

Project Document Review & Containment Cell Cover Evaluation Report

**Rockwool Industries, Inc. Federal
Superfund Site
1741 Taylors Valley Road, Belton, Bell
County, Texas.**

Prepared for

**Texas Commission on
Environmental Quality**

October 17, 2016

Submitted By:

**Contract No.
582-14-40670
Work Order No.
327-0055**



**Ben Camacho
Project Manager**



Daniel B. Stephens & Associates, Inc.

4030 W. Braker Lane, Suite 325, Austin, Texas 78759

Project Document Review and Containment Cell Cover Evaluation Report

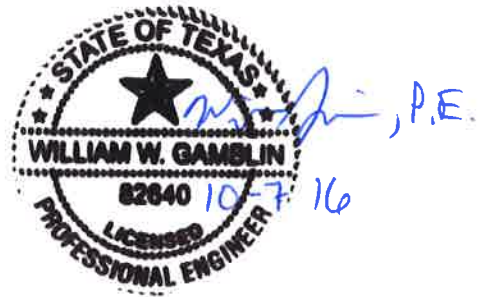
Rockwool Industries, Inc. Federal Superfund Site
1741 Taylors Valley Road
Belton, Bell County, Texas

Prepared for

**Texas Commission on Environmental
Quality (TCEQ)**

Project B1605574.00
October 3, 2016

Braun Intertec Corporation



October 6, 2016

Project B16005574.00

Mr. Ben Camacho
Daniel B. Stephens and Associates, Inc.
4030 W. Braker Lane Suite 325
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Re: Project Review and Containment Cell Cover Evaluation Report
Rockwool Industries, Inc. Federal Superfund Site
1741 Taylors Valley Road
Belton, Bell County, Texas
DBS&A Project Number: ES016.AIR0.55.00007

Dear Mr. Camacho:

In accordance with Work Order Number 021636 and the subcontractor agreement (BIC-AIRS14) dated May 20, 2016 between Braun Intertec Corporation (Braun Intertec) and Daniel B. Stephens and Associates, Inc. (DBS&A), Braun Intertec conducted a Project Review and Containment Cell Cover Evaluation of the above referenced site (Site). The purpose of this project was to conduct a review of the project file documents in order to summarize historical information and identify data gaps since the time the containment cell was first constructed.

The Project Review and Containment Cell Cover Evaluation Report (Report) was prepared on behalf of, and for use by DBS&A and the TCEQ. No other party has a right to rely on the contents of the Report without written authorization by Braun Intertec. Please refer to the attached report for the scope, methods and conclusions of our project. We appreciate the opportunity to provide our professional services for you for this project. If you have any questions regarding this letter or the attached Report, please contact William Gamblin at 512.484.2033.

Sincerely,

BRAUN INTERTEC CORPORATION

William Gamblin, P.E.

William Gamblin, P.E.
Senior Engineer

Susannah Duly

Susannah Duly, P.G., C.P.G.
Senior Geologist

Attachment:
Project Review and Containment Cell Cover Evaluation Report

AA/EOE



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A. Executive Summary

A Project Review and Containment Cell Cover Evaluation was performed for the Rockwool Industries, Inc. Federal Superfund Site located at 1741 Taylors Valley Road, Belton, Bell County, Texas (the Site) in accordance with the scope of services described in Work Order Number 021636 between Braun Intertec Corporation (Braun Intertec). and Daniel B. Stephens and Associates, Inc. (DBS&A). The scope of services included conducting a review of the project file documents in order to summarize historical information and identify data gaps since the time the containment cell was first constructed. Since construction, specific inspection and maintenance activities have been established in order to ensure that the selected remedy remains protective of human health and the environment. The maintenance tasks were performed for the Rockwool Industries Inc. Federal Superfund Site in order to ensure the continued protectiveness of the selected remedy. However, the containment cell cover is experiencing wide-spread cracking, predominantly on the southern half, suggesting the integrity of the cover is being compromised and the cover is not performing as designed. The formation of these cracks were initially observed and documented in 2012. Exploring repair options and/or alternative cover systems is recommended.

B. Introduction

B.1. Authorization

Braun Intertec received authorization from DBS&A to conduct a Project Review and Containment Cell (CC) Cover Evaluation for the Rockwool Industries, Inc. Federal Superfund Site in accordance with the scope of services described in Work Order Number 021636 between Braun Intertec Corp. and DBS&A on July 27, 2016.

B.2. Project Objective

The objective of the Project Review and CC Cover Evaluation was to conduct a review of the project file documents in order to summarize historical information and identify data gaps since the time the CC was first constructed.

C. Site Background

The Site includes an approximate 100-acre tract of land in a primarily industrial area located one quarter mile east of Interstate 35 in Bell County, Texas. The Site is bordered to the north by the Leon River and to the south and west by Nolan Creek. East Belton Cemetery and other commercial and undeveloped private properties lie to the west of the Site and light industrial properties lie to the east (**Figure 1 – Site Location Map**).

Rockwool Industries Inc. manufactured household mineral wool insulation material by melting copper and antimony slag, coke, limestone trap rock and basalt in a coke-fired blast furnace or cupola and then extruding by blowing air over spinning drums to form the insulation fibers. The facility manufactured mineral wool insulation from the mid-1950s until February 1987.

The Site is broadly divided into two main areas; the North Property and the Central Property as illustrated in **Figure 2** (Site Map). The North Property and adjoining Geer Property-Cemetery area constitute a 14-acre tract of land on the north side of Taylor's Valley Road. The Central Property includes Operable Unit 2 (OU2) and forms a 47-acre tract of land south of Taylor's Valley Road extending to FM-93. Historically, the Site included a Non-Process tract that covered approximately 40-acres of land located south of FM-93, which traversed southwest to Nolan Creek. During prior remedial investigations, the Non-Process tract was determined to be free of contaminant impacts; therefore, this 40-acre tract of land is no longer considered part of the Site.

The Record of Decision (ROD) was signed in September 2004. Following the ROD, the remedial action (RA) was performed and completed in accordance with the accepted remedial design (RD). The RA consisted of activities utilized to eliminate human and ecological exposure to contaminated waste emanating from the Site. RA processes included drainage improvement activities, waste and soil excavation and removal, and the placement of clay and topsoil caps over the contaminated areas. The clay/topsoil covered areas were marked and surveyed for institutional control and replanted with vegetative cover. The RA also consisted of the construction and capping of a containment cell designed to contain excavated waste from areas of the Site.

D. Scope of Services

The following tasks were conducted at the Site as part of the Project Review and CC Cover Evaluation.

D.1. Review of Project Documents

Braun Intertec completed a file review of the documents available to the Texas Commission on Environmental Quality (TCEQ) and relevant to the containment cell cover evaluation. Including:

D.1.a. EPA Project Documents

- Interim Record of Decision dated August 2003
- Record of Decision dated September 30, 2004
- Remedial Action – Demonstration of Methods Applicability Report dated June 15, 2005
- Preliminary Closeout Report dated September 2005
- Operations and Maintenance Plan dated January 2006
- Remedial Action Report dated February 3, 2006

D.1.b. TCEQ Project File Documents

General Site Documentation

- Field Sampling Plan (FSP) for Operations and Maintenance Activities dated April 26, 2011.
- Addendum No. 1 to the April 26, 2011 FSP for Operations and Maintenance Activities dated June 14, 2012.
- Addendum No. 2 to the April 26, 2011 FSP for Operations and Maintenance Activities dated January 19, 2015.
- Addendum No. 3 to the April 26, 2011 FSP for Operations and Maintenance Activities dated June 11, 2015
- Site Specific Health and Safety Plan Groundwater Monitoring dated November 18, 2010

MatCon HMA Cover Documentation

- Operation and Maintenance Plan (Addenda to the Site Operations and Maintenance Plan) for MatCon HMA Cover dated August 28, 2013.
- Fence Construction & Hot Mixed Asphaltic Concrete Cover Repair Letter Report dated February 3, 2015.

Operation and Maintenance Reports

- Initial Site Visit Report dated January 7, 2011.
- Operations and Maintenance Plan dated February 11, 2011.
- Semi-Annual Operations and Maintenance Report dated August 15, 2011.
- Drainage Maintenance Activity Letter Report dated September 4, 2012.
- Semi-Annual Operations and Maintenance Report dated October 29, 2012.
- Field Summary Report Letter Report dated July 11, 2013.
- Annual Operations and Maintenance Report dated July 16, 2013.
- Annual Operations and Maintenance Report dated August 25, 2014.
- Operations and Maintenance Inspections Letter Report dated August 25, 2015.
- Annual Operations and Maintenance Report dated October 15, 2015.

Restrictive Covenants

- Restrictive Covenant Tracts 8-9.
- Restrictive Covenant Tracts 10-13.

Survey Documentation

- Rockwool Boundary Survey 1 of 2.
- Rockwool Boundary Survey 2 of 2.
- Rockwool Topography Survey 1 of 2.
- Rockwool Topography Survey 2 of 2.

D.1.c. MatCon, Inc. Documents

- The MatCon (Modified Asphalt Technology for Waste Containment) Product Sheet.
- MatCon Project Summary – Rockwool Superfund Site.
- MatCon Cap Warranty – Site Closure Project Rockwool Superfund Project

D.1.d. Relevant Landfill Cover Documents

- EPA Green Remediation Best Management Practices (Landfill Cover Systems and Energy Production) dated December 2011(Document #EPA 542-F11-024).
- Naval Facilities Engineering Command (Sustainable Long-Term Management of Landfills Under the Navy's Environmental Restoration Program) dated April 2016.
- Naval Facilities Engineering Command (Alternative Landfill Capping – Concrete Capping) Engineering and Expeditionary Warfare Center web page, no date given.
- WASTE360 – Clay Remains a Top Choice for Final Landfill Cover dated August 2015.

D.2. Evaluation of Containment Cell Cover Performance

While conducting the review of the above referenced documents, Braun Intertec evaluated the design, construction, and performance of the containment cell cover system. Any information or data that could be a concern for maintaining the integrity of the containment cell cover was noted.

E. Evaluation Results

E.1. Containment Cell Cover History

- September 4, 2004 United States Environmental Protection Agency (EPA) authorizes containment cell and cap installation
- July 2005 MatCon was selected as the containment cell cover technology in a design revision submitted to the EPA.
- April 20, 2005, CC excavation was initiated
- August 27, 2005, MatCon cover installation was initiated.
- August 29, 2005, MatCon cover installation was completed.
- August 30, 2005, MatCon cover patching of cracks occurred.
- November 23, 2005, MatCon cover patching of cracks occurred.
- January, 2006, TCEQ commences O&M activities identified in the O&M plan excluding the MatCon Operation and Maintenance Plan dated January 13, 2006.
- November 23, 2010, MatCon cover inspection documented good integrity of asphalt material.
- March 17-18, 2011, First Five Year Review field inspections are conducted by EPA.
- August 1, 2011, TCEQ letter to EPA: Comments on Draft Final First Five-Year Review
- July 10, 2012, MatCon cover inspection revealed significant cracking.
- September 21, 2012, First Five Year Review report is signed by the EPA.
- June 12, 2013, MatCon cover inspection revealed significant cracking.
- August, 2013, Operation and Maintenance Plan updated to include detailed CC cover repair guidance.
- August, 2014, CC Cover patching, repair and overlay was conducted.
- September 24, 2014 CC Cover crack repair was conducted.
- October 28, 2014 CC Cover crack repair was conducted.

- November 10, 2014 CC Cover crack repair was conducted.
- June 9, 2015 Five cores of the CC were completed.
- October 19, 2015 CC Cover crack repair was conducted.
- March 29, 2016 CC Cover cracks linear distances were measured.
- May 26, 2016 CC Cover cracks linear distances were measured.
- June, 2016 CC Cover cracks were inspected.
- July 28, 2016 Ten cores of the CC and soil borings were completed.

E.2. Containment Cell Cover Design

In the Interim ROD, the EPA chose treatment to immobilize the waste and off-site recycling as the selected remedy. However, due to cost concerns, the selected remedy was changed in the ROD to an on-site CC where it is stated (first page of the Determination in the “Description of Selected Remedy” section):

“The containment cell will be an industrial landfill with multilayer construction which will prevent materials from leaching into the ground water.”

Also stated in the ROD (second page of the Determination in the “Statutory Determinations” section) is the following:

“This final remedial action is protective of human health and the environment; complies with those Federal and State requirements that are applicable or relevant and appropriate for this scope action; and is cost effective. Although the final action is not intended to address the statutory mandate for permanence and treatment to the maximum extent practicable, the selected action provides the same level of protection at a lower cost than the recycling remedy which satisfies the preference for treatment.”

A major design change is documented in the Remedial Action Report. Of particular interest was the following statement on page 16 in section 2.2 “Remedial Design Background”:

“CH2M Hill submitted a design revision in July 2005, while the RA was being conducted, which reflected technical direction from the EPA to replace the earthen cover for the CC with a proprietary low-permeability bituminous cover (MatCon™ Hot Mix Asphalt [HMA]).”

The original design specified the installation of a soil cover or cap over the waste materials contained within the CC. Discussions between EPA and TCEQ developed a consensus that a cover requiring minimal to no ongoing maintenance would be preferable to one that would require upkeep.

E.3. Containment Cell Cover Installation Concerns

Based on a review of the RA report, the following subparagraphs summarize issues/concerns regarding the CC installation activities.

- E.3.a.** The RA Report documented the installation of the CC. As documented in the RA Report, during excavation of the CC, an “alluvial till” was encountered which caused the original design of the bottom surface slope to be changed from 2:1 to 5:1. To compensate for the loss of volume in the CC, the floor elevation was lowered. Contrary to design specifications, a heavy equipment access ramp located in the southeast corner of the CC was left in place during the liner install due to time constraints.
- E.3.b.** The RA Report documented that the 2% design slope was not obtained along the southern and western perimeter during final grading operations prior to installation of the MatCon cover. Asphalt was utilized to make up the elevation differential in those areas.
- E.3.c.** In Section 3.4.1 of the RA Report, MatCon cover cracking issues were noted. During the installation of the MatCon cover, it was discovered that folding of the geotextile and liner material exposed on the berm surfaces between the anchor trench and the CC interior were causing cracks in the MatCon cover installed over the bermed areas. The geotextile and liner were removed from the top of the berms along the east, west, and north CC berms, however along the southern berm (where the MatCon cover was already installed) the geotextile/liner was left in place. Cracks were observed in the installed MatCon along the southern berm (presumably due to the folding geotextile and liner) and were milled out and the MatCon was reinstalled. Shortly after installation, additional cracking occurred in the same area. Approximately three months after installation, the installed MatCon cover along with the geotextile and liner on top of the southern berm were removed and the MatCon cover was reinstalled to grade in that area.
- E.3.d.** Heavy rainfall which caused delays in construction was documented in the RA Report. On July 16th and 17th 2005 approximately 1.7 inches of rainfall accumulated in the CC.

E.4. Containment Cell Cover Inspections

A site inspection by a TCEQ contractor in November 2010 reported that the CC cover was in good shape with little to no cracks evident on the main cell area. On July 10, 2012, a site inspection noted that significant surface cracks were evident on the CC cover and they were concentrated along the seams of the asphalt and on the southern half of the CC. Cracks were observed up to 3/4” wide and appeared to be several inches deep. Older, patched cracks were observed to have reopened. All subsequent CC cover inspections have noted increasing crack development.

E.5. Containment Cell Cover Repairs/Inspections

In August 2014, a TCEQ Contractor conducted a comprehensive repair of the CC cover. Cracks previously identified throughout the MatCon cover were sealed using Martin EZ-7 Cold-Applied Crack Sealant. Approximately 2,800 linear feet of cracks were sealed in general conformance with specifications outlined in the TCEQ Operation and Maintenance Plan for MatCon Cover. A seal coat was applied to the entire MatCon cover.

Additionally, cracks sealed were resealed on four separate occasions (9/24/2014, 10/28/2014, 11/10/2014, and 10/19/2015).

During the Fiscal Year (FY) 2016 Operation and Maintenance (O&M) inspections, new cracks were identified as well as previously sealed cracks that had reopened. In FY16, crack measurements collected during two separate occasions indicated the following:

- Approximately 880 feet of new cracks and previously sealed cracks had reopened and were measured on March 29, 2016.
- Approximately 114 feet of new cracks had formed over a 2 month period (since March 2016) and were measured on May 26, 2016.
- Approximately 850 feet of cracks were measured at the patch overlay areas on May 26, 2016.

The total number of cracks equates to approximately 1,844 feet of cracks located throughout the MatCon cover.

On the June 16, 2016, TCEQ contractors accompanied by the TCEQ performed a site visit to evaluate the cracks. Based on site observations, the majority (~75%) of the cracks were observed on the southern half of the MatCon cover.

As a result of the crack reoccurrences throughout the MatCon cover, asphalt coring activities were performed on July 28, 2016 in order to conduct a preliminary observation of conditions located underneath the MatCon cover. The coring activities were performed in a manner following the guidelines set forth in the MatCon® O&M Manual. Ten locations were cored using an asphalt coring machine and each core was routed to a depth of approximately 4-inches (or to the base of the MatCon cover). Upon removal of the asphalt core, the core hole was inspected to identify any indications of gaps or voids that may exist between the top of the gravel base material and the base of the MatCon cap. Soil borings were advanced in each core hole to a maximum depth of two feet below the top of the gravel base layer (one soil boring advanced to 4-feet below the asphalt to evaluate the conditions of the waste material). The following conclusions were drawn from the field inspection of the cores and soil samples:

- The diameter of each core was 4-inches. Each core was drilled to the bottom of the HMA cover. Asphalt core sample thickness ranged from 3.5-inches to 5-inches capturing the full extent of the asphalt cap.
- At each core location, voids or gaps between the top of the clay liner and the bottom of the asphalt cap were not observed and there was no evidence to suggest that the separation of the MatCon cover and gravel base layer is occurring.
- Based on the soil boring depths, the gravel base layer appears at least 2-feet thick. However, the waste material was observed at 1.5 feet below the bottom of asphalt at one location, which indicates that the base material may not be entirely uniform in thickness throughout the cover.
- Based on the initial gravimetric water content results, the moisture content of the samples was low and resembled slightly moist characteristics. Moisture appears to be present beneath the asphalt; however, no soil saturation was observed. Evidence of water stains emanating out the lowest sections of various crack systems suggesting that rainwater enters the crack systems in the higher elevation areas and then exits downgradient in the same crack system.

E.6. MatCon, Inc. Documents

Promotional literature from MatCon, Inc. website includes the Rockwool Superfund Site as one of the Project Summaries. On the Rockwool Project Summary, it is stated that the paving contractor paved the entire 3.7 acre cap in one continuous operation lasting nearly 28 hours and finished just ahead of another rain event. The Project Summary also notes that cracks were noticed even after considerable rolling on the berm attributed to “bunched” liner and geotextile material. The material was removed and the cover was successfully installed. It was also noted that the berm was not graded smoothly and compacted to specifications, but the EPA contractor authorized paving due to an imminent storm and a very tight schedule. An attempt was made to correct the sub-grade issue by applying a skim coat over portions of the berm, but this did not completely correct the problem. Construction cracks appeared in numerous places along the berm and were repaired. The site was inspected in 2006 and site repairs were made in 2008 under warranty.

The MatCon Product Sheet on the MatCon, Inc. website claims that:

- MatCon does not crack like compacted clay or lose plasticity like HDPE in arid climates or become brittle in arctic climates. Nor is it subject to UV damage below the top millimeter or so, which is exposed.
- MatCon resists erosion, remains stable on slopes and conforms well to differential settlement of underlying materials.
- MatCon covers allow for less material to import and more waste storage capacity.
- MatCon can be rapidly installed on a prepared subgrade (~2½ acres/day) and used the next day.

The MatCon CAP Warranty for the Rockwool Superfund Site lists several deficiencies including the berm issue described above. MatCon also states that they will do Hydraulic Conductivity Monitoring by collecting core samples during every annual inspection of the warranty period.

E.7. Relevant Landfill Cover Documents

Various landfill cover documents were reviewed including the EPA Green Remediation Best Management Practices: Landfill Cover Systems and Energy Production guidance document, the Naval Facilities Engineering Command – Sustainable Long-Term Management of Landfills Under the Navy’s Environmental Restoration Program, the Naval Facilities Engineering Command – Alternative Landfill Capping – Concrete Capping, and WASTE360 – Clay Remains a Top Choice for Final Landfill Cover.

- E.7.a.** The EPA Green Remediation Best Management Practices: Landfill Cover Systems and Energy Production document suggested best management practices to reduce the environmental footprint of various landfill cover systems including conventional cover systems, evapotranspiration (ET) cover systems, and asphalt or concrete cover systems. The document indicated that proper operation and maintenance of a cover system and landfill closure elements are needed to ensure they are performing as intended.

- E.7.b.** The Naval Facilities Engineering Command – Sustainable Long-Term Management of Landfills Under the Navy’s Environmental Restoration Program document advises landfill owners in adopting sustainable long-term management strategies. It is noted in the document that most post-closure maintenance is expended on the cap because this is the main component of the landfill exposed to physical and climatic stresses; however, long-term cap performance is not necessarily linked to high levels of post-closure maintenance.
- E.7.c.** The Naval Facilities Engineering Command – Alternative Landfill Capping – Concrete Capping document describes asphalt/concrete (e.g., hard-surface) capping as an alternative containment technology that involves using modified paving construction practices to reduce contaminant mobility and protect groundwater. The document lists factors that may limit the applicability and effectiveness of the process with the following:
- Contaminants remain in place at the site.
 - Actual operating life is uncertain.
 - Requires long-term monitoring and maintenance.
 - Cannot be installed during frozen or saturated ground conditions.
 - May be buried to prevent degradation from ambient oxygen and ultraviolet radiation from sunlight.
 - Soil movement due to frost heaving can damage barrier if buried above frost line.
- E.7.d.** The WASTE360 – Clay Remains a Top Choice for Final Landfill Cover document evaluated multiple landfill covers systems including clay covers, evapotranspiration covers, synthetic covers (membrane), and hard covers (asphalt/concrete). The document states that asphalt covers may even be protected from sunlight and oxidation by burying it in native soils. The document also states that despite the availability of a number of alternative landfill capping methods, clay covers are still the go-to system in most areas of the country.

F. Conclusions

Based on the extensive review of project documents, project history, and relevant literature; the evidence suggests that the containment cell cover system/remedy is not performing as designed and continued crack development appears to be accelerating despite repeated patching efforts. Observations of crack development show little to no vertical deflection of the asphalt material. No horizontal movement of “blocks” of asphalt cap material is evident along the edges of the containment cell. All of the crack development appears to be a function of the asphalt material itself. Core sampling, and subgrade sampling reveal that the subgrade material is non-saturated and substantially consolidated and compacted suggesting that movement of the subgrade material is unlikely occurring. Evidence points toward tensile stress fracture as the predominant force behind the ongoing asphalt cover material failure.

The cause of the tensile stresses is unknown, however the predominance of cracks on the southern facing face of the landfill and the appearance of the first significant cracks after the hottest and driest year in decades (2011) suggests that thermal expansion and/or ultraviolet radiation from solar radiation may play a dominant role.

G. Recommendations

Based on the results of this containment cell cover evaluation, it is recommended that during the short term, cracks in the MatCon cover continue to be repaired, however, given the ongoing and increasing nature of crack development, an alternative cover system should be explored. A detailed study should be conducted to evaluate the most cost efficient technology to either augment or replace the existing MatCon cover.

Figures



EPA ID No. TXD066379645

TCEQ Site ID No. SUP033

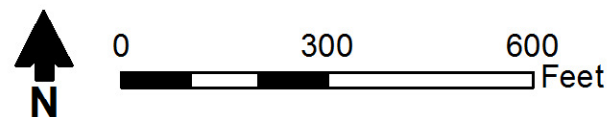
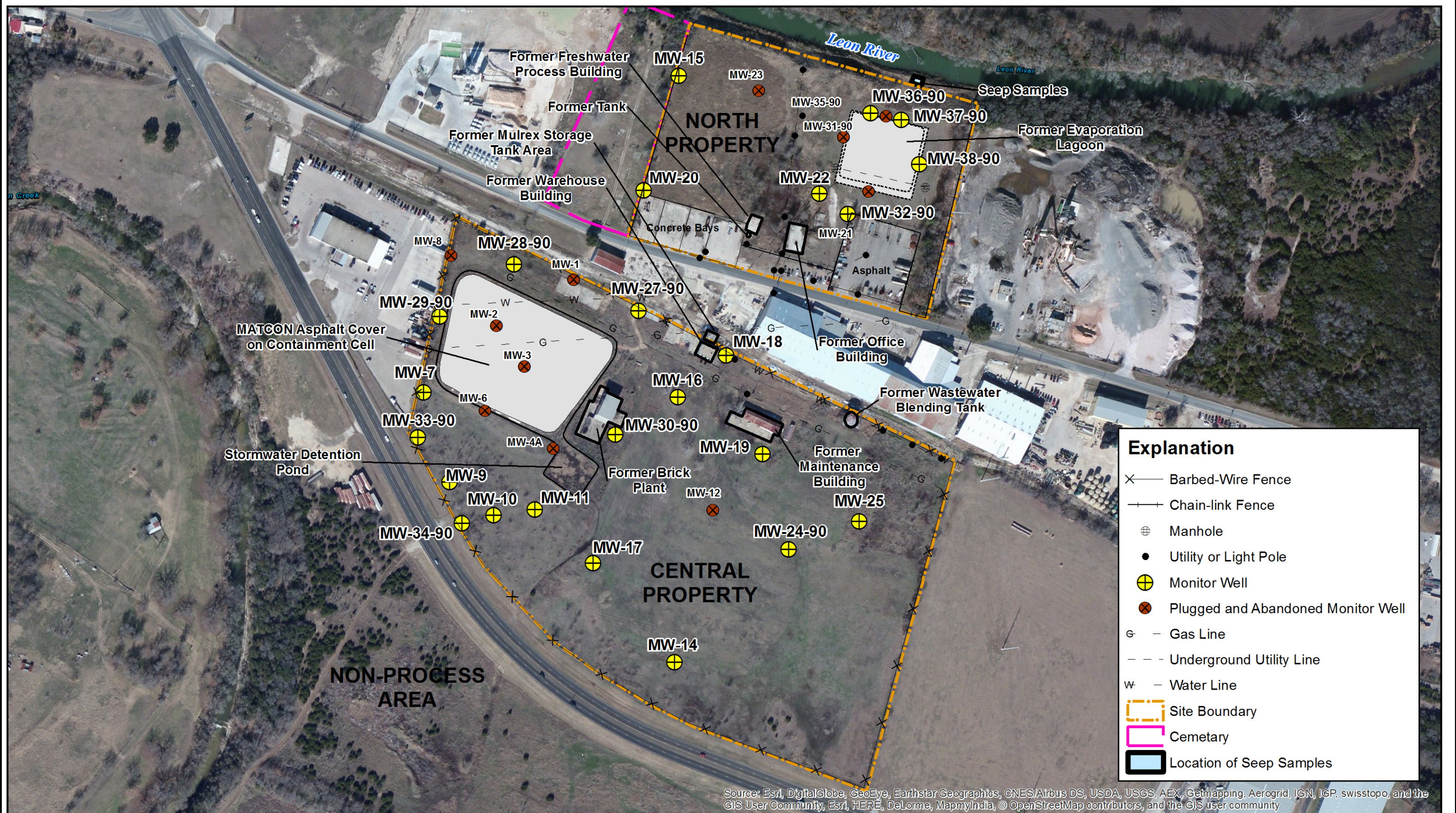


0 500 1,000 Feet



Daniel B. Stephens & Associates, Inc.
2/3/2015 ES15.AIR0.40

ROCKWOOL INDUSTRIES, INC.
FEDERAL SUPERFUND SITE
1741 TAYLOR VALLEY ROAD
BELTON, BELL COUNTY, TEXAS
Site Location Map



ROCKWOOL INDUSTRIES, INC.
 SUPERFUND SITE
 1741 TAYLOR'S VALLEY ROAD
 BELTON, TEXAS
Site Map



Appendix A

References

References

As-Built Drawings, Soil/Waste Excavation and Site Restoration, Rockwool Industries, Inc. Superfund Site, Belton, Texas, Sheets 1 - 20, prepared for EPA by CH2MHill, January 2006, Attachment 11 to the RAR (Record Drawings).

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Appendix B

Surveys

