), the fourth five-year review of the remedy in place at the Compass Industries Superfund Site (“site” or “Compass Industries site”) located in Tulsa County, Oklahoma, has been completed. The results of the five-year review indicate that the remedy implemented at the site is protective of human health and the environment.

Under the statutory requirements of Section 121(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), P. L. 99-499, and the subordinate provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300.430(f)(4)(ii), performance of five-year reviews are required for sites where hazardous substances remain on site above levels that allow for unlimited use and unrestricted exposure. This situation applies to the Compass Industries site. The U. S. Environmental Protection Agency (EPA) completed the first five-year review at the Compass Industries site in September 2000, the second five-year review was completed in December 2001, and the third five-year review was completed in April 2006. The trigger for the first five-year review was the actual start of construction in January 1990. This is the fourth five-year review.

The fourth five-year review for this site indicates that the current site conditions are protective of human health and the environment. The remedial actions for this site continue to be implemented as set forth in the decision document. In September 2006, the Oklahoma Department of Environmental Quality (DEQ) placed a notice on the deed (Notice of Remediation under CERCLA) for the site. The deed notice is intended as an institutional control to provide notification of the site conditions and remedial actions and to restrict the uses of the land at the site and minimize potential exposure to contaminants.

To address the findings during the fourth five-year review, recommendations and follow-up actions have been identified for the site. The site is currently operating under the Post Closure Operation and Maintenance Plan (O&M) dated August 1991. This document should be reviewed and updated to reflect current site conditions and current procedures used during inspection, sampling, and reporting. Surface water data remained below monitoring level concentrations for successive five-year review periods. Based on the data provided over the last 15 years and in accordance with the O&M plan, it is recommended that the surface water sampling activity be discontinued. However, should site conditions indicate that there has been or will be potential offsite migration of waste, sampling of potentially affected media will be required. Seep sample locations should continue to be visually monitored to document the current status of water seepage. Sampling should be conducted prior to each five-year review if water is present. The semi-annual inspections performed by the City of Sand Springs, during which the vents are sampled, vegetative cover is inspected, and the cap/liner system is checked for evidence of damage from brush and burrowing animals should continue. Settlement Surveys should continue to be conducted once every five years.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Compass Industries (Avery Drive)		
EPA ID (from WasteLAN): OKD980620983		
Region: 6	State: Oklahoma	City/County: Tulsa County
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: November 1990	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Orphius Mohammad		
Author title: Engineer Intern	Author affiliation: Oklahoma DEQ	
Review period:** April 2006 to January 2011		
Date(s) of site inspection: 09 / 14 / 2010		
Type of review: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> Regional Discretion </div> <div> <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL State/Tribe-lead </div> <div> <input type="checkbox"/> NPL-Removal only </div> </div>		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input checked="" type="checkbox"/> Other (specify) 4 th (fourth)		
Triggering action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Actual RA Onsite Construction at OU #____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Other (specify) </div> <div> <input type="checkbox"/> Actual RA Start at OU#____ <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> </div>		
Triggering action date (from WasteLAN): April 24, 2006		
Due date (five years after triggering action date): April 24, 2011		

Five-Year Review Summary Form cont'd.

Issues: The fourth five-year review for this site indicates that the remedial actions set forth in the decision documents for this site continue to be implemented as intended by the decision documents. This assessment has been made based on a review of data available for the site, a site inspection, technical evaluation, and interviews. The short-term protectiveness of the remedy is not affected. In September 2006, the Oklahoma Department of Environmental Quality (DEQ) placed a notice on the deed (Notice of Remediation under CERCLA) for the site. The deed notice is intended as an institutional control to provide notification of the site conditions and remedial actions and to restrict the uses of the land at the site and minimize potential exposure to contaminants.

Recommendations and Follow-up Actions: To address the findings during the fourth five-year review, recommendations and follow-up actions have been identified for the site. The site is currently operating under the Post Closure Operation and Maintenance Plan (O&M) dated August 1991. This document should be reviewed and updated to reflect current site conditions and current procedures used during inspection, sampling, and reporting.

Surface water data remained below monitoring level concentrations for successive five-year review periods. Based on the data provided over the last 15 years and in accordance with the O&M plan, it is recommended that the surface water sampling activity be discontinued. However, should site conditions indicate that there has been or will be potential offsite migration of waste, sampling of potentially effected media will be required.

Seep sample locations should continue to be visually monitored to document the current status of water seepage. Sampling should be conducted prior to each five-year review if water is present.

The semi-annual inspections performed by the City of Sand Springs, during which the vegetative cover is inspected and the cap and liner system is checked for evidence of damage from brush and burrowing animals should continue.

Settlement Surveys should continue to be conducted once every five-years.

Protectiveness Statement(s): The remedy implemented at the Compass Industries site is protective of human health and the environment.

Other Comments: Reuse of the property that remains protective of the cap integrity is encouraged.

Fourth Five-Year Review Report Compass Industries Superfund Site

I. Introduction

The United States Environmental Protection Agency (EPA) Region 6 and the Oklahoma Department of Environmental Quality (DEQ) conducted a fourth five-year review of the remedial action implemented at the Compass Industries Superfund Site (“site” or “Compass Industries site”), located in Tulsa County, Oklahoma, for the period between April 2006 (when the third five-year review was completed) and September 2010. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment, and to document the methods, findings, and conclusions of the five-year review in a Five-Year Review Report. Five-Year Review Reports identify issues found during the review, if any, and make recommendations to address the issues. This Fourth Five-Year Review Report documents the results of the review for the Compass Industries Superfund site, conducted in accordance with EPA guidance on five-year reviews.

EPA guidance on conducting five-year reviews is provided by Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (EPA, 2001a). EPA and DEQ followed the guidance provided in this OSWER directive in conducting the five-year review performed for the Compass Industries site.

CERCLA, 42 USC § 9601 *et seq.* and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300 *et seq.*, call for five-year reviews of certain CERCLA remedial actions. EPA policy also calls for a five-year review of remedial actions in some other cases. The statutory requirement to conduct a five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA), P.L. 99-499. The EPA classifies each five-year review as either statutory or policy depending on whether it is being required by statute or is being conducted as a matter of policy. The fourth five-year review for the Compass Industries site is a statutory review. The EPA Five-Year Review guidance specifies that five-year reviews are required or appropriate whenever a remedial action results in hazardous substances, pollutants, or contaminants remaining on site at levels that will not allow for unlimited use or unrestricted exposure. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA § 121, as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for

which such review is required, the results of all such review, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the NCP Part 300 (40 CFR § 300.430(f)(4)(ii)) which states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The EPA five-year review guidance further states that a five year review should be conducted as a matter of policy for the following types of actions:

- A pre-SARA remedial action that leaves hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure;
- A pre or post SARA remedial action that, once completed, will not leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure but will require more than five years to complete; or,
- A removal-only site on the National Priorities List (NPL) where the removal action leaves hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure and no remedial action has or will be conducted.

In accordance with the EPA five-year review guidance, the five-year review for the Compass Industries site is being conducted because the implemented remedial action resulted in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure.

This is the fourth five-year review for the Compass Industries site. The first five-year review was completed in September 2000, the second five-year review was completed in December 2001, and the third five-year review was completed on April 24, 2006. EPA guidance indicates the triggering action date for the first statutory five-year review is the date at which on-site construction begins (January 1990), and for subsequent five-year review reports the trigger action is the date of the previous five-year review. Therefore, the fourth review for the Compass Industries site must be completed by April 24, 2011.

II. Site Chronology

Table 1: Chronology of Site Events

EVENTS	DATES
The site is operated as a quarry and limestone from the site is being utilized for cement and railroad ballast making.	1904
Quarrying operations have ceased and waste dumping activities have begun.	1964
The site is operated as a municipal solid waste landfill facility.	1972-1976
Several fires are reported at the landfill.	1970s
Waste disposal and landfill activities at the site cease.	Early 1980s
Air monitoring is conducted by EPA and Oklahoma Department of Health (OSDH) after repeated complaints were made by local residents and the media.	Early 1983
The Compass Industries site is proposed to the National Priorities List (NPL).	September 1983
Approximately 28 borings are installed to extinguish underground fires.	1983-1984
EPA and OSDH enter into a cooperative agreement to conduct the RI/FS.	July 1984
The Compass Industries Site is formally added to the NPL.	September 1984
The most recent underground fire burns out.	Late 1984
The Remedial Investigation Report is published and the Feasibility Study is completed.	July 1987
The Endangerment Assessment is published.	August 1987
The Record of Decision for the Compass Industries Site is signed.	September 29, 1987
EPA issues a Unilateral Administrative Order against seven PRPs.	March 1989
EPA installs a fence and posts warning signs around the site perimeter.	May-June 1988
The Remedial Design contract is awarded.	August 1988
EPA approves the Final Design.	April 1989
The Remedial Action begins with the construction of test fill.	January 1990
Clearing and grubbing is started and a subsurface drainage system is installed.	February 1990
Grubbing of the heavy vegetation is completed.	March 1990
The liner installation is complete.	October 1990
The final vegetative cover is planted.	April-May 1991
The Remedial Action is complete with the acceptance of the Remedial Action Report.	January 1991
The final site inspection for vegetative cover is completed.	August 29, 1991
EPA accepts the O&M Plan.	August 1991
O&M begins at the site with the collection of seep and background samples.	1991
The Close Out Report signifying site completion is signed.	June 30, 1992
EPA notifies the PRPs of the intent to monitor vents and seeps adjacent to the cap.	October 1993
1993 Annual Monitoring Report, Compass Industries Site.	January 18, 1994

1994 Annual Monitoring Report, Compass Industries Site.	December 30, 1994
The last seep sampling event occurred.	1995
1999 Annual Monitoring Report, Compass Industries Site.	December 30, 1999
EPA finalizes the first five-year review for the Compass Industries site.	September 26, 2000
2000 Annual Monitoring Report, Compass Industries Site.	December 31, 2000
A Notice of Intent to Delete and a Direct Final Notice of Deletion are published.	November 28, 2001
Second Five-Year Review Report completed.	November 2001
EPA publishes a removal of the deletion and establishes a new comment period.	March 19, 2002
The Notice of Intent to Delete is published.	July 18, 2002
O&M responsibilities shift to the City of Sand Springs. 2002 Annual O&M Report prepared and submitted by the City of Sand Springs.	2002
2003 Annual O&M Report prepared and submitted by the City of Sand Springs.	2003
2004 Annual O&M Report submitted by the City of Sand Springs.	December 31, 2004
2005 Operation and Maintenance Annual Report.	April 21, 2006
Third Five-Year Review Report completed.	April 2006
Explanation of Significant Differences issued.	August 15, 2006
Deed Notice filed in Tulsa County Registrar's Office for Compass Site.	September 29, 2006
2006 Operation and Maintenance Annual Report.	December 31, 2006 (received October 29, 2007)
EPA letter to City of Sand Springs City Planner, David Harris, regarding Proposed Mining and Mineral Processing Use (SUP-010).	January 12, 2007
EPA Letter to City of Sand Springs City Attorney, David Weatherford, Proposed Mining and Mineral Processing Use (SUP-010).	November 1, 2007
2007 Operation and Maintenance Annual Report.	December 31, 2007 (received August 25, 2008)
2008 Operation and Maintenance Annual Report.	December 31, 2008 (received May 27, 2009)
2009 Operation and Maintenance Annual Report.	December 31, 2009 (received July 2, 2010)
2010 Operation and Maintenance Annual Report.	December 31, 2010 (received February 7, 2011)

III. Background

Physical Characteristics

The Compass Industries Superfund site is an abandoned landfill located in a former limestone quarry west of Chandler Park in Tulsa County, Oklahoma (Lots 3 and 4, Section 18, Township 19 North, Range 12 East and Lot 6 NE1/4 SE1/4, Section 13, Township 19 North, Range 11 East). The site is situated on a bluff approximately one-quarter mile south and 200 feet above the Arkansas River, directly west of the Chandler Park softball facility (EPA, 1992). The Compass Industries site consists of approximately 125 acres, of which approximately 46 acres are located in the northeastern portion of the site, which is the primary area of concern (Flint, 1994). Aerial photograph of the site area is illustrated in Image 1 and 2.

The site's topography slopes downward to the west and north (EPA, 1992). However, it has been modified by quarrying, landfilling, and remediation activities. The road to the south of the remediation area forms a drainage divide, and most of the surface water from Chandler Park flows into one of two ditches located in the park area (EPA, 2001b). The majority of runoff flows through water gaps in the east-west ridge above Avery Drive. Runoff from precipitation, springs, and seeps flows in a westerly direction into the Arkansas River through a network of small streams (EPA, 1987b).

The site is underlain by two aquifers. The Hogshooter Formation contains a shallow, unconfined, low-yield, perched aquifer; while the Layton Sandstone member of the Coffeyville Formation forms a somewhat deeper aquifer. Between the upper and lower aquifers is a sequence of 32 to 50 feet of shale, which acts as a confining bed that restricts the downward migration of ground water. Therefore, most of the ground water contamination is confined to the Hogshooter Formation and the overlying soils. The Hogshooter Formation is exposed at the surface on all sides of the site (EPA, 1987b).

Recharge for both aquifers is from local precipitation infiltration and is discharged through seeps and springs into surface waters near and within the site. No use of water from either of these aquifers is known. Ground water flows to the west-northwest at the site. The average flow rate of both aquifers is 720 gallons per day, or an estimated 263,000 gallons of water per year (EPA, 1987b).

Land and Resource Use

Land ownership at the site can be classified as private. The site is zoned as industrial while being surrounded by areas zoned for agriculture, commercial, and residential. See Figures 4 through 6 for zoning maps of Tulsa County.

According to the Tulsa County Assessor's Office, the legal description crosses 2 parcels of land, taking neither of them in their entirety. There are two separate owners listed as follows: (1) Jim's Inc, 1925 E 5th St, Tulsa, OK 74104 and (2) A J B Inc, PO Box 471555, Tulsa, OK 74147-1555.

In September 2006 a Deed Notice was filed with Tulsa County restricting the use of the site (Attachment 8). The owner of the affected property created an easement granted to the DEQ and its employees and agents to assure the ongoing protection of the remedy, engineering controls and land use restrictions. The easement is legally binding on all future owners of the

affected property and will only be removed or modified if the DEQ with written notice to the EPA modifies or removes its land use restrictions or engineering controls. The engineering controls at this site include:

- (i) The landfill cap and its components,
- (ii) The perimeter fence, and
- (iii) The signs along the property boundary.

The land use restrictions at the site include:

- (i) No digging on the capped area,
- (ii) No activities that will cause erosion or disrupt the integrity of the cap or landfill,
- (iii) No use, for any purpose, of the ground water,
- (iv) No water wells of any kind drilled within the cap or landfill, and
- (v) No residential use of the affected property.

History of Contamination

The site was originally operated as a quarry, and limestone from the site was being utilized for cement and railroad ballast making as early as 1904. Quarry operations at the site continued into the early 1960s. Aerial photography from 1964 shows that by that time quarrying operations had ceased, and waste dumping activities had begun (EPA, 2001b).

Between 1972 and 1976, the site operated as a municipal solid waste landfill facility permitted by the Oklahoma State Department of Health (OSDH); however, photographic evidence shows waste disposal and landfill activities continued into the 1980s (EPA, 2001b). Disposal of industrial waste was performed at the facility, even though it was not allowed as part of the permit conditions and regulations. Site data indicates that wastes were disposed of in an irregular manner, making it difficult to ascertain where the wastes of concern were located (EPA, 1987b). Records show that the site accepted three categories of wastes: solids, liquids, and sludges, which included acids, caustics, potentially toxic solvents, and potentially carcinogenic materials (EPA, 2001b). The absolute volumes of the pollutants are unknown, but are estimated to be approximately 620,000 cubic yards (EPA, 1987b).

Initial Response Actions

Several fires were reported at the landfill during the 1970's. Often these fires were the result of the spontaneous combustion of the waste materials, burned underground for extended periods of time, and expelled smoke from the ground which was multi-colored and produced odors (EPA, 2001b). The most recent fire burned underground for several years, occasionally breaking through the top soil cover, and burned out in late 1984. Citizens and the media complained of odors early in 1983, which prompted air monitoring in the vicinity of the landfill by the EPA and OSDH. Air monitoring results revealed the presence of some organics, but at levels that were considered non-hazardous. The EPA proposed the Compass Industries site to the NPL in September 1983 (EPA, 1987b). The NPL is the list, compiled by EPA, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response. During 1983 and 1984, approximately 28 borings were installed at the site to extinguish underground fires (EPA, 2001b). The site was listed on the NPL in September 1984.

In July 1984, the EPA and OSDH entered into a Cooperative Agreement to conduct a Remedial Investigation (RI) and Feasibility Study (FS) at the site (Flint, 1994). During the RI, samples were collected from soil, water, and air. The routes of offsite migration examined included surface runoff, ground water, transported sediments, and air. Analytical results identified 12 inorganic and 33 organic priority pollutants. The most common priority pollutants were base-neutral compounds, which had the greatest concentrations in samples of waste collected from surface and test trench soils. Findings from the RI included the following:

- Migration of contaminants in the ground water was being mitigated by attenuating mechanisms.
- Offsite migration of contaminants was limited to surface runoff and seeps.
- The shallow aquifer was contaminated, and the deeper aquifer was also contaminated, but to a lesser extent.
- Soil samples collected in the drainage ways were contaminated with inorganic priority pollutants, and wastes sampled on the ground surface showed significant concentrations of both inorganic and organic priority pollutants.
- The large spatial variation in compounds detected and their concentrations suggested that the disposal and types of wastes disposed may have varied widely across the site.
- Some, but not all, of the random soil samples taken from the site showed significantly higher concentrations of priority pollutants than the background soil samples (EPA, 1992).

In July 1987, the FS for the site was completed (EPA, 1992). The EPA signed a Record of Decision (ROD) for the site on September 29, 1987 (EPA, 1987b). The remedy selected and implemented under the ROD was Capping and On-site Ground Water Treatment.

In August 1987, an Endangerment Assessment study was completed for the site. The study picked 15 chemicals as indicator chemicals from among those found at the site. The indicator chemicals were selected using the magnitude of their indicator scores and an evaluation of their environmental fate and transport characteristics. Findings from the Endangerment Assessment included the following:

- Ingestion of ground water was not considered a potential exposure pathway since nearby residents use city water.
- Ingestion or dermal absorption of surface water was determined not to pose a health hazard.
- Site soils represented the only contaminated environmental medium for which the exposure pathways were complete (EPA, 1987a).

Basis for Taking Action

The purpose of the response actions conducted at the Compass Industries site was to protect public health and welfare and the environment from releases or threatened releases of hazardous substances from the site. The primary threat that the Compass Industries site posed to public health and safety was the potential for recurring fires with toxic air emissions, which had the possibility of reaching nearby residences. In addition, there was a potential for surface

discharges along the bluff below the landfill site. The area is also a bald eagle habitat (EPA, 1987a).

IV. Remedial Actions

Remedial Action Objectives

The specific remedial objectives of the remedial action were to prevent direct contact between the contaminated site materials, including soil, leachate, surface waters, and air emissions, and the human and animal population; prevent the infiltration of precipitation into the waste; and divert surface run-on and promote natural drainage of precipitation from the landfill.

Remedy Selection

The ROD was signed on September 29, 1987. The principal concerns addressed at the site were from surface soils contaminated with inorganic and organic priority pollutants. The remedy described in the ROD included the following elements:

- Resource Conservation and Recovery Act (RCRA) cap involving site grading, cap placement, diversion of surface water, and air emissions monitoring.
- Ground water will be treated at a later date if found to be necessary.
- Installation of security fences and signs to restrict access to the site.
- Monitoring of the site for 30 years to ensure no significant offsite migration.
- Additional remedial action if significant migration of contaminants occurs (EPA, 1987b).

On August 15, 2006, the EPA, in consultation with DEQ, issued an Explanation of Significant Differences (ESD) for the Site. The purpose of the ESD was to document post-Record of Decision changes based on Agency guidance regarding the evaluation and implementation of Institutional Controls (EPA, 2000 and 2003). The ESD revised the selected remedy to include an Institutional Control (IC) as a component of the overall remedy because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. An IC is needed to ensure the long-term protectiveness of the remedy, and will restrict the uses of the land at the Site and minimize potential exposure to contaminants. As discussed under Section 3, the IC was filed by DEQ on September 29, 2006.

Remedy Implementation

Essential elements of the remedial design (RD) included: landfill boundary investigation, cap design, subsurface drainage, runoff control, water treatment building, decontamination area, gas venting system, design drawings, treatment of ground water (if necessary, after compliance monitoring following the placement of the cap), cost effectiveness screening, and cost estimate. The contract for the RD was awarded to Bechtel Environmental, Inc. in August 1988 by the OSDH. The Final Design Report was completed in March 1989 and approved by EPA in April 1989 (EPA, 1992).

In late March 1989, EPA issued a Unilateral Administrative Order (UAO) to seven potentially responsible parties (PRPs) to assume responsibility for remedial actions at the site

(EPA, 1989). Three of the PRPs (Sun, Texaco, and Standard Royalties, Inc.) agreed to perform the remedial action (RA) in accordance with the EPA approved RD. Bechtel Environmental, Inc. was the contractor selected by the PRPs to perform the RA. Essential elements of the remedial action included: subcontract award and mobilization, clearing and grubbing, grading, construction of the clay cap, placement of the liner, permanent vegetative cover, final inspection, and demobilization (EPA, 1992).

Site mobilization was initiated in January 1990. Site work involving clearing and grubbing and waste reshaping were performed in phases throughout the time frame beginning January 1990 and ending in October 1990 (Bechtel Environmental, 1991). A subsurface drainage system to collect leachate was installed February 1990 and operated during remedial action construction activities until construction completion. The waste was reshaped and compacted to reduce settlement of the cap using a large track dozer, rubber tire scrapers, and other heavy equipment. The excavation of a 36-inch wide perimeter trench and the plugging of the existing monitoring wells were done in conjunction with the reshaping of the waste (EPA, 1992).

A gas transmission geotextile layer was placed directly over the reshaped waste to intercept gases. The clay cap was then placed in 8 inch lifts and compacted until 24 inches of cover was attained. Following the completion of the clay liner, the geosynthetic liner system was installed, which included an impermeable 30 mil membrane (HDPE) liner and subsurface drainage system (consisting of geotextile, and geogrid panels). A sandy soil was then placed over the drainage system and covered with topsoil. The cover soil layer was placed in one 18-inch lift within 48 hours of the completion of the drainage system. Rip-rap was placed at the west end of the site and graded. A 4-inch layer of gravel was placed between the geogrid layer and the rip-rap to further facilitate drainage. The liner installation was completed by October 1990. The site was then seeded with temporary winter cover. Site work was completed by installing a new fence at the west end of the site and repairing the existing fence along the south side of the site. Demobilization activities were completed by the end of November 1990. The Remedial Action Report signifying the end of the RA was signed on January 28, 1991 (Bechtel Environmental, 1991). The final vegetative cover was deferred until the spring of 1991 to facilitate better growth of native spring grasses. Repair work and the final vegetative cover were completed by August 29, 1991. The Closeout Report was signed on June 2, 1992 signifying site completion (EPA, 1992).

Operation and Maintenance

O&M activities prescribed by the Record of Decision (ROD) included a ground water and air monitoring and analysis program, inspection of the surface vegetation, and the periodic repair of the perimeter fence and signage. Cap maintenance entailed inspecting the cap and maintaining and replacing the passive gas filters in the gas collection and venting system. The ROD also required the site be monitored for a period of at least 30 years after the completion of the RA (EPA, 1987b).

Following construction activities, a post-closure O&M Plan was developed and finalized in August 1991, specifying both Environmental Monitoring and Performance Monitoring (EPA,

1992). The scope of the Environmental Monitoring program was sampling and analysis of ground water, surface water, and sediment for parameters which could potentially pose a threat to human health and the environment. Ground water sampling was to be conducted through sampling of seeps on the northeast bluffs to check for the presence of chemical contaminants within the perched aquifer. The Performance Monitoring program was designed to verify that the main engineered elements were performing as designed and to detect trends that could indicate weakness developing in the containment system so that corrective action could be taken before the integrity of the structure was compromised. Monitoring consisted of visual inspection during walkovers, topographic surveys based on predetermined grid lines, and aerial surveys. Settlement monuments were to be surveyed semi-annually for the first year, annually for the second through fifth years, and then every five years after that. The landfill surface was inspected semi-annually, and repairs performed as needed (EPA, 1992). [It should be noted that the volume of gas was anticipated to be small and have low toxicity. Therefore, during design and installation of the passive vent system, it was determined that vent filters were not needed and accumulated gases would vent directly into the atmosphere.]

Flint Environmental Services (a division of Flint Engineering & Construction Co.) was contracted to operate the site and complete the tasks assigned in the O&M Plan (EPA, 2001b). O&M began at the site in 1991 with the collection of seep and background samples. In 1994, Flint Engineering & Construction Co. divested itself of Flint Environmental Services. Operation of the site then transitioned to Mr. J. Scott Stelle, R.E.M., who had been the project manager (EPA, 2001b). O&M activities during 2001 were performed by Stelle & Associates Inc. After the second five-year review report was completed, the responsibility for the O&M activities shifted to the City of Sand Springs (City of Sand Springs, 2002).

In 2002 after several years of sampling and data review, the EPA, in consultation with DEQ, concluded that a reduction in sampling of the surface water and ground water seeps was appropriate due to the lack of occurrence of seeps (last ground water seep sampling in 1995) and the lack of detected contaminants in surface water as well as its lack of occurrence (last surface water sampling in 2000). The O&M requirements and sampling schedule was further clarified in 2003, and is summarized in Table 2 (EPA, 2003). Further discussion related to O&M activities is provided in Section 6 under Data Review.

Table 2: Current O&M Requirements

Activity	Schedule
Seep Sampling - Samples will be taken and analyzed to ensure that no offsite ground water migration from the perched aquifer is occurring.	Every five years, if water is present. Data and description to be included in the five-year review.
Surface Water Sampling - Samples will be taken and analyzed to ensure that no offsite migration is occurring.	Every five years, if water is present. Data and description to be included in the five-year review.
Site Inspections - The integrity of the fence, gas vents, and cap will be inspected for signs of vandalism, erosion, degradation, and repair.	Semi-annually. Description to be included in the Annual O&M Report and the five-year reviews.
Settlement Survey - Settlement of the landfill over time will be monitored.	Every five years. Data and description to be included in the five-year review.
Site Maintenance -Vegetation and slope at the site must be maintained in such a condition to prevent erosion of the soil at the Affected Property to maintain cap integrity and stability.	As necessary, based on semi-annual Site Inspections and Five-year Reviews. Description to be included in the Annual O&M Report and the five-year reviews.
Vent Sampling - The gases being released from the landfill will be monitored.	Semi-annually. Data and description to be included in the Annual O&M Report and the five-year reviews.
Institutional Controls - The deed files will be checked to ensure that the notices remain in place.	Semi-annually. Status to be reported in the Annual O&M Report and the five-year reviews.
Annual O&M Report - A report of all site activity and sampling results will be submitted to the regulatory agencies.	Annually

V. Progress since the Last Five-Year Review

The remedial activities specified in the ROD have been implemented, and the completion of remedial action was documented in the final remedial action report dated January 1991. Since the start of remedial action, and during the O&M phase of the project, three five-year reviews were completed, and are briefly summarized below.

First Five-Year Review September 26, 2000

The first five-year review was delayed due to the lack of a clear definition of the capped area. In 1997, the cap was surveyed and defined by the legal metes and bounds definition. Despite the delay in the Five-Year Review, the requirements of the 1991 August O&M Plan were being conducted. Monitoring at the site included sampling ground water seeps and surface water for five-plus years past cap installation. Data review indicated that contaminants of concern did not exceed the monitoring concentration levels established in the O&M Plan (EPA, 2000).

The remedy of a RCRA cap over the landfill was found to be operating as designed. It was in good condition, with minor repairs having been made. Settlement of the cap was minimal, and the appurtenant structures were in sound condition with no signs of physical deterioration. No major deficiencies were noted, but the following potential deficiencies were identified:

- Continued mowing of the native grasses may result in a buildup of thatch; therefore, if mowing continues, the site should be raked approximately every four years.
- As the area returns to native vegetation, woody plants with strong root systems may damage the liner system; therefore woody vegetation should be removed at least annually.
- Burrowing animals, including mice, rats, and snakes, may also damage the liner system; therefore, continued periodic checks on the site should be maintained.
- Erosion of the RCRA cap continues to be a concern, and the site should be periodically inspected to ensure that the full 24 inches of the RCRA cap remains intact (EPA, 2000).

Second Five-Year Review December 26, 2001

The Second Five-Year Review report concluded that the remedial actions implemented at the Compass Industries site were expected to be protective; therefore, the remedy for the site was protective of human health and the environment. The Second Five-Year Review Report stated that the remedy was functioning as designed. The cap was generally in good condition, with noticeable minor repairs having been made in the past, and settlement had been minimal. All analyses of the surface water had shown no contaminants above the remedy threshold, and the fence had kept the site generally secure, with only infrequent trespassing (EPA, 2001b). Table 3 summarizes the recommendations and follow-up actions completed.

Table 3: Second Five-Year Review Recommendations and Follow-up Actions

Recommendation	Follow-up Action	Completed
Remove woody vegetation from the north slope	Woody vegetation removed	2001
Add more rip-rap to the lower end of the swale	Rip-rap added	2001
Survey the settlement monuments	Settlement monuments surveyed	2001
Rake approximately every 4 years if mowing continues at the site	Site Monitored	Continued with repairs as necessary.
Remove woody vegetation at least annually	Site monitored and woody vegetation removed as necessary	2004
Continue periodic checks for burrowing	Site inspections conducted semi-annually	Continued with repairs as necessary.
Periodically inspect the cap to insure that the full 24-inches remains intact	Site inspections conducted semi-annually	Continued with repairs as necessary.

Third Five-Year Review April 24, 2006

The third five-year review concluded that the remedy implemented at the Compass Industries site was protective of human health and the environment in the short-term, and would remain so provided the integrity of the cap was maintained through removal of woody vegetation, prevention of erosion, maintenance of the vegetative cover, and implementation of institutional controls. Table 4 summarizes the recommendations and follow-up actions completed.

Table 4: Third Five-Year Review Recommendations and Follow-up Actions

Recommendation	Follow-up Action	Completed
Remove woody vegetation from the southwest boundary of the cap	Woody vegetation removed	2006, 2008, 2009, 2010
Repair erosion areas along the western boundary and add rip-rap as necessary to limit further erosion	Rip-rap added	2006
Survey the settlement monuments	Settlement monuments surveyed	2006 and 2010
Continue Semi-annual site inspections	Site inspections conducted semi-annually	Continued with repairs as necessary. 2009 and 2010 repair to site fence and signs.
Implement Institutional Control	Notice of Remediation under CERCLA	2006

Progress since last Five-Year Review

- To ensure continued long-term protectiveness, trees located along the perimeter fence and encroaching on the edge of the landfill in the southwestern portion of the site have been removed.
- Erosion in the western area of the site has been checked and riprap has been added to prevent further erosion.
- The settlement monument surveying scheduled for early 2006 and in 2010 has been conducted, and the results reviewed in this report.
- The annual inspections to check the vegetative cover and the cap and liner system for evidence of damage from brush and burrowing animals, have been conducted by the City of Sand Springs routinely.
- Finally, in September 2006, the Oklahoma Department of Environmental Quality (DEQ) placed a notice on the deed (Notice of Remediation under CERCLA) for the site. The deed notice is intended as an institutional control to provide notification of the site conditions and remedial actions and to restrict the uses of the land at the site and minimize potential exposure to contaminants.

VI. Five-Year Review Process

This fourth five-year review for the site has been conducted in accordance with the EPA's Comprehensive Five-Year Review guidance dated June 2001 (EPA, 2001a). Interviews were conducted with relevant parties; a site inspection was conducted; and applicable data and documentation covering the period of the review were evaluated. The activities conducted as part of this review and specific findings are described in the following paragraphs.

Administrative Components

The fourth five-year review team:

- Orphius Mohammad, DEQ.
- Hal Cantwell, DEQ.
- Amy Brittain, DEQ.
- Don McElhaney, DEQ.

The review was conducted from July 2010 to October 2010. The tasks for the five-year review included:

1. Inspection of the site on September 14, 2010.
2. A press release stating that a five-year review was underway published on August 13, 2010.
3. Inspection of the Deed Notice on July 21, 2010.
4. Inspection of the site repository on July 21, 2010.
5. Review of relevant documents, and
6. Preparation of the five-year review report.

Community Involvement

The community was notified on August 13, 2010 that a five-year review was being conducted. A draft copy of the public notice is provided as an attachment to this report (Attachment 5).

Upon signature, the Fourth Five-Year Review Report will be placed in the information repositories for the site, both local to the site and at the EPA Region 6 office in Dallas, Texas and DEQ Central Records in Oklahoma City. A notice will then be published in the local newspaper to summarize the findings of the review and announce the availability of the report at the information repositories.

Documents Review

The fourth five-year review consisted of a review of all documents including operation and maintenance reports relevant to the Compass Industries Site (Attachment 4).

Data Review

The three major pathways for possible off-site contamination were surface water, ground water, and air (discussed under vent sampling). The possible exposure of individuals to surface water and ground water through the following routes, incidental ingestion of surface water and ground water as drinking water and dermal contact with ground water or surface water, were considered. There also was the potential for direct contact with contaminated source materials. Post construction O&M activity was designed to monitor these media to determine remedy performance.

Seep Sampling

The site is underlain by two aquifers. The samples of the ground water monitoring wells showed high concentrations. This indicated a degradation of ground water quality due to the landfill waste being present in the perched aquifers. Recharge for both aquifers is from local precipitation infiltration and is discharged through seeps and springs into surface waters near and within the site. Because the perched aquifers are recharged and may transport contaminants off-site through seeps, the post closure environmental monitoring program was implemented.

The ROD specifies that “collection and on-site treatment of contaminated ground water in the upper, perched water bearing zone shall be performed, if deemed necessary, through compliance monitoring following installation of the cover material.” One of the RAOs was to “prevent the infiltration of precipitation into the waste.” Therefore, the seep water monitoring program was designed to monitor potential migration of materials from the site. Location and compliance monitoring of natural ground water seeps from the perched aquifers was monitored for the presence of chemical contaminants as listed in Table 5. The seep samples were collected to determine if contaminants were leaching out of the wastes and transported offsite. These data were used to determine the need for ground water treatment, as well as confirm that the RCRA cap had achieved the ROD requirement of limiting precipitation infiltration into the waste area.

Table 5: Monitoring Concentration Levels

Analyte	Monitoring Concentration Level (µg/L)
Arsenic	250
Chromium (IV)	1200
Lead	340
Bis(2-ethylhexyl)phthalate	5000
Benzene	116
Polychlorinated Biphenyl	0.1
Total Organic Carbon	reported
Biochemical Oxygen Demand	reported
Total Suspended Solids	reported
pH	reported

Notes: µg/L = micrograms per liter

The first and second five-year reviews, noted that the seeps had not been sampled since 1995 as they had stopped flowing. In addition, efforts to locate other seeps were unsuccessful. During those reviews, the data collected up to 1995 were reviewed, and it was concluded that the seep data did not exceed the monitoring concentration levels set in the O&M plan (Refer to previous five-year reviews for data tables). The O&M plan further defined the need for future action based on the following: (1) “If during any 5 year period the monitoring results for any contaminant are continuously below the monitoring concentration, the seep will be considered clean for that contaminant and analysis for that contaminant can be discontinued.” and, (2) “After successive sampling events of no discharge detected, if possible, an alternate location shall be selected in the same general area. If an alternate location isn’t found, the marked seep can be reported as no discharge and sampling discontinued for that location.”

In 2002, based on the site data results and the lack of seep discharge, the EPA, in consultation with DEQ, agreed to adjust the seep sampling requirements and further clarified the sampling activity in 2003. Seep sampling was to be conducted prior to each five-year review if water was present. During the 2006 five-year review, the presence of seep water remained absent.

As part of the fourth five-year review, the seep area was investigated for the presence of water. No seep water was identified. The seeps continue to remain dry. As such, the absence of water seeping from the sampling locations appears to be indicative of the RCRA cap’s continued effectiveness in limiting or mitigating precipitation infiltration into the perched aquifer. In addition, the lack of water seepage precludes the need for onsite treatment of the perched ground water.

Surface Water and Sediment

One of the ROD RAOs was to “divert surface run-on and promote natural drainage of precipitation from the landfill.” Therefore, monitoring surface water and sediment would provide an indication of the adequacy of the run-on/run-off controls as well as contaminant containment over time.

The cap and berm structures were constructed to divert surface runoff consisting of sheet flow into natural runoff channels located along the northwestern/western part of the site. This swale collects sheet flow from the cap and carries the water to a point beyond the hazardous waste capped area where it is ultimately drained from the site through existing natural channels into the Arkansas River.

During the first and second five-year reviews, the surface water data collected up to 2000/2001 were reviewed, and it was concluded that the data did not exceed the monitoring concentration levels set in the O&M plan. The last few years had results at or slightly above the detection limit (*Third Five-Year Review Report for the Compass Industries Superfund Site, Tulsa County, Oklahoma, CH2M HILL, 2006*).

In 2002, based on the site data results, the EPA, in consultation with DEQ, agreed to adjust the surface water and further clarified the sampling activity in 2003. Surface water sampling was to be conducted prior to each five-year review if water was present.

During the 2006 five-year review, the presence of surface water remained absent. The last surface water sampling was conducted prior to completion of the second five-year review. During 2002, 2003, and 2004, walkovers of the area were performed, with no resulting notice of surface water.

Table 6: Surface Water Monitoring Concentration Levels

Analyte	Monitoring Concentration Level (ug/L)	Surface Water Results							
	(ug/L)	2006			2010				
Sample Identification Number		Site #2	Site #3	Site #6	C01	C02	C03	C05	C06
Arsenic	250	<20	<20	<20	<20	<20	<20	<20	<20
Chromium (IV)	1200	ND at 50	ND at 50	ND at 50	ND at 20	ND at 20	ND at 20	ND at 20	ND at 20
Lead	340	<5	<5	<5	<5	<5	<5	<5	<5
Bis(2-ethylhexyl)phthalate	5000	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	116	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Polychlorinated Biphenyl	0.1	ND at 0.5	ND at 0.5	ND at 0.5	ND at 0.5	ND at 0.5	ND at 0.5	ND at 0.5	ND at 0.5
Total Organic Carbon	reported (mg/L)	18	9	7	12	12	12	8	11
Biochemical Oxygen Demand	reported (mg/L)	12	<3	<3	<3	<3	<3	<3	<3
Total Suspended Solids	reported (mg/L)	355	6	12	88	6	<5	<5	<5
pH	reported	7.2	7.4	7.4	8.36	8.48	8.44	8.5	8.39

Notes: $\mu\text{g/L}$ micrograms per liter
 mg/L milligrams per liter
 ND not detected at the reporting limit
 NS not sampled due to insufficient volume.

In 2006 and 2010, surface water was present in the swale and samples were collected. The 2006 results were not available at the time of the 2006 five-year review and are included here. Results from these two sampling events indicate that the monitoring concentrations as set in the O&M Plan were not exceeded (Table 6). However, the detection limit for the polychlorinated biphenyls (PCBs) was reported as 0.5 $\mu\text{g/L}$, which is above the O&M monitoring concentration of 0.1 $\mu\text{g/L}$. PCBs were not detected at the 0.1 $\mu\text{g/L}$ detection limit for years 1993 through 2000, and are not expected to be present in the samples collected in 2006 and 2010. Based on successive years of non-detected concentrations, it is recommended that surface water sampling be discontinued. However, should future condition change and call into question remedy protectiveness, surface water sampling will be required.

The O&M plan indicates that sediment samples would be collected along with surface water, but did not provide any monitoring concentration levels for such sampling. Written documentation was not found, however; discussions with the previous RPMs (state and EPA) and previous site O&M contractors indicated that sediment sampling was eliminated prior to the start of O&M sampling activities in 1992. During the RA, sediments in the swale and all

exposed waste materials in the vicinity were removed, consolidated and capped. Any soil run-off from the site would be the result of the erosion of clean fill used to complete the cap construction.

Cap inspections conducted through this five-year reporting period did not indicate the presence of standing water on the capped area or within the swale. As such, the cap and berm structures continue to control run-on/runoff and the drainage swale continues to discharge surface run-off effectively. No indication of offsite migration of contaminants has been found as all surface water data results are below the site monitoring concentrations. No annual report (from 1992 to the present) has indicated the presence of significant siltation or sediment accumulation nor have there been erosion issues that would lead to potential offsite migration of waste material through this pathway.

Vent Sampling

As described in the Final Design Report dated March 1989, a secondary function of the cap was to contain small amounts of gas being generated in the waste to prevent or relieve any gas buildup under the cap. The venting system was designed as a passive system which permits the gas to migrate through a porous layer to the high points of the fill and collect in a gravel filled trench which encircles the site. The collected gases are then vented into the atmosphere. Since the volume of gas was anticipated to be small and have low toxicity, it was designed to be vented directly into the atmosphere without passing it through filters. The only noted impacts on air quality were evident during remedial action when the waste was being managed.

The August 1991 O&M plan does not describe or discuss the need for vent sampling. As noted above, the expectation was that the volume of gas would be small and would have a low toxicity. In October 1993, vent sampling for the presence of organic vapors was added to the O&M activity schedule, and the first round of vent sampling was conducted in 1994. Sampling was conducted monthly through 2000 with a field analytical screening tool identified as a Foxboro Organic Vapor Analyzer with a flame ionization detector. These data were reviewed annually and subsequently in the first and second five-year reviews. (*Third Five-Year Review Report for the Compass Industries Superfund Site, Tulsa County, Oklahoma, CH2M HILL, 2006*). The conclusion was that the presence of organic vapors indicated that the waste continues to off gas and that the venting system was working. The organic vapor concentrations present were probably methane gas from the biodegradation of the waste materials and were not considered a hazard in the open atmosphere at these levels.

In 2003, EPA, in consultation with DEQ, sent the City of Sand Springs a letter clarifying the responsibilities for O&M activities as well as describing site activities that need to be conducted on a regular schedule. Specific to vent sampling, this was to be conducted semi-annually during the site inspections. Due to the turn-over in City personnel and a lack of documentation related to site O&M activities, vent sampling was not conducted in 2002 or 2003.

The 2006 five-year review had data for the two rounds of sampling conducted in 2004 available for review. Sampling was conducted with a field screening tool identified as Mini Rae 2000 Organic Vapor Analyzer with Photoionization Detector (PID) calibrated using a 100 part per million (ppm) isobutylene span gas. Analytical results for organic vapors ranged from 0 ppm

to just below 20 ppm. The review concluded that these levels were consistent with previous years, and that these field readings were not a concern.

With the submittal of the 2008 Annual Report, further review of the vent sampling process and field screening tool was conducted. Through numerous emails and phone conversations, it was determined that the current field screening tool did not have the capability to detect methane. In 2009, a Photovac Micro Flame-Ionization Detector (FID) was included in addition to the PID, so that methane could be measured. Vent sample data collected using the PID from 2005 through 2009 is less than 50 ppm with two exceptions (Tables 7 and 8). Vent 2 reported results between 1300-9000 ppm for October 2006 followed by 312 ppm in June 2008, and Vent 5 reported 140 ppm for October 2006. In September, methane results were detected in Vents 2 (24000 ppm), 3(>50000 ppm), 7 (5000 ppm), and 8 (3265 ppm). In December, methane results were detected in Vents 1(26000 ppm), 2 (14000 ppm), 3(>50000 ppm), 8 (17500 ppm), 9(46.5 ppm), and 11 (3180 ppm). Locations of vents are illustrated in Figure 2.

Table 7: Vent Sample Results for 2004 through 2008

Sample Date		vent 1	vent 2	vent 3	vent 4	vent 5	vent 6	vent 7	vent 8	vent 9	vent 10	vent 11
2004	Mar	0	0	0	0	0	0	0	0	0	0	0
	Oct	0	19.8	0	0	0	0	0	0	0	0	0
2005	Mar	0	0	0	0	0	0	0	0	0	0	0
	Oct	0	12.4	0	0	0	0	0	0	0	0	0
2006	Apr	2.8	0	0	0	0	0	0	0	0	0	0
	Oct	0	1300-9000	0	48.4	140	35.8	0	0	0	0	38.4
2007	June	1.8	316	3.6	1.3	0	0	0	0	0	0	0
	Nov	0	0	0	0	0	0	0	0	0	0	0
2008	Aug	0	0	0	0	0	0	0	0	0	0	0
	Dec	5.9	5.2	8.2	0	28.3	29.3	0	0	0	0	0

Notes: 0 below detection limit
 ppm all results are reported in parts per million by volume
 OVA All sampling conducted with a Mini Rae 2000 Organic Vapor Analyzer with Photoionization Detector calibrated using a 100ppm isobutylene span gas.

Resources: Five Year Review 2000, 2nd Five Year Review 2001, Oct 1993 Letter, O&M Manual 1991, April 10, 2003 Letter, Feb 19, 2002 Letter

Table 8: Vent Sample Data for 2009-2010

Sample Date	Sample Instrument	vent 1	vent 2	vent 3	vent 4	vent 5	vent 6	vent 7	vent 8	vent 9	vent 10	vent 11	Measurement
2009													
Sept*	PID	0	6.2	5.1	0	0	0	0	0	0	0	0	ppm
	FID	7.2	24000	>50000	38.5	44.5	52	5000	3265	55	50	60	ppm
	FIDB	5	57	637	36	44	53	58	50	55	50	60	ppm
	TSI	22	80	76	80	60	70	53	39	55	39	33	ft/min
Dec**	PID	5.1	2.1	1.8	1.4	0	0	0	0	0	0	0	ppm
	FID	26000	14000	>50000	0	0	8.8	2.6	17500	46.5	78	3180	ppm
	FIDB	61	0	0	0	0	5.1	1.3	17.1	1	46	57	ppm
	TSI	80	80	80	60	60	60	50	40	50	40	30	ft/min
2010													
May***	PID	0	0	0	0	0	0	0	0	0	0	0	ppm
	FID	0	0	0	0	0	0	0	0	0	0	0	ppm
	FIDB	0	0	0	0	0	0	0	0	0	0	0	ppm
	TSI	63	101	17	30	4	0	0	3	13	12	5	ft/min
Dec	PID	0	2.5	1.4	0	0	0	0	0	0	0	0	ppm
	FID	>6270	>6270	>6270	0.3	0.1	25.6	0	>6270	379	0.1	665	ppm
	FIDB	1	0.5	7	0.2	0	0	0	0	1.4	0.8	0	ppm
	TSI	48	0.5	20	70	60	50	50	12	60	40	100	ft/min

Notes: * Gusty winds lead to uncertainty related to velocity readings.
 ** Velocity meter malfunctioned after 2 vents. Reported velocities are estimates based on previous readings.
 *** PID and FID were checked three times to make sure the equipment was functioning properly. No issues identified.
 0 below detection limit
 ppm all results are reported in parts per million
 PID All organic vapor samples were collected using a Mini Rae 2000 Organic Vapor Analyzer with Photoionization Detector calibrated using a 100ppm isobutylene span gas
 FID All methane vapor samples were collected using a Photovac Micro Flame-Ionization Detector. It was calibrated for methane and fitted with a carbon filter on the intake
 TSI All flow rates were measured using a TSI Velocichk 8340 measured in feet per minute.
 FIDB Background methane vapor samples collected using the Photovac Micro Flame-Ionization Detector.
 ft/min feet per minute

Resources Five Year Review 2000, 2nd Five Year Review 2001, Oct 1993 Letter, O&M Manual 1991, April 10, 2003 Letter, Feb 19, 2002 Letter .

The ROD does not include any specific guidelines for vent sampling, and vent sampling was not further discussed or described in the O&M Plan. Vent sampling for the presence of organic vapors was added to the O&M activity schedule in October 1993 to verify that the gas collection system was working as intended. The continued presence of organic vapors indicates the system continues to collect landfill gases and vent them to the atmosphere.

Methane gas produced by decomposing solid wastes can become an explosion hazard. The lower explosive limit (LEL) for methane is 5% methane by volume in air, which is 50,000 ppm. The concentration of methane is considered a concern when this limit is met at the property line or cap edge. Methane is also a concern at 25 % of the LEL in/at onsite structures. Since the site has no permanent structures, the monitoring results were compared against the 50,000 ppm level of concern. Monitoring data for all vents, except for Vent 3, were below the LEL. Monitoring data are collected just inside the vent outlet providing a conservative result. Background levels measured during site sampling show ambient concentrations to be much lower than those sampled at the vent outlet.

The organic vapor concentrations remain low and are not considered a hazard in the open atmosphere at these levels. Methane vapor concentrations are a concern for Vent 3; however, methane vapor concentrations are not expected to exceed levels of concern at the property boundary. Review of current land use adjacent to and around the site continues to be undeveloped. East of the site is Chandler Park. The open air athletic area sits on the property boundary, and the nearest structure is approximately 834 feet east of the cap boundary. The nearest resident is approximately 1464 feet east of the cap boundary (Figure 7). At this time, there are no identified exposure points or receptors near the site. The air exposure pathway is currently incomplete.

Settlement Survey

Settlement monitoring was conducted in 1990, 1991, 1992, 1993, 1994, 2001, 2006, and 2010. The next monitoring event is scheduled to be conducted prior to the next five-year review. As presented in table 9, settlement survey data show minimal movement in the cap surface with no significant indication of either subsidence or bulging of the capped area. Locations of settlement monuments are illustrated in Figure 3.

Table 9: Survey of the Cap Settlement Markers

Year	Markers					
	1	2	3	4	5	6
1990	860.74	847.58	846.15	832.54	822.40	823.34
1991	860.76	847.50	846.17	832.45	822.30	823.21
1992	860.75	847.43	846.01	832.48	822.31	823.23
1993	860.75	847.51	846.13	832.6	822.44	823.36
1994	860.73	847.47	846.09	832.58	NS	823.34
2001	860.75	847.42	846.06	832.55	822.25	823.34
2006	860.76	847.43	845.99	832.58	822.47	823.39
2010	860.69	847.46	845.91	832.61	822.29	823.08

Notes: NS Not Surveyed.

Site Inspection and Maintenance

Site inspections have been conducted semi-annually each year since the third five-year review with Annual Report submittals in the following year. Site maintenance activities have been completed as necessary, including mowing, fence repair, sign replacement, removal of

woody vegetation, maintenance of erosion areas, and repair of gas vent protection poles. The site inspections have documented that the vegetative cover remains well-established and healthy. No recent erosion sites were apparent on the cap. Inspections of the slopes around the edges of the cap were monitored for woody brush growth that could damage the cap liner. Woody vegetation was removed in 2006, 2008, 2009, and 2010. No evidence of damage to the cap or liner system from brush or burrowing animals was discovered. The drainage system was inspected and appeared to be functioning properly. The cap perimeter is secured by chain-link fence with barbed wire and locked gates which require maintenance from time to time due to vandalism. This appears to be the only vandalism activity at the site.

One of the RAOs was to “prevent direct contact between the contaminated site materials, including soil, leachate, surface waters, and air emissions, and the human and animal population.” Site inspections and maintenance activity did not identify any erosion features, cracks, burrows, vegetation, or slope issues that would affect the integrity of the cap. The cap is in good condition and continues to act as a barrier between receptors and the landfill waste. No exposure pathways were identified

Site Inspection

An inspection was conducted at the site on September 14, 2010. In attendance were Ms. Katrina Higgins-Coltrain/EPA Region 6, Mr. Hal Cantwell/DEQ, Mr. Orphius Mohammad/DEQ, Mr. Don McElhaney/DEQ, Mr. Frank Weigle/Public Works Division Supervisor for the City of Sand Springs, and Mr. Scott Stelle/Stelle and Associates (O&M contractor for the City of Sand Springs). The completed site inspection checklist is provided in Attachment 4. Photographs taken during the site inspection are provided in Attachment 3.

During the site inspection, the perimeter fence, the surface of the landfill cover, surface drainage, and the gas monitoring vents were inspected. The gas monitoring vents were properly labeled and in good condition. The perimeter fence was in good condition overall. All perimeter gates were locked and in good condition.

Interviews

During the course of this five-year review, interviews were conducted with Mr. Hal Cantwell/DEQ, Ms. Katrina Higgins-Coltrain, Remedial Project Manager, EPA Region 6, and Mr. Frank Weigle, Public Works Division Supervisor for the City of Sand Springs. Interview Record Forms which document the issues discussed during these interviews are provided in Attachment 5. All the interviews indicated a positive position about the site and its current condition. Community interest is currently low, as the site is appropriately maintained and no longer represents a hazard. Chandler Park provides a good neighbor to the site (because of the activity at the park, any trespass or activity at the site is noticed). DEQ encourages appropriate re-use of the site that will be protective of the local community, the potential users of the site, and the remedy.

VII. Technical Assessment

An overall assessment of the remedy implemented at the site was conducted to confirm that the selected remedy is operating according to the ROD expectations and is still protective of human health and the environment. The assessment was used to primarily answer the following questions:

- Is the remedy functioning as intended by the decision documents?
- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?
- Has any other information come into light that could call into question the protectiveness of the remedy?

Question A: Is the remedy functioning as intended by the decision documents?

The decision document for the Compass Industries site is the September 1987 ROD (EPA, 1987) that included the construction of a RCRA cap, run-on/run-off diversion, site security, and performance monitoring. As supported by the findings of the first, second and third five-year reviews (EPA, 2000, and EPA, 2001) as well as the annual reports, the remedy is operating as designed. The cap remains in place with no evidence of erosion, cracking, subsidence, or bulging. The vegetative cover is well established and healthy and continues to provide erosion protection for the capped area as evidenced by the lack of erosion areas and siltation accumulation in the swale. Surface water runoff is controlled by allowing sheet flow from the cap to accumulate in the native swale located onsite which then carries water past the capped area to eventually discharge into the river. The cap continues to provide a barrier against exposure to the landfill waste as well as precipitation infiltration as evidenced by the lack of seep water from the perched aquifer and the lack of contaminants detected in surface water samples. Site fencing and locked access gates remain intact and in good condition providing limited access to the site for authorized personnel only.

In accordance with the Third Five-Year Review recommendation to implement institutional controls, the DEQ filed a notice on the deed (Notice of Remediation under CERCLA) for the site. The deed notice is intended to provide notification of the site conditions, to describe continued O&M actions, to restrict the uses of the land and ground water, and to minimize the potential for exposure to contaminants.

The gas venting system installed as part of the cap design is functioning as designed. Vent sampling has taken place and evidence of passive gas emissions is documented

Early Indicators of Potential Remedy Problems. Early indicators related to the remedy implemented at the Compass Industries site would potentially include visible damage to the cap, through erosion, encroachment of woody vegetation, and/or burrowing animals, an increase in volatile concentrations detected at the site vents, a significant increase in settlement observed via the settlement survey monitoring, and/or a reoccurrence of seeps demonstrating elevated levels of site contaminants. Seeps have not been observed at the site during site inspections conducted during the current five-year review period and no significant increase in volatile concentrations have been observed at the site vents. During this five-year review period, a new sampling

procedure was used to detect methane. Methane data are limited and should continue to be monitored.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The purpose of this question is to evaluate the effects of any significant changes in standards or assumptions used at the time of remedy selection. Changes in promulgated standards or “to be considered” information (TBCs) and assumptions used in the original definition of the remedial action may indicate an adjustment in the remedy is necessary to ensure the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics.

There have been no changes in exposure pathways for the Compass Industries site since completion of the Third Five-Year Review.

Changes in Applicable or Relevant and Appropriate Regulations (ARARs). ARARs for this site were identified in the September 1987 ROD, including, on the Federal level, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, National Pollution Discharge Elimination System (NPDES) requirements, the Clean Water Act, the Fish and Wildlife Coordination Act, and the Endangerment Species Act. On the State level, ARARs identified for the remedy included the Oklahoma Clean Air Act and the Oklahoma Water Quality Standards. This five-year review for the site included review of ROD-specified ARARs to determine whether changes may have been implemented that may affect the protectiveness of the selected remedy. No changes were identified.

The DEQ, Oklahoma Water Resources Board (OWRB), and the Federal regulations have not been revised to the extent that the effectiveness of the remedy at the site would be called into question. No new regulations have been issued by the State of Oklahoma or the Federal government that would call into question the effectiveness of the remedy.

Question C: Has any other information come into light that could call into question the protectiveness of the remedy?

The type of other information that might call into question the protectiveness of the remedy includes potential future land use changes in the vicinity of the site or other expected changes in site conditions or exposure pathways. A request was made by a landowner immediately south of the landfill area to re-open a quarry at this location; both EPA and DEQ responded with requests for further information, and the request for permit was ultimately denied. No other information has come to light as part of this fourth five-year review for the site that would call into question the protectiveness of the site remedy. In September 2006, the DEQ placed a notice on the deed (Notice of Remediation under CERCLA) for the site to restrict the uses of the land and ground water at the site and minimize the potential for exposure to contaminants.

Technical Assessment Summary

The technical assessment, based on the data review, site inspection, technical evaluation, and interviews indicates that the remedial actions selected for the site continue to be implemented as intended by the decision document.

VIII. Issues

The site is currently operating under the Post Closure Operation and Maintenance Plan (O&M) dated August 1991. This document should be reviewed and updated to reflect current site conditions and current procedures used during inspection, sampling, and reporting.

Surface water data remained below monitoring level concentrations for successive five-year review periods. Based on the data provided over the last 15 years and in accordance with the O&M plan, it is recommended that the surface water sampling activity be discontinued. However, should site conditions indicate that there has been or will be potential offsite migration of waste, sampling of potentially effected media will be required.

Seep sample locations should continue to be visually monitored to document the current status of water seepage. Sampling should be conducted prior to each five-year review if water is present.

The semi-annual inspections performed by the City of Sand Springs, during which the vent are sampled, vegetative cover is inspected, and the cap/liner system is checked for evidence of damage from brush and burrowing animals should continue.

Settlement Surveys should continue to be conducted once every five-years.

IX. Recommendations and Follow-up Actions

Table 10: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Operation and Maintenance (O&M) Plan	Update Operation and Maintenance (O&M) Plan	City of Sand Springs	EPA	October 2012	N	N
Surface Water Sampling	Discontinue	City of Sand Springs	EPA	April 2011	N	N
Settlement Survey	Continue to complete prior to each five-year review	City of Sand Springs	EPA	Before October 2015	N	Y
Seep Sampling	Continue to monitor prior to each five-year review and sample if water is present	City of Sand Springs	EPA	Before October 2015	N	Y
Site Inspections and Maintenance, including vent sampling	Continue to complete semi-annually and perform maintenance activity as necessary	City of Sand Springs	EPA	Semi-annual activity documented in Annual Reports	N	Y

X. Protectiveness Statement

The remedy implemented at the Compass Industries site is protective of human health and the environment.

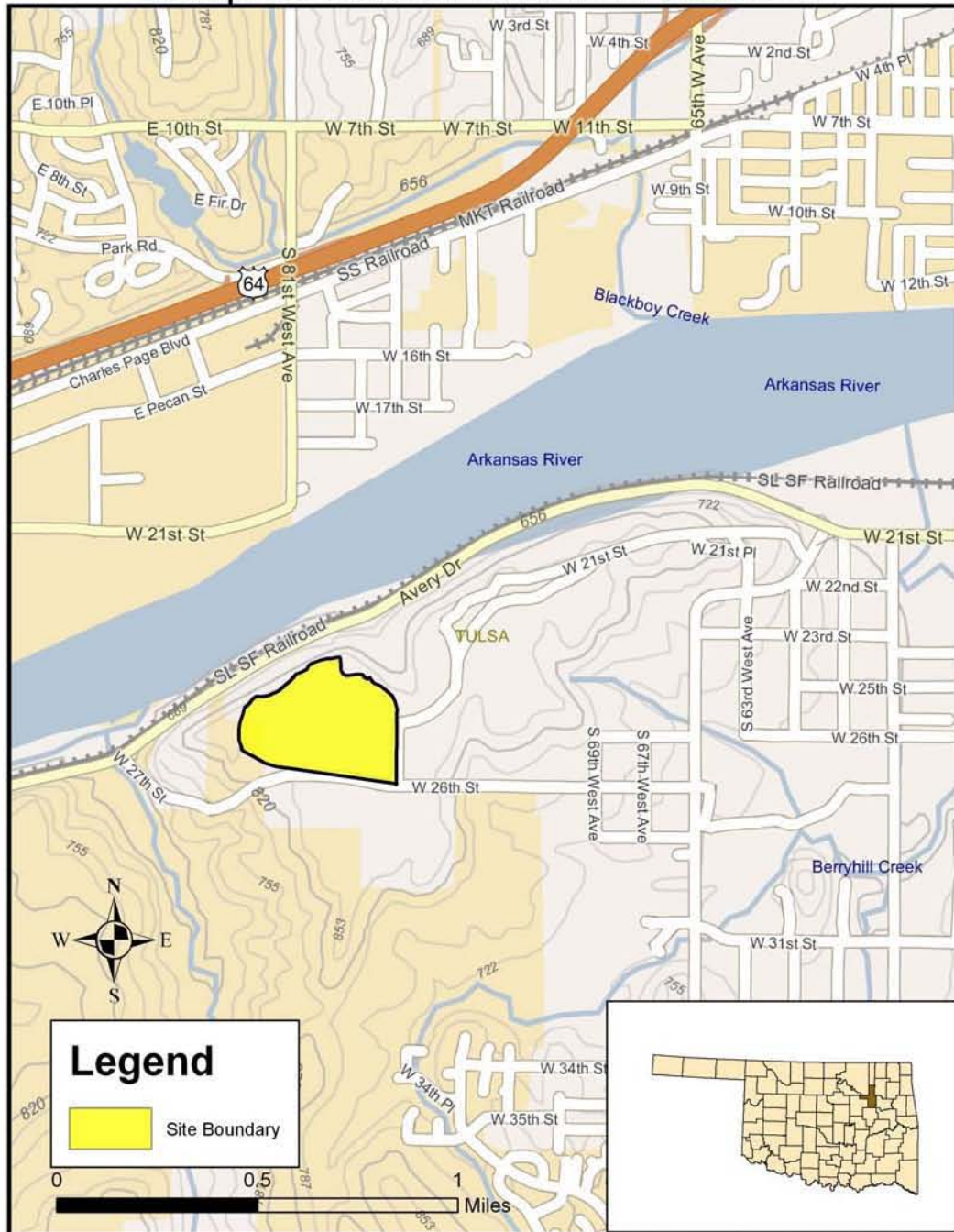
XI. Next Review

The next five-year review, the fifth for the site, will be due in 2016, which is five years from the date of this report.

ATTACHMENT 1

Site Location Maps

Compass Industries Landfill Location



Map created by Jacob Bankhead
on 6/9/2010.

We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

Figure 1: Site Location Map.

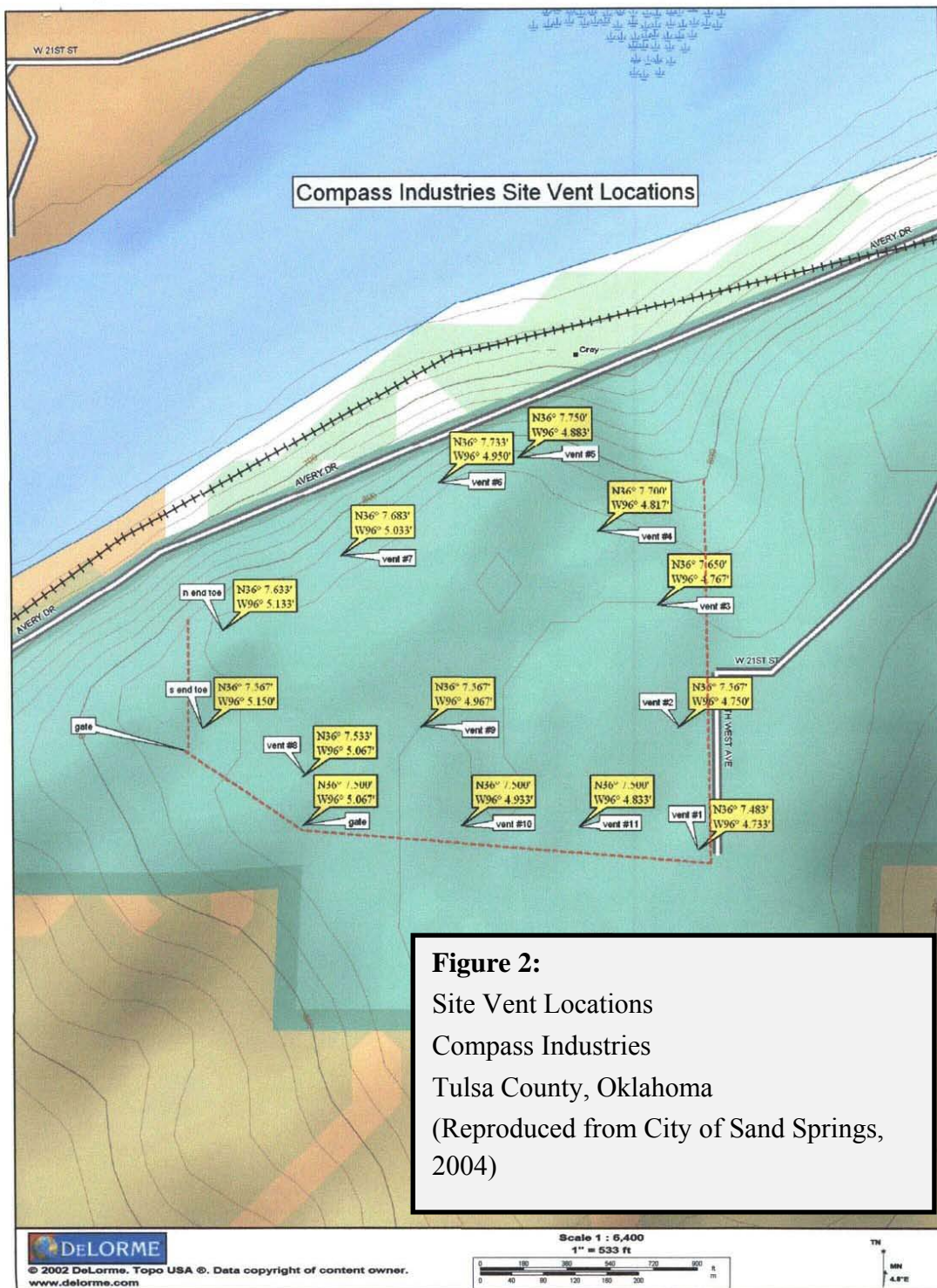


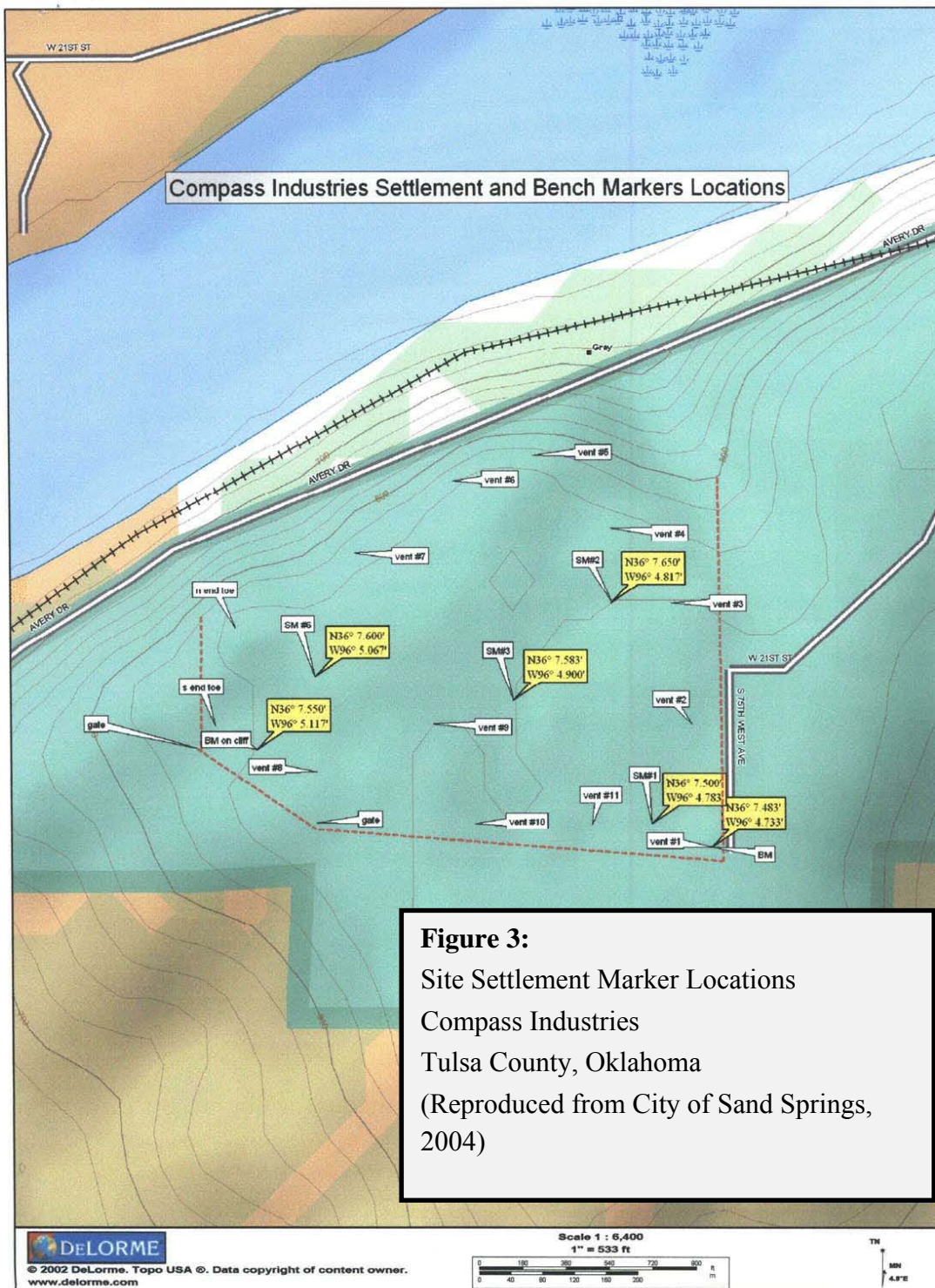
Figure 2:

Site Vent Locations

Compass Industries

Tulsa County, Oklahoma

(Reproduced from City of Sand Springs,
2004)



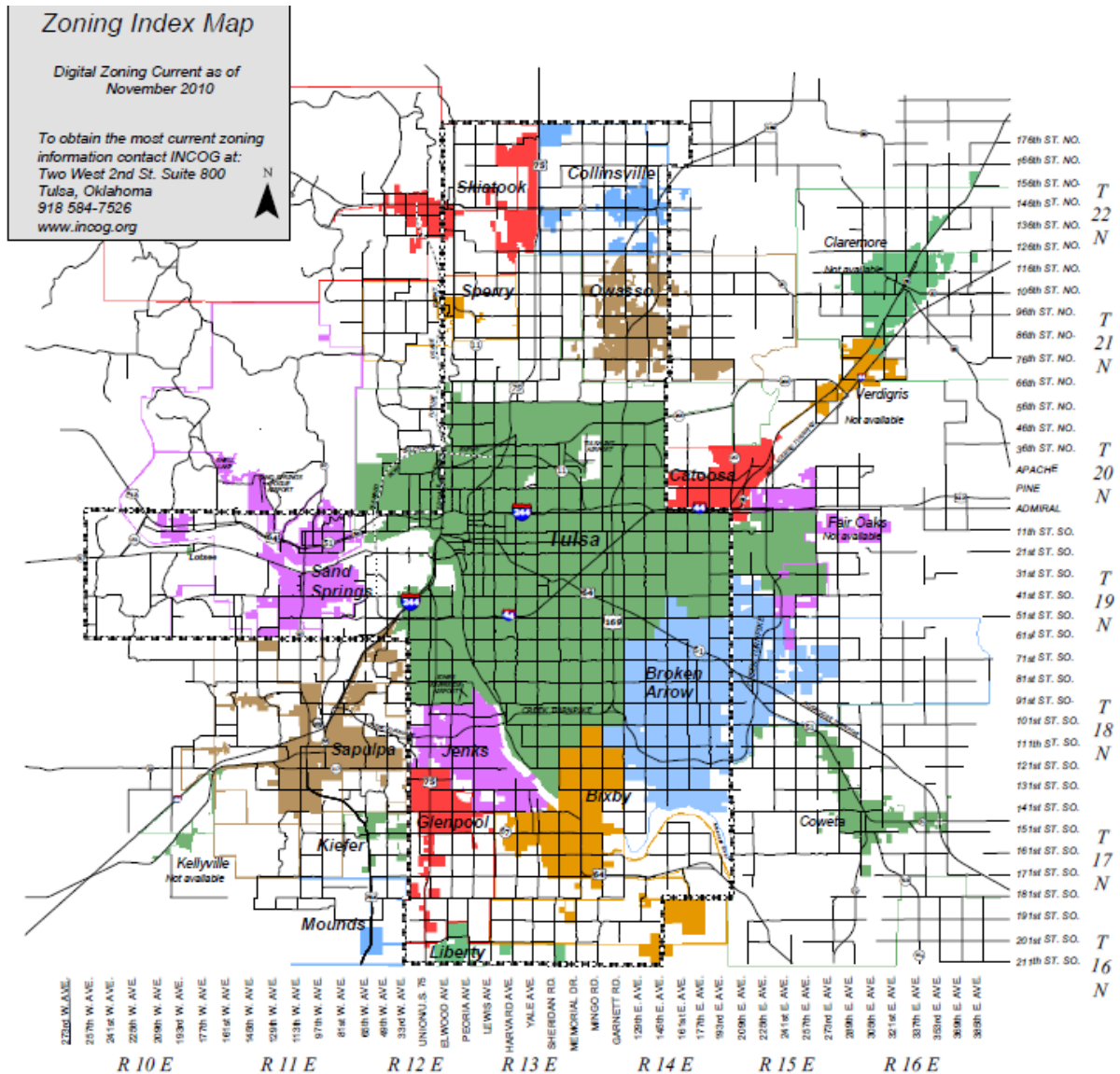


Figure 4: Tulsa County Zoning Index Map
(source - <http://www.incog.org/mapping/Zoning/ZoningIndex.pdf>)

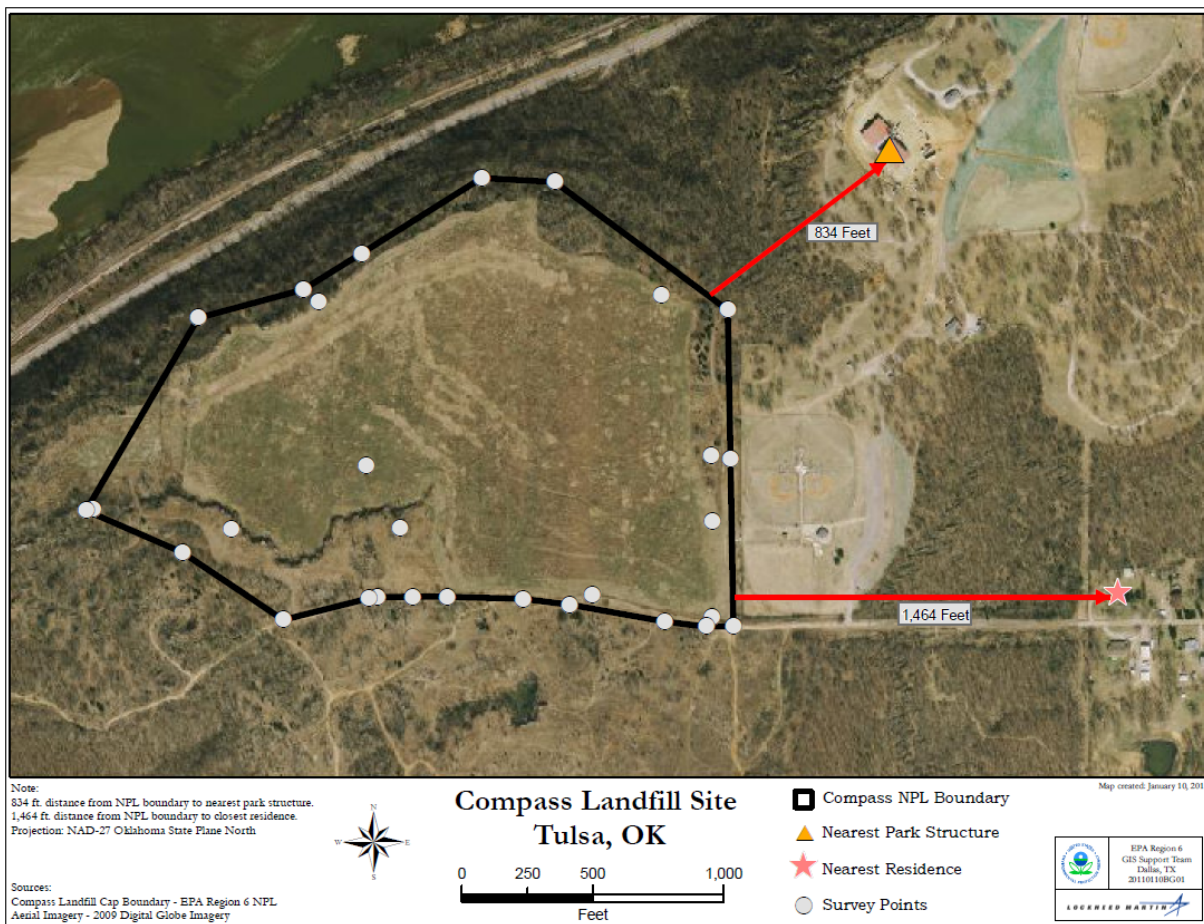


Figure 7: Compass Landfill - Distances from nearby facilities

ATTACHMENT 2

List of Documents Used in the Reviewed

Documents Reviewed:

Bechtel Environmental, Inc., 1991. *Remedial Action Report for the Compass Industries Superfund Site, Tulsa County, Oklahoma.* January 28, 1991

CH2M HILL, 2006. *Third Five-Year Review Report for the Compass Industries Superfund Site Tulsa County, Oklahoma.*

City of Sand Springs, 2002. *2002 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.*

City of Sand Springs, 2003. *2003 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.*

City of Sand Springs, 2004. *2004 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 31, 2004.

City of Sand Springs, 2006. *2006 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 31, 2006.

City of Sand Springs, 2007. *2007 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 31, 2007.

City of Sand Springs, 2008. *2008 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 31, 2008.

City of Sand Springs, 2009. *2009 Annual Operation and Maintenance Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 31, 2009.

Flint Environmental Services, 1994. *1993 Annual Monitoring Report, Compass Industries Site.* January 18, 1994.

Stelle, J. Scott, R.E.M., 1994. *1994 Annual Monitoring Report, Compass Industries Site.* December 30, 1994.

Stelle & Associates Inc., 2000. *2000 Annual Monitoring Report, Compass Industries Site.* December 31, 2000.

U. S. Environmental Protection Agency (EPA), 1987a. *Endangerment Assessment, Compass Industries Site.* August 10, 1987.

U. S. Environmental Protection Agency (EPA), 1987b. *Summary of Remedial Alternative Selection, Compass Industries Landfill, Tulsa County, Oklahoma (Record of Decision).* September 1987.

U. S. Environmental Protection Agency (EPA), 1989. *Administrative Order Docket Number CERCLA VI-589.* March 29, 1989.

U. S. Environmental Protection Agency (EPA), 1992. *Close Out Report, Compass Industries*

Landfill Superfund Site, Tulsa County, Oklahoma. June 30, 1992.

U. S. Environmental Protection Agency (EPA), 2000. *First Five-Year Review Final Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* September 26, 2000.

U. S. Environmental Protection Agency (EPA), 2000. *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups.* EPA 540-F-00-005, OSWER 9355.0-74FS-P, September 2000.

U. S. Environmental Protection Agency (EPA), 2001a. *Comprehensive Five-Year Review Guidance.* EPA 540-R-01-007. June 2001.

U. S. Environmental Protection Agency (EPA), 2001b. *Second Five-Year Review Final Report, Compass Industries Superfund Site, Tulsa County, Oklahoma.* December 26, 2001.

U. S. Environmental Protection Agency (EPA), 2002a. Removal of the Direct Final Notice of Deletion Amendment, *Compass Industries Landfill Superfund Site, Tulsa County, Oklahoma.* March 1, 2002, published March 19, 2002.

U. S. Environmental Protection Agency (EPA), 2002b. *Notice of Intent to Delete, Compass Industries Landfill Superfund Site, Tulsa County, Oklahoma.* May 1, 2002, published May 16, 2002.

U. S. Environmental Protection Agency (EPA), 2002c. *Notice of Deletion, Compass Industries Landfill Superfund Site, Tulsa County, Oklahoma.* June 28, 2002, published July 18, 2002.

U. S. Environmental Protection Agency (EPA), 2003, Draft. *Institutional Controls: A Guide to Implementing, Monitoring, and Enforcing Institutional Controls at Superfund, Brownfields, Federal Facility, UST and RCRA Corrective Action Cleanups.* Draft, February 2003.

U. S. Environmental Protection Agency (EPA), 2003. *Letter to Mr. Frank Weigle of Sand Springs, Oklahoma regarding Operation and Maintenance for the Compass Industries Landfill Superfund Site.* April 10, 2003.

ATTACHMENT 3

Photographs



Image 1: Landfill aerial looking south east



Image 2: Landfill aerial looking north west



Image 3: Landfill looking towards Toe of Cap (view is to north west)



Image 4: Photograph of site looking north east



Image 5: Cap and cliff looking east (west end of the site)



Image 6: Limestone cliff, south west part of the site (looking north-west)



Image 7: Limestone cliff (looking east)

ATTACHMENT 4

Site Inspection Checklist

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Compass Industries Superfund Site	Date of inspection: 9-14-2010
Location and Region: Sand Springs, OK Region 6	EPA ID: OKD980620983
Agency, office, or company leading the five-year review: Oklahoma DEQ	Weather/temperature: Cloudy, 60°F
Remedy Includes: (Check all that apply) <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other Ground water Sampling </div> <div style="width: 45%;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </div> </div>	
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>Frank Weigle, Division Supervisor, City of Sand Springs.</u> <u>9-10-2010</u> <div style="display: flex; justify-content: space-between; margin: 5px 0;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. <u>918-246-2590</u> Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____ _____	
2. O&M staff _____ <div style="display: flex; justify-content: space-between; margin: 5px 0;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

Agency	<u>DEQ</u>		
Contact	<u>Hal Cantwell</u>	<u>Environmental Program Specialist</u>	<u>9-27-2010</u>
	Name	Title	Date
Problems; suggestions; <input checked="" type="checkbox"/> Report attached	<u>405-702-5139</u>		
	Phone no.		

Agency	<u>United States Environmental Protection Agency</u>		
Contact	<u>Katrina Higgins-Coltrain</u>	<u>Remedial Project Manager</u>	<u>9-8-10</u>
	Name	Title	Date
Problems; suggestions; <input checked="" type="checkbox"/> Report attached	<u>214-665-8143</u>		
	Phone no.		

Agency	<u></u>		
Contact	<u></u>	<u></u>	<u></u>
	Name	Title	Date
Problems; suggestions; <input type="checkbox"/> Report attached	<u></u>		
	Phone no.		

Agency	<u></u>		
Contact	<u></u>	<u></u>	<u></u>
	Name	Title	Date
Problems; suggestions; <input type="checkbox"/> Report attached	<u></u>		
	Phone no.		

[illegible]

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	O&M Documents <input checked="" type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
Remarks: Documents are readily available at the City of Sand Springs office. No documents are kept onsite.				
2.	Site-Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A
Remarks: Documents are readily available at the City of Sand Springs office. No documents are kept onsite.				
3.	O&M and OSHA Training Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
Remarks: _____				
5.	Gas Generation Records	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: Documents are readily available at the City of Sand Springs office. No documents are kept onsite.				
6.	Settlement Monument Records	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: Documents are readily available at the City of Sand Springs office. No documents are kept onsite.				
7.	Groundwater Monitoring Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
Remarks: _____				
10.	Daily Access/Security Logs Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A

IV. O&M COSTS																																																															
1.	O&M Organization <input type="checkbox"/> State in-house <input type="checkbox"/> Contractor for State <input type="checkbox"/> PRP in-house <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Federal Facility in-house <input type="checkbox"/> Contractor for Federal Facility <input checked="" type="checkbox"/> Other <u>City of Sand Springs and Contractor Stelle and Associates</u>																																																														
2.	O&M Cost Records <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate _____ <input type="checkbox"/> Breakdown attached <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 20%;">To _____</td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> <td></td> </tr> </table>			From _____	To _____					Date	Date	Total cost			<input type="checkbox"/> Breakdown attached	From _____	To _____				<input type="checkbox"/> Breakdown attached	Date	Date	Total cost				From _____	To _____				<input type="checkbox"/> Breakdown attached	Date	Date	Total cost				From _____	To _____				<input type="checkbox"/> Breakdown attached	Date	Date	Total cost				From _____	To _____				<input type="checkbox"/> Breakdown attached	Date	Date	Total cost			
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From _____	To _____				<input type="checkbox"/> Breakdown attached																																																										
Date	Date	Total cost																																																													
3.	Unanticipated or Unusually High O&M Costs During Review Period Describe costs and reasons: _____ _____ _____ _____ _____ _____																																																														
V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A																																																															
A. Fencing																																																															
1.	Fencing damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A Remarks _____ _____																																																														
B. Other Access Restrictions																																																															
1.	Signs and other security measures <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Remarks <u>Shown in the Photographs</u> _____																																																														

C. Institutional Controls (ICs)			
1.	Implementation and enforcement Site conditions imply ICs not properly implemented <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Site conditions imply ICs not being fully enforced <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Type of monitoring (<i>e.g.</i> , self-reporting, drive by) <u>Site Inspections</u> Frequency: Semiannually Responsible party/agency <u>City of Sand Springs</u> Contact <u>Frank Weigle</u> <u>Division Supervisor, City of Sand Springs</u> <u>918-246-2590</u> <div style="display: flex; justify-content: space-between; width: 100%;"> Name Title Date Phone no. </div> Reporting is up-to-date <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Reports are verified by the lead agency <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Specific requirements in deed or decision documents have been met <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Violations have been reported <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Other problems or suggestions: <input type="checkbox"/> Report attached <div style="border-bottom: 1px solid black; height: 15px; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 15px; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 15px; width: 100%;"></div>		
2.	Adequacy <input checked="" type="checkbox"/> ICs are adequate <input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A Remarks _____ _____ _____		
D. General			
1.	Vandalism/trespassing <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No vandalism evident Remarks <u>O&M staff indicated there has been some evidence of trespassing in the past. Perimeter/fence gate has been vandalized and has been repaired on more than one occasion.</u>		
2.	Land use changes on site <input checked="" type="checkbox"/> N/A Remarks _____ _____		
3.	Land use changes off site <input checked="" type="checkbox"/> N/A Remarks _____ _____		
VI. GENERAL SITE CONDITIONS			
A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Roads damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A Remarks _____ _____		

B. Other Site Conditions		
Remarks _____ _____ _____ _____ _____ _____		
VII. LANDFILL COVERS ■ Applicable □ N/A		
A. Landfill Surface		
1.	Settlement (Low spots) □ Location shown on site map □ Settlement not evident Areal extent _____ Depth _____ Remarks <u>Minor Settlement, has been reported in City of Sand Springs 2009 Annual Report.</u> _____	
2.	Cracks □ Location shown on site map ■ Cracking not evident Lengths _____ Widths _____ Depths _____ Remarks _____ _____	
3.	Erosion □ Location shown on site map ■ Erosion not evident Areal extent _____ Depth _____ Remarks _____ _____	
4.	Holes □ Location shown on site map ■ Holes not evident Areal extent _____ Depth _____ Remarks _____ _____	
5.	Vegetative Cover ■ Grass ■ Cover properly established □ No signs of stress □ Trees/Shrubs (indicate size and locations on a diagram) Remarks _____ _____	
6.	Alternative Cover (armored rock, concrete, etc.) ■ N/A Remarks _____ _____	
7.	Bulges □ Location shown on site map ■ Bulges not evident Areal extent _____ Height _____ Remarks _____ _____	

8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____ _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____
9.	Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____ _____	<input checked="" type="checkbox"/> No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	Flows Bypass Bench Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
2.	Bench Breached Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
3.	Bench Overtopped Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
C. Letdown Channels <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	Settlement <input type="checkbox"/> Location shown on site map Areal extent _____ Depth _____ Remarks _____ _____	<input checked="" type="checkbox"/> No evidence of settlement
2.	Material Degradation <input type="checkbox"/> Location shown on site map Material type _____ Areal extent _____ Remarks _____ _____	<input checked="" type="checkbox"/> No evidence of degradation
3.	Erosion <input type="checkbox"/> Location shown on site map Areal extent _____ Depth _____ Remarks _____ _____	<input checked="" type="checkbox"/> No evidence of erosion

4.	Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of undercutting	
5.	Obstructions Type _____ <input type="checkbox"/> Location shown on site map Areal extent _____ Size _____ Remarks _____	<input checked="" type="checkbox"/> No obstructions	
6.	Excessive Vegetative Growth Type _____ <input checked="" type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____		
D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Gas Vents <input type="checkbox"/> Active <input checked="" type="checkbox"/> Passive <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____		
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____		
3.	Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____		
4.	Leachate Extraction Wells <input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____		
5.	Settlement Monuments <input type="checkbox"/> Located <input checked="" type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks _____		

E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Gas Treatment Facilities <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
2.	Gas Collection Wells, Manifolds and Piping <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Gas Monitoring Facilities (<i>e.g.</i> , gas monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
F. Cover Drainage Layer <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Outlet Pipes Inspected	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____ _____			
2.	Outlet Rock Inspected	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____ _____			
G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Siltation Areal extent _____	Depth _____	<input type="checkbox"/> N/A
<input type="checkbox"/> Siltation not evident Remarks _____ _____			
2.	Erosion Areal extent _____	Depth _____	
<input type="checkbox"/> Erosion not evident Remarks _____ _____			
3.	Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____ _____			
4.	Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____ _____			

H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1.	Deformations <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Deformation not evident Horizontal displacement _____ Vertical displacement _____ Rotational displacement _____ Remarks _____ _____	
2.	Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Degradation not evident Remarks _____ _____	
I. Perimeter Ditches/Off-Site Discharge <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Siltation <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Siltation not evident Areal extent _____ Depth _____ Remarks _____ _____	
2.	Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Vegetation does not impede flow Areal extent _____ Type _____ Remarks _____ _____	
3.	Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Areal extent _____ Depth _____ Remarks _____ _____	
4.	Discharge Structure <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks _____ _____	
VIII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1.	Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Areal extent _____ Depth _____ Remarks _____ _____	
2.	Performance Monitoring Type of monitoring _____ G Performance not monitored Frequency _____ <input type="checkbox"/> Evidence of breaching Head differential _____ Remarks _____ _____	

IX. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____ _____
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____

C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (<i>e.g.</i> , chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____		
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____		
D. Monitoring Data			
1.	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining		
E. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____ _____		

X. OTHER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
XI. OVERALL OBSERVATIONS	
A.	Implementation of the Remedy
No Significant Issues noted during the site inspection.	
B.	Adequacy of O&M
The site is currently operating under the Post Closure Operation and Maintenance Plan (O&M) dated August 1991. This document should be reviewed and updated to reflect current site conditions and current procedures used during inspection, sampling, and reporting.	
C.	Early Indicators of Potential Remedy Problems
D.	Opportunities for Optimization

Site Inspection Team Roster

Name	Organization	Title
Ms. Katrina Higgins-Coltrain	EPA Region 6	Remedial Project Manager
Mr. Frank Weigle	City of Sand Springs	Public Works Division Supervisor for the City of Sand Springs and Project Manager for O&M
Mr. Hal Cantwell	DEQ	Project Manager
Orphius I Mohammad	DEQ	Environmental Engineer
Don McElhaney	DEQ	Technical Intern
Mr. Scott Stelle	Stelle and Associates	Site supervisor for O&M

ATTACHMENT 5

Interviews

INTERVIEW RECORD

Site Name: Compass Industries Superfund Site		EPA ID No.: OKD980620983	
Subject: Five Year Review		Time: 12:01 PM	Date: 9-10-2010
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other Location of Visit: Email Questioner		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Contact Made By:			
Name: Orphius Mohammad		Title: Environmental Engineer	Organization: DEQ
Individual Contacted:			
Name: Frank Weigl		Title: Division Supervisor, Public Works Department	Organization: City of Sand Springs
Telephone No: 918-246-2590		Street Address:	
Fax No:		City, State, Zip:	
E-Mail Address: feweigl@sandspringsok.org			
Summary Of Conversation			
<p>1. What is your overall impression of the project (general sentiment)?</p> <p>Answer: The Compass Land Fill Project was necessary from an environmental stand point to correct a man made pollution problem that affected a community and region of Oklahoma. The Project was well engineered, constructed, and documented. Long Term Site Maintenance and Operation procedures were well defined, and have been followed and documented on an annual basis. The Project has been successful and returned the land to as near normal for future use as possible. The Corps of Engineers, EPA, and DEQ have executed a successful professional reclamation project.</p> <p>2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.</p> <p>Answer: Yes. The City of Sand Springs has been assigned the Site Maintenance and Operation responsibilities and I have been assigned to be the City of Sand Springs Resident Maintenance and Operations Project Manager since April 2001. The City of Sand Springs has been responsible for semi-annual site visits (at minimum), inspections, maintenance, sampling, and annual documentation and reporting activities as required in the Site Maintenance and Operation Procedures to the EPA Region 6 Office Remedial Project Manager (Katrina Higgins-Coltrain) in Dallas, Texas. I have had continuous communication with the EPA Region 6 Remedial Project Manager and have been responsible to oversee the execution of the Site Maintenance and Operation representing the City of Sand Springs, Oklahoma as a function of my duties as a City of Sand Springs, Public Works Department Division Supervisor. Necessary work projects have been executed and the results have been accepted by the EPA on an annual basis.</p>			

INTERVIEW RECORD

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Answer: No.

4. Do you feel well informed about the site's activities and progress?

Answer: Yes.

5. Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or recent maintenance activities?

Answer: Yes.

(a) We would like to have permission to use spraying along with mowing (cutting) as a method to control brush at the cap edge and in particular around the chain link fence.

(b) If the site is determined to be non-hazardous, we would like to have permission to use standard Warning or No Entry signs instead of those now used because of the problem of keeping them from being continuously removed.

(c) Do the EPA and DEQ have recommendations for possible reintroduction of the site for some sort of activity or use?

(d) Can the City of Sand Springs use the site for any purpose?

(e) Will the owner of the property ever have any responsibility for the site and can the owner ever decide to use the site for any function or purpose while the City of Sand Springs is responsible for the Site Maintenance and Operation?

INTERVIEW RECORD

Site Name: Compass Industries Superfund Site		EPA ID No.: OKD980620983	
Subject: Five Year Review		Time: 9:00 AM	Date: 9-27-2010
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other Location of Visit: Email		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Contact Made By:			
Name: Orphius Mohammad		Title: Environmental Engineer	Organization: DEQ
Individual Contacted:			
Name: Hal Cantwell		Title: Environmental Program Specialist	Organization: DEQ
Telephone No: 405-702-5139		Street Address: 707, N. Robinson	
Fax No:		City, State, Zip: Oklahoma City, Oklahoma, 73101	
E-Mail Address: Hal.Cantwell@deq.ok.gov			
Summary Of Conversation			
<p>1. What is your overall impression of the project (general sentiment)? Answer: Seems to be working very well and is well maintained.</p> <p>2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results. Answer: There have been very limited inspections of the Site by DEQ.</p> <p>3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses. Answer: There have been no complaints, violations, or other incidents related to the site requiring a response by our office.</p> <p>4. Do you feel well informed about the site's activities and progress? Answer: Yes.</p> <p>5. Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or recent maintenance activities? Answer: No.</p>			

INTERVIEW RECORD

Site Name: Compass Industries Superfund Site		EPA ID No.: OKD980620983	
Subject: Five Year Review		Time: 9:00 A.M.	Date: 9-8-2010
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other Location of Visit: Email		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Contact Made By:			
Name: Orphius Mohammad		Title: Environmental Engineer	Organization: DEQ
Individual Contacted:			
Name: Katrina Higgins-Coltrain		Title: Remedial Project Manager	Organization: EPA Region 6
Telephone No: 214-665-8143		Street Address: 1445 Ross Ave	
Fax No:		City, State, Zip: Dallas, Texas, 75251	
E-Mail Address: coltrain.katrina@epa.gov			

Summary Of Conversation

1. What is your overall impression of the project (general sentiment)?

Answer: The project is under regular maintenance which is being conducted by the City of Sand Springs, Oklahoma. The site is inspected twice per year followed by an annual report of site activity. These annual reports are filed and copies are sent to the Oklahoma Department of Environmental Quality (DEQ).

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Answer: Communications between the U.S. Environmental Protection Agency (EPA) and the City of Sand Springs is routine during times of site activity. EPA has been communicating with Sand Springs on the need for updated vent sampling protocol, sampling reporting, and operation and maintenance (O&M) planning. These communications were also relayed to the DEQ. It was expected that the O&M plan would be updated prior the Five-year review, however, this is not the case. It will need to be included as a recommendation and follow-up action in the Final Five-year review report.

In 2003 and then later in 2006, permit applications were filed for quarry activities within the vicinity of the site. Concerns from the local governments were relayed to EPA regarding any potential impacts that may affect the site and the implemented remedy. EPA responded with letters, in each occasion that clarified the remedy components and the concern that blasting in the area may compromise the integrity of the remedy. No further communication on the issue has been received.

INTERVIEW RECORD

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Answer: No responses have been filed to my knowledge. I am unaware of any response action taken by my office or local response agencies.

At this time, an institutional control has been placed on the property to restrict its use and the projected land use around the site has remained unchanged. As part of the Five-year review process, these will be reviewed and any changes noted.

4. Do you feel well informed about the site's activities and progress?

Answer: The site O&M requires limited maintenance and upkeep that is routine. No significant issues related to remedy construction have been identified or discussed during the inspections and sampling activities.

5. Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or recent maintenance activities?

Answer: Site O&M activities need to be updated and documented in a revised O&M Plan. The plan has not been updated since about 1992, and site activities and responsibilities have changed. This plan should provide the history of events that have led to the current site maintenance and sampling activities, a description of the revised activities, a description of the vent sampling (its purpose and implication), and a description of potential corrective actions that may be performed based on the site inspection and results of the vent sampling. In addition, current guidance should be used during development of the revised plan:
(<http://www.epa.gov/superfund/cleanup/postconstruction/operate.htm>).

ATTACHMENT 6

Community Involvement, DEQ Press Release (8/13/2010)

Five-Year Review for the Compass Industries Landfill Superfund Site

The Oklahoma Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) began the Five-Year Review of the Compass Industries Landfill Superfund Site earlier this month. The purpose of this review is to determine whether the site remedy remains protective of human health and the environment and to document the methods, findings, and conclusions of the five-year review in a report. The report will be available to the public in April 2011. This will be the fourth Five-Year Review for the site. Five-Year Reviews of remedies at Superfund sites are required when waste is left in place; in this case, waste was capped onsite.

The Compass Industries Landfill Site is located in the Chandler Park area west of Tulsa, Oklahoma. In the early 1900s the Compass Site was a limestone quarry. From 1972 to 1976, the abandoned quarry was used as a municipal landfill. During this period, permit conditions did not allow the disposal of industrial waste at the site. However, evidence shows that industrial waste was disposed in the landfill counter to regulations and permit conditions. Records indicate the site accepted three categories of wastes: solids, liquids, and sludges, which included acids, caustics, potentially toxic solvents, and potentially carcinogenic materials. In the 1970s and early 1980s several underground fires were reported at the landfill. In 1983, after repeated complaints from citizens, the EPA in conjunction with the Oklahoma State Department of Health conducted air monitoring at the site. The site was proposed to the National Priorities List (NPL) in September 1983 and added to the NPL in September 1984.

A Remedial Investigation and Feasibility Study indicated the surface water, groundwater and soil at the site were contaminated with organic and inorganic pollutants. On September 29, 1987, EPA signed a Record of Decision (ROD). The ROD is a legally binding decision document that directed the remedy for the site. The objective of the selected remedy was to protect human health and the environment by preventing current or future exposure to contaminated surface water, groundwater, and soil. Remedial activities included installation of a cover which isolates contaminated material from human contact and reduces infiltration or precipitation through the landfill area, groundwater treatment at a later date if found to be necessary, and installation of fences and signs along the perimeter of the cap.

The clean up was completed in June 1991, and the site was removed from the National Priorities List on July 18, 2002. Since that time, the City of Sand Springs has been performing operations and maintenance at the site, which includes monitoring the groundwater seeps and collection of samples as necessary, monitoring and sampling of the vents surrounding the capped landfill, inspection of the surface vegetation, and the periodic repair of the perimeter fence and signage.

The Oklahoma Department of Environmental Quality (DEQ) and EPA plan to be out in the community while conducting the Five Year review.

Information about the site is available on the Internet at www.epa.gov/region6/superfund. For more information about the site, contact Hal Cantwell, DEQ, at (405) 702-5139 or by e-mail at hal.cantwell@deq.ok.gov or Katrina Higgins-Coltrain, EPA, at (214) 665-8143 or 1-800-533-3508 (toll-free) or by e-mail at coltrain.katrina@epa.gov

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PROOF OF PUBLICATION

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STATE OF OKLAHOMA, }
COUNTY OF TULSA, } SS.

AFFIDAVIT:

I, Santa Mullis, of lawful age, being duly sworn, upon the oath of TULSA WORLD, a daily newspaper printed in the City of Tulsa, County of Tulsa, paid general circulation therein, printed in the English language, and that the notice by publication here to attached, was published in said newspaper for

1 day(s), the first publication being on the 13th day of August, 2010 and

the last day of publication being on the 13th day of August, 2010,

and that said newspaper has been continuously and uninterruptedly published in said county of Tulsa, Oklahoma, for a period of Hundred and Four (104) weeks consecutively, prior to the first publication of said notice, or a longer period, as required by Chapter four, Title 25 Oklahoma Session Laws, 1943, as amended by House Bill No. 495, and complies with all of the prescriptions and requirements of the laws of Oklahoma. (The advertisement above referred to, a true and printed copy of which is hereto attached, was published in said NEWSPAPER on the following dates, to-wit: 8/13/10)

The advertisement above referred to, a true and printed copy of which is hereto attached, was published in said NEWSPAPER on the following dates, to-wit: 8/13/10

Said notice was published in the regular edition of said newspaper and not in a supplement thereof.

Publishing Fee 525.63
Notary Fee
Affidavit
TOTAL 525.63

Santa Mullis

(Signature)

Subscribed and sworn to before me this 13 day of AUGUST, A.D., 2010

My commission expires 6-15-2012

Paula Boggs
Notary Public



Published in the Tulsa World, August 13, 2010, Tulsa, OK

Five-Year Review for the Compass Industries Landfill Superfund Site

The Oklahoma Department of Environmental Protection (ODEP) and the U.S. Environmental Protection Agency (EPA) began the Five-Year Review of the Compass Industries Landfill Superfund Site earlier this month. The purpose of this review is to determine whether the site remedy remains protective of human health and the environment and to document the methods, findings, and conclusions of the five-year review in a report. The report will be available to the public in April 2011. This will be the fourth Five-Year Review for the site. Five-Year Reviews of remedies at Superfund sites are required when waste is left in place; in this case, waste was capped onsite.

The Compass Industries Landfill site is located in the Chandler Park area west of Tulsa, Oklahoma. In the early 1900s the Compass Site was a limestone quarry. From 1972 to 1976, the abandoned quarry was used as a municipal landfill. During this period, permit conditions did not allow the disposal of industrial waste at the site. However, evidence shows that industrial waste was disposed in the landfill counter to regulations and permit conditions. Records indicate the site accepted three categories of wastes: solids, liquids, and sludges, which included acids, caustics, potentially toxic solvents, and potentially carcinogenic materials. In the 1970s and early 1980s, several underground fires were reported at the landfill. In 1983, after repeated complaints from citizens, the EPA in conjunction with the Oklahoma State Department of Health conducted air monitoring at the site. The site was proposed to the National Priorities List (NPL) in September 1983 and added to the NPL in September 1984.

A Remedial Investigation and Feasibility Study indicated the surface water, groundwater and soil at the site were contaminated with organic and inorganic pollutants. On September 29, 1987, EPA signed a Record of Decision (ROD). The ROD is a legally binding decision document that directs the remedy for the site. The objective of the selected remedy was to protect human health and the environment by preventing current and future exposure to contaminated surface water, groundwater, and soil. Remedial activities included installation of a cover which isolates contaminated material from human contact and reduces infiltration or precipitation through the landfill area, groundwater treatment at a later date if found to be necessary, and installation of fences and signs along the perimeter of the cap.

The clean up was completed in June 1991, and the site was removed from the National Priorities List on July 18, 2002. Since that time, the City of Sand Springs has been performing operations and maintenance of the site, which includes monitoring the groundwater seeps and collection of samples as necessary, monitoring and sampling of the vents surrounding the capped landfill, inspection of the surface vegetation, and the periodic repair of the perimeter fence and signs.

The Oklahoma Department of Environmental Protection (ODEP) and EPA plan to be out in the community while conducting the Five Year review.

Information about the site is available on the Internet at www.epa.gov/region6/superfund. For more information about the site, contact Hal Contwell, ODEP, at (405) 702-5139 or by e-mail at hal.contwell@odep.ok.gov or Katrina Hiseins-Collins, EPA, at (214) 465-8143 or 1-800-533-3508 (toll-free) or by e-mail at collins.katrina@epa.gov

ATTACHMENT 7

Deed Search Memorandum

Memorandum

July 21, 2010

To: Compass Industries File

From: Don McElhaney, Technical Intern

Re: Deed Notice Search for the Compass Industries Superfund Site

On July 21, 2010, Don McElhaney and Orphius Mohammad from the DEQ went to the County Clerk, Registrar of Deeds Office at the Tulsa County Court House in Tulsa to search the records to see if the deed notices filed by the DEQ for the Compass Industries Superfund Site could be found easily by the public. By searching the county's records on computer workstations in the Registrar of Deeds Office anyone can find both deed notices with only the legal descriptions of the properties. The deed information is provided in the tables below:

Tenth Street	
Legal Description:	Lots 3 & 4, S18, T19N, R12E; Lot 6 NE1/4 SE1/4, S13, T19N, R11E
Date filed:	09/29/06
Document Number:	2006113074
Number of Pages:	7

ATTACHMENT 8

Deed Notice

Tulsa County Clerk - EARLENE WILSON
Doc # 2006-113074 Pages 1
Receipt # 886572 09/29/06 13:07:13
Fee 25.00



OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
LAND PROTECTION DIVISION

OKLAHOMA
DEPT. OF ENVIRONMENTAL QUALITY

OCT - 4 2006

FILED BY:

HEARING CLERK

DEQ Case No: 06-297 DN

In Re:

Compass Industries Landfill
(Avery Drive) Superfund Site,

DEED NOTICE.

**NOTICE OF REMEDIATION OR RELATED ACTION TAKEN PURSUANT TO THE
FEDERAL COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION
AND LIABILITY ACT and
CREATION OF EASEMENT**

LEGAL BASIS FOR NOTICE:

The Oklahoma Department of Environmental Quality ("DEQ") hereby files this NOTICE OF REMEDIATION OR RELATED ACTION TAKEN PURSUANT TO THE FEDERAL COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT AND CREATION OF EASEMENT (hereinafter "Notice") pursuant to Oklahoma Statutes, 27A § 2-7-123 (B). This Notice does not grant any right to any person not already allowed by law. This Notice shall not be construed to authorize or encourage any person or other legal entity to cause or increase pollution, to avoid compliance with State or Federal laws and regulations regarding pollution or to in any manner escape responsibility for maintaining environmentally sound operations.

The DEQ may take administrative or civil action to recover costs or to compel compliance with the below described "Land Use Restrictions" and to prevent damage to, or interference with the below described "Engineering Controls" and "Continuing Operation, Maintenance and Monitoring." The Land Use Restrictions, Engineering Controls and Continuing Operation, Maintenance and Monitoring will apply to the Affected Property and to persons who own and/or use the Affected Property until such time as the DEQ, with written notice to the U.S. Environmental Protection Agency (EPA), files a subsequent Notice that changes or removes the Land Use Restrictions, Engineering Controls and Continuing Operation, Maintenance and Monitoring set forth below. Activities that cause or could cause damage to the Remedy or the Engineering Controls described herein below, or recontamination of soil or groundwater are prohibited.

The owner of the below described Affected Property has the legal authority to create, and does hereby voluntarily create, an easement granted to the DEQ and its employees and agents, for ingress and egress through, across and onto the Affected Property to assure the ongoing protection of the remedy, engineering controls and land use restrictions described herein below. This easement touches and concerns the land; runs with the land; is legally binding on all future

owners of the Affected Property and will only be removed or modified if and when the DEQ, with written notice to the EPA, modifies or removes its land use restrictions or engineering controls in the manner described herein below.

REASON FOR NOTICE:

The Compass Site, the Affected Property described below, operated as a municipal landfill between 1972 and 1976 under a permit issued by the Oklahoma State Department of Health. During the operation of the Site, various materials, principally waste jet fuel, oily sludges, miscellaneous solvents, acids, caustics and benzene, were disposed of in the landfill that were not allowed by the permit for the Site.

In September 1983, the Compass Site was proposed for the National Priorities List (NPL), and was listed in September 1984. The Site was addressed through a Record of Decision dated September 1987 and a Remedial Action that was completed in June 1991 involving the installation of a clay cap and a geosynthetic liner. The Site was delisted from the NPL in July 2002.

Presently, the Site is undergoing a Five-Year review to assure that human health and the environment are being protected by the Remedial Action. Institutional Controls are needed to ensure the protectiveness of the remedy. Therefore, site information regarding location and wastes will be filed in the form of this Notice in the Deed Records to inform the public of site restrictions and contamination.

AFFECTED PROPERTY:

The survey of the Compass Industries Site (also known as the Chandler Park Landfill, Chandler Dump, Tulsa Refuse Dump Number 1, and the Berryhill Site) is appended as Attachment A to this notice. **The legal description of the Site is:**

A tract of land being a part of Government Lots 3 and 4, Section 18, Township 19 North, Range 12 East AND being a part of Government Lot 6 and a part of the Northeast Quarter (NE/4) of the Southeast Quarter (SE/4) of Section 13, Township 19 North, Range 11 East, all in Tulsa County, State of Oklahoma, according to the U.S. Government Survey thereof, and all being more particularly described as follows:

COMMENCING at the Northwest corner of said Government Lot 4; Thence S1°20'42"E a distance of 506.19 feet to the POINT OF BEGINNING; Thence S75°41'56"W a distance of 338.55 feet to a point; Thence N56°03'38"W a distance of 461.97 feet to a point; Thence N66°38'30"W a distance of 400.87 feet to a point; Thence N30°08'07"E a distance of 852.76 feet to a point; Thence N75°04'33"E a distance of 413.94 feet to a point; Thence N57°54'24"E a distance of 260.80 feet to a point on the East line of said Lot 6; Thence N57°54'24"E a distance of 541.82 feet to a point; Thence S87°16'30"E a distance 280.30 feet to a point; Thence S53°24'53"E a distance of 820.39 feet to a point on the East line of said Lot 3; Thence S1°15'08"E a distance of 570.38 feet to the Northeast corner of Lot 4; Thence S0°57'03"E along the East line of Lot 4 a distance of 637.53 feet to a point; Thence S88°51'57"W a distance of

104.41 feet to a point; Thence N82°56'59"W a distance of 158.34 feet to a point; Thence N79°47'18"W a distance of 369.74 feet to a point; Thence N83°12'19"W a distance of 178.28 feet to a point; Thence N88°18'15"W a distance of 290.14 feet to a point; Thence N89°48'50"W a distance of 131.95 feet to a point; Thence S88°16'28"W a distance of 134.71 feet to a point; Thence S84°59'29"W a distance of 31.59 feet to the POINT OF BEGINNING, containing 68.6876 Acres.

REMEDY:

Remediation activities ("Remedy") at the Affected Property included:

1. Closure of the landfill and installation of a clay cap, geosynthetic liner and gas collection system that are substantially equivalent to the requirements under the Resource Conservation and Recovery Act (RCRA). This remedy involved a cover that isolates contaminated material from human contact and reduces infiltration or precipitation through the landfill area.

The major components of the remedy involved:

- A. Clearing and grubbing (i.e., digging up roots, stumps, and recycling) fifty acres.
 - B. Reshaping 140,835 cubic yards of waste.
 - C. Importing 43,098 cubic yards of waste fill to maintain surface grading.
 - D. Installing a geotextile gas transmission layer to release landfill gases.
 - E. Filling the perimeter trench with clay soil to provide an 18-inch thick layer over the landfill. This required 12,627 cubic yards for the trench and 235,467 square yards for the layer.
 - F. Placing a geosynthetic liner consisting of 30-milimeter High Density Polyethylene over the clay layer.
 - G. Placing a cover material for the geosynthetic liner consisting of 117,734 cubic yards of soil fill.
 - H. Placing 6 inches of top soil and a vegetative cover over the cover material.
 - I. Installing 6 settlement monuments (survey metal plates) to monitor subsidence throughout the capped area.
2. Installation of a fence and signs along the perimeter of the cap.

ENGINEERING CONTROLS:

The engineering controls at this Site include the landfill cap and its components, the perimeter fence, and the signs along the property boundary.

CONTINUING OPERATION, MAINTENANCE AND MONITORING:

Operation and maintenance activities include maintaining vegetation and slope at the Site in such a condition to prevent erosion of the soil, to maintain cap integrity and stability, and ensure that human health and the environment are being protected.

Activity	Schedule
Seep Sampling - Samples will be taken and analyzed to ensure that no offsite ground water migration from the perched aquifer is occurring.	Every five years, if water is present. Data and description to be included in the five-year review.
Surface Water Sampling - Samples will be taken and analyzed to ensure that no offsite migration is occurring.	Every five years, if water is present. Data and description to be included in the five-year review.
Site Inspections - The integrity of the fence, gas vents, and cap will be inspected for signs of vandalism, erosion, degradation, and repair.	Semiannually. Description to be included in the Annual O&M Report and the five-year reviews.
Settlement Survey - Settlement (subsidence) of the landfill over time will be monitored through surveys. A qualified company will be retained to perform these surveys.	Every five years. Data and description to be included in the five-year review.
Site Maintenance - Vegetation and slope at the Site must be maintained in such a condition to prevent erosion of the soil at the Affected Property to maintain cap integrity and stability and repair of the fence as needed to restrict access to unauthorized personnel.	As necessary, based on semiannual Site Inspections and Five-year Reviews. Description to be included in the Annual O&M Report and the five-year reviews.
Vent Sampling - The gases being released from the landfill will be monitored.	Semiannually. Data and description to be included in the Annual O&M Report and the five-year reviews.
Institutional Controls - The deed files will be checked to ensure that the notices remain in place.	Semiannually. Status to be reported in the Annual O&M Report and the five-year reviews.
Annual O&M Report - A report of all site activity and sampling results will be submitted to the regulatory agencies.	Annually

LAND USE RESTRICTIONS:

The land use restrictions at the above-described Affected Property are:

- a. No digging on the capped area;
- b. No activities that will cause erosion or disrupt the integrity of the cap or landfill;
- c. No use, for any purpose, of the ground water;
- d. No water wells of any kind drilled within the cap or landfill; and,

- e. No residential use of the Affected Property, defined as having any person present at the Affected Property for more than sixteen (16) hours within one twenty-four (24) hour period.

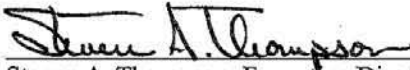
These land use restrictions apply to the entirety of the Affected Property described herein above.

Changes to the Land Use Restrictions:

May be proposed by submittal of a work plan to the DEQ and EPA to reduce or remove subsurface contaminants. If the DEQ, with written notice to the EPA, approves the work plan and approves completion of the tasks set forth therein, the DEQ, with written notice to the EPA, may file a subsequent Notice on this property designating new land use restrictions or removing the Land Use Restrictions.

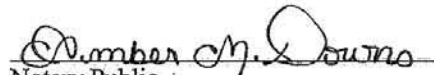
Proposals to change the Land Use Restrictions for the Affected Property, and questions regarding this Notice should be addressed to the DEQ Office of the General Counsel, 707 North Robinson, Oklahoma City, Oklahoma; P.O. Box 1677, Oklahoma City, Oklahoma 73101-1677 with written notice to the U.S. EPA Office of Regional Counsel, 1445 Ross Avenue, Suite 1200, Dallas, Texas, 75202-1200.

This Notice and the Land Use Restrictions contained herein run with the land and no change of ownership of the Affected Property will change the Land Use Restrictions described herein above. This Notice and the Land Use Restrictions contained herein are effective upon the date of signature by the Executive Director of the DEQ.


Steven A. Thompson, Executive Director
Oklahoma Department of Environmental Quality

9-25-06
Date

Subscribed and sworn to before me this 25th day of September, 2006.


Notary Public
Oklahoma County, Oklahoma



EASEMENT

I hereby certify that I have the legal right to, and do hereby, create an easement and encumber the real property as described in the foregoing Notice. I hereby voluntarily grant an easement to the DEQ and its employees and agents, for ingress and egress through, across and onto the Affected Property to assure the ongoing placement, operation and protection of the Remedy, Engineering Controls and Land Use Restrictions described herein above.

I have had notice and an opportunity to meet with representatives of the Oklahoma Department of Environmental Quality to comment on the foregoing Notice and agree herewith. I hereby agree to the filing of the foregoing Notice and Easement.

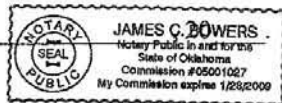
Sandra Dee
Sandra Dee, President
Jim's Inc.

9-8-06
Date

Subscribed and sworn to before me this 8th day of September, 2006.

James C. Bowers
Notary Public

My Commission expires:



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