Sandia National Laboratories / New Mexico

PROPOSAL FOR NO FURTHER ACTION ENVIRONMENTAL RESTORATION PROJECT SITE 194, GENERAL PURPOSE HEAT SOURCE TEST AREA OPERABLE UNIT 1335

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PROPOSAL FOR
NO FURTHER ACTION
Environmental Restoration Project

Site 194, General Purpose Heat Source Test Area
OU 1335

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1. Introduction

1.1 ER Site 194 General Purpose Heat Source Test Area

Sandia National Laboratories/New Mexico (SNL/NM) is proposing an administrative no further action (NFA) decision for Environmental Restoration (ER) Site 194, The General Purpose Heat Source (GPHS) Test Area, Operable Unit (OU) 1335. ER Site 194, formerly included in OU 1298, was identified in the Hazardous and Solid Waste Amendment (HSWA) Module IV (Ref. 1) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518) (Ref. 2).

1.2 SNL/NM Administrative NFA Process

This proposal for a determination of an administrative NFA decision has been prepared using the criteria presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (PIP) (Ref. 3). Specifically, this proposal will "contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMU) at the facility that may pose a threat to human health or the environment" (as proposed in the Code of Federal Regulations [CFR] Section 40 Part 264.51[a] [2]) (Ref. 4). The HSWA Module IV contains the same requirements for an NFA demonstration:

> Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (Ref. 1).

In requesting an administrative NFA decision for ER Site 194, this proposal is using existing administrative/archival information to satisfy the permit requirements. This unit is eligible for an administrative NFA proposal based on one or more of the following criteria taken from the RCRA Facility Assessment Guidance (Ref. 5):

- Criterion A: The unit has never contained constituents of concern.
- Criterion B: The unit has design and/or operating characteristics that effectively prevent releases to the environment.
- Criterion C: The unit clearly has not released hazardous waste or constituents into the environment.

Specifically, ER Site 194 is being proposed for an administrative NFA decision because "there are no releases of hazardous waste (including hazardous constituents that may pose a

threat to human health or the environment" as proposed in CFR Section 40 Part 264.51[a][2] (Ref. 4).

1.3 Local Setting

SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with KAFB, the United States Forest Service, the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other nuclear activities since 1945.

Site 194 is an area in South Thunder Range, about 400 feet south of the large shock tube at ER Site 89 (Figure 1). At one time a shock tube used for the GPHS test studies was situated on this site. This structure has since been removed. The terrain is flat with some vegetation, primarily grasses, sage, and tumbleweeds. The shallow subsurface geology is comprised of alluvial sediments, clay to gravel/cobble size. Depth to ground water at the nearby Chemical Waste Landfill wells has been measured at about 500 feet below ground surface.

2. History of the SWMU

2.1 Sources of Supporting Information

In preparing to request an administrative NFA decision for ER Site 194, a background study was conducted to collect available and relevant site information. Background information sources included existing records and reports of site activity. In addition, interviews were conducted with SNL/NM staff and contractors familiar with site operational history. The study was completely documented and has provided traceable references which sustain the integrity of this proposal.

The following information sources, hierarchically listed with respect to assigned validity, were available for use in the evaluation of ER Site 194:

- One surface radiation survey report, including data from radiation swipe surveys
- Interviews with four ER Site 194 facility personnel including a health physicist
- Miscellaneous information sources including SNL/NM personnel correspondence (memorandums, letters, test reports, and notes regarding ER Site 194)
- Photographs and field notes from numerous site inspections conducted by SNL/NM staff

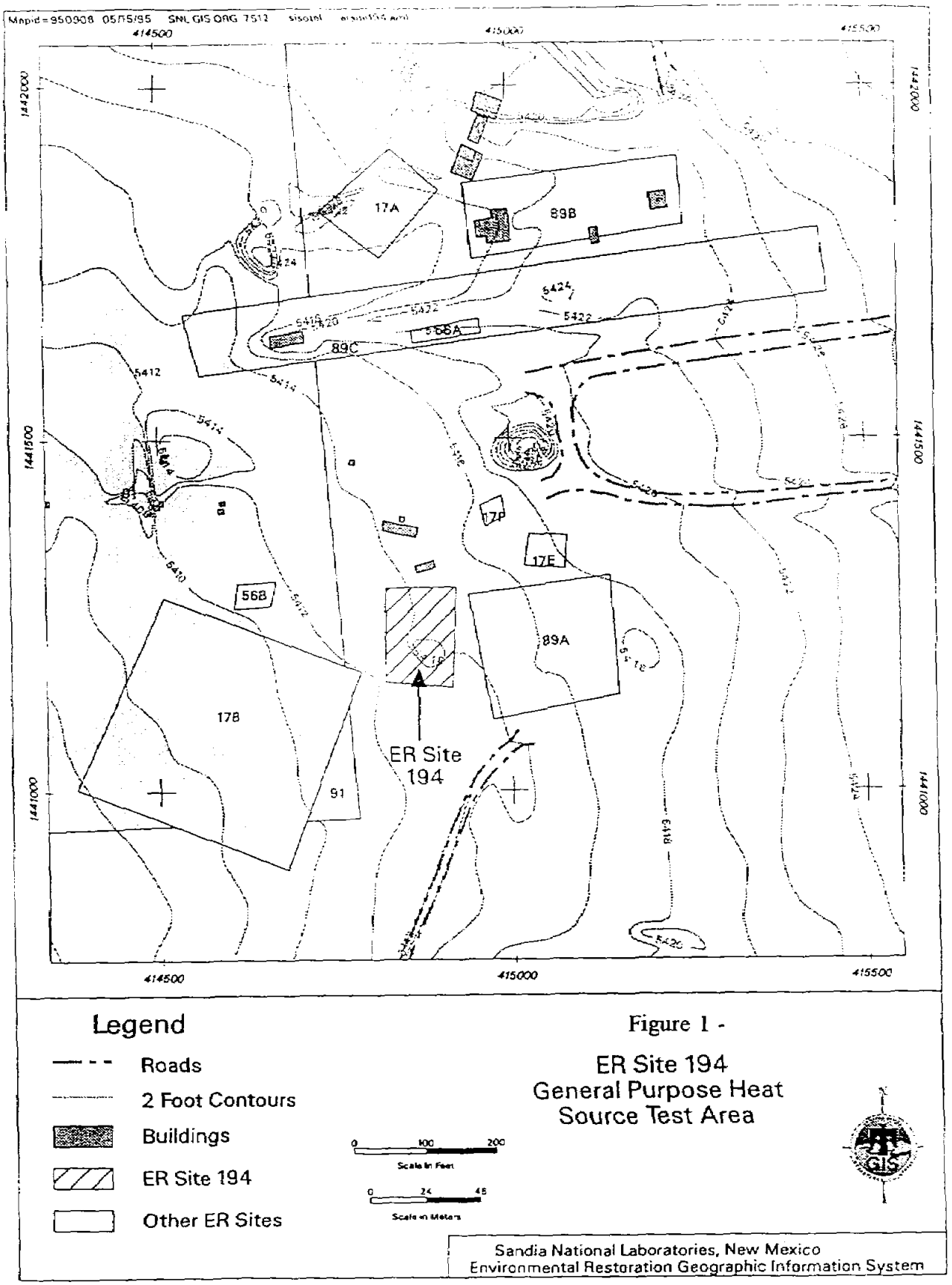

Figure 1. ER Site 194 General Purpose Heat Source Test Area

- The Comprehensive Environmental Assessment and Response Program (CEARP) Phase I Report (Ref. 6) and CEARP records. (Copy contained in the SNL/NM Environmental Operations Record Center)

- The RCRA Facility Assessment (RFA) Report (EPA 1987) (Ref. 7).

Utilizing this information, a brief history of ER Site 194 and a discussion of all relevant evidence regarding past waste practices and releases at the site have been prepared and are presented in this proposal for an administrative NFA decision.

2.2 Previous Audits, Inspections, and Findings

The original CEARP information from interviews conducted in 1985 states that "currently, some tests are being conducted to examine the dispersion of plutonium from a space shuttle detonation on the launch pad. The tests use capsules containing 100 grams of depleted uranium. Several of the capsules have been breached." The Hazard Ranking System (HRS) finding for the SWMU was uncertain for RCRA-regulated hazardous waste and information was insufficient to calculate an HRS migration mode score (Ref. 6).

2.3 Historical Operations

ER Site 194, the GPHS Test Area, is located in South Thunder Range, about 400 feet south of the large shock tube at ER Site 89 (Figure 1).

A series of tests designed by Los Alamos National Laboratory were conducted at the site from 1980 to 1985 to evaluate the blast hardness of radioisotope-powered heat sources, GPHS, used for space missions (Ref. 8). The focus of the tests was to determine the survivability of the GPHS when subjected to blast pressures such as those associated with a space shuttle launch accident (Ref. 9).

The GPHS module consisted of a 3.8 inch- by 3.7 inch- by 2 inch-vessel constructed of high-impact carbon fiber and containing four 200-gram, iridium-alloy-clad pellets of depleted uranium (DU) (Ref. 10 and 12). This description is contradictory to the one originally published in the CEARP (Ref. 6). A schematic of the GPHS module is shown in Figure 2.

The tests utilized a shock tube constructed of schedule-160 steel pipe with an internal diameter of 22 inches and a test section approximately 66 feet long (Figure 3). The total length of the tube varied, depending on desired test conditions (Ref. 10).

Six to eight tests were conducted at the test area (Ref. 11). Four tests were conducted using C-4 explosive charges ranging in size from 60 pounds to 257 pounds (Ref. 12). However, another source states that Baratol ($BaNO_3$+TNT) and plastic bonded high explosives (PBX) were also used in the tests (Ref. 8). The explosive charge was placed at one end of the shock tube and the GPHS test module was placed at the other end (Ref. 10). Following detonation of the explosive charge, the GPHS module was ejected into a catch pit at the end

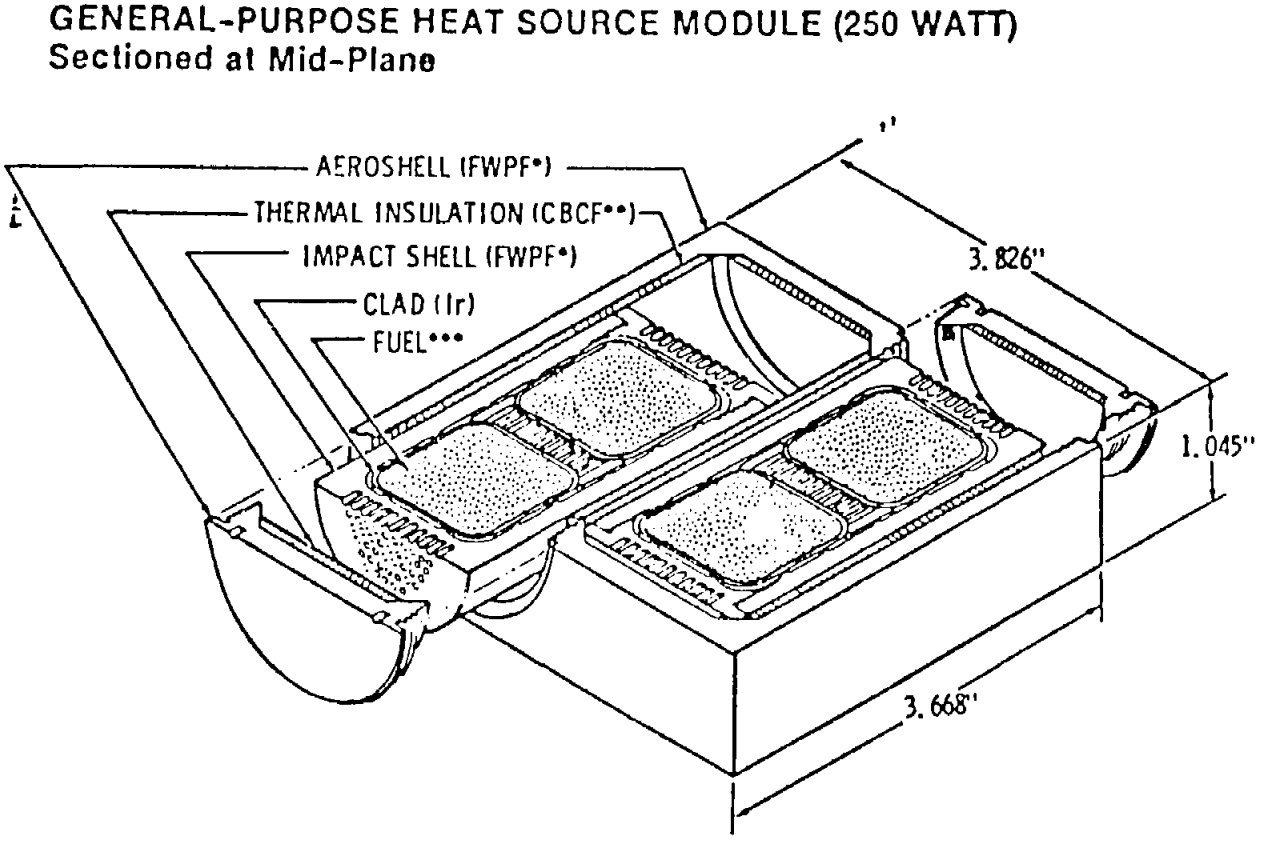

Figure 2. General Purpose Heat Source Module Assembly

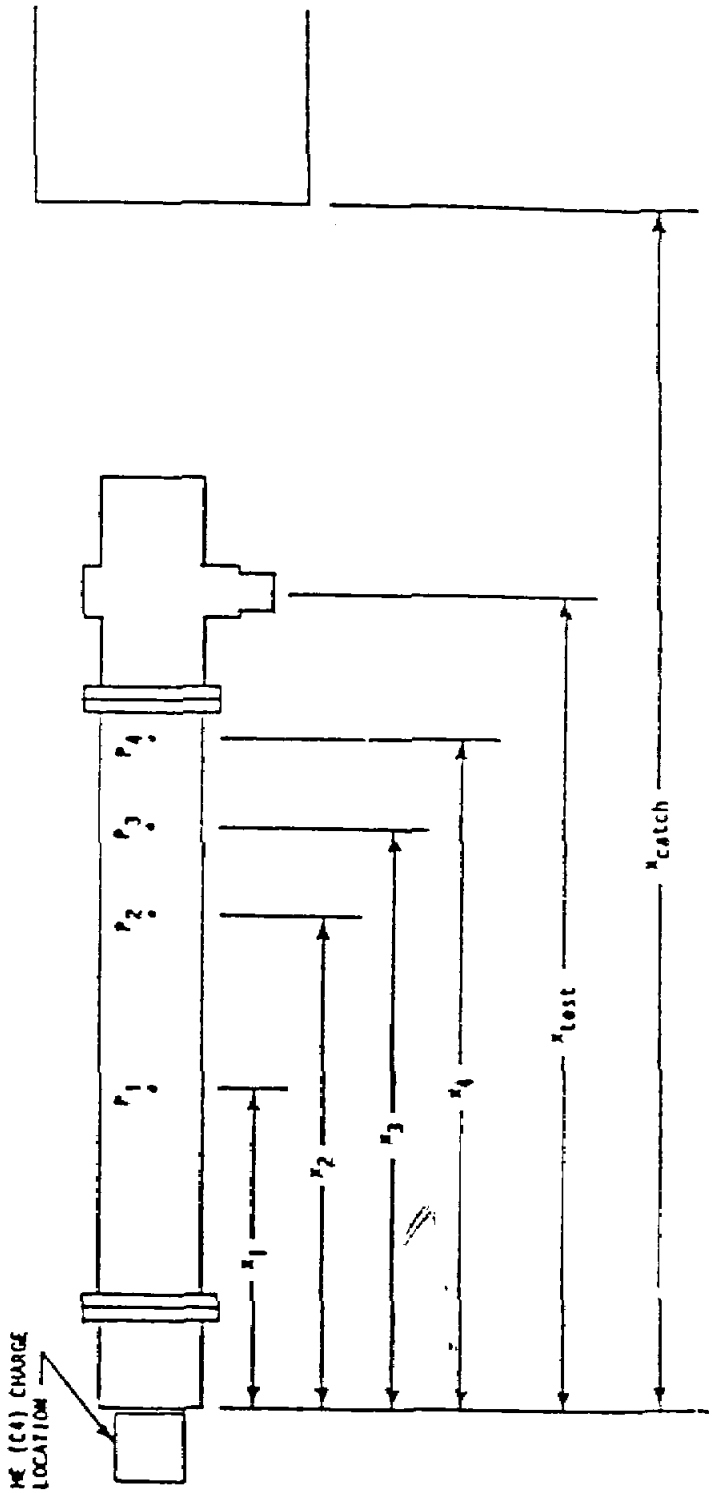

Figure 3. Sandia Shock Tube Set-Up

of the shock tube. The catch pit is described as a large pit, 8 feet deep and 10 feet in diameter, containing vermiculite or sawdust (Ref. 11). The GPHS modules and their associated parts were recovered from the catch pit for detailed laboratory examination (Ref. 9).

3. Evaluation of Relevant Evidence

3.1 Unit Characteristics

ER Site 194 is defined by a 50-foot radius from the 10-foot by 15-foot catch pit that remains at the former shock tube location. The catch pit was designed to contain the GPHS modules and their associated parts ejected from the shock tube during the tests.

3.2 Operating Practices

During one test, a DU pellet was reportedly released into the catch pit from a GPHS module (Ref. 12 and 13). A search was undertaken for the missing pellet so that the blast effects on the pellet could be evaluated. Ten man-days were spent looking for the pellet in the pit and ten man-days were spent looking for the pellet outside the pit. Archeology students were employed to systematically sift through the vermiculite in the pit and locate the pellet (Ref. 11). The search was unsuccessful and the pellet was never found.

Recovered heat source pellets from a subsequent test indicate that none were sufficiently damaged to scatter DU (Ref. 9). Therefore, if a DU pellet remains at the site it is probably intact within its iridium-alloy containment shell.

3.3 Presence or Absence of Visual Evidence

There is no visible evidence of hazardous material in or surrounding the catch pit.

3.4 Results of Previous Sampling/Surveys

Radiological and land surveys were conducted by RUST-Geotech during January 1994 (Ref. 14). A gamma-scan survey was performed at 6-foot centers over the surface area of the entire site using a sodium iodide scintillometer. No gamma detections above the background readings of 11 to 13 microroentgens per hour were found within the site boundaries. If a DU pellet remained on site, it should have been found based on the survey technique. These survey results support the belief that the lost DU pellet is no longer present on site.

3.5 Assessment of Gaps in Information

There are no records documenting the search for the missing DU pellet. However, the potential data gap from incomplete archival records has been addressed by ER project interviews, published articles describing the tests, site visits, and the surface gamma radiation survey results. This new information indicates that there is little chance that the missing pellet could have released DU to the environment.

3.6 Rationale for Pursuing an Administrative NFA Decision

SNL/NM is proposing an administrative NFA decision for ER Site 194 because the SWMU has not released hazardous waste or constituents into the environment (Criterion C). In January 1994, a surface gamma radiation survey was performed at the site (Ref. 14). No detections above background levels were found at the site. This survey suggests that the missing DU pellet no longer remains on site. However, if the DU pellet remains at the site, recovered pellets from another test indicate that it is probably intact within its iridium-alloy containment shell and has not released DU to the environment.

Therefore, based on recent surveys and newly obtained historical information, ER Site 194 is recommended for an administrative NFA decision because the SWMU has not released hazardous waste or constituents into the environment (Criterion C).

4. Conclusion

Based upon the evidence cited above, no potential remains for a release of hazardous waste (including hazardous constituents) which may pose a threat to human health or the environment. Therefore, ER Site 194 is recommended for an NFA determination.

5. References[1]

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2. United States Environmental Protection Agency (EPA), August 1992. Hazardous Waste Management Facility Permit No. NM5890110518, EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

[1]The SNL/NM reference numbers refer to a SNL/NM Records Center coding system intended to maintain the confidentiality of SNL/NM employees.

3. Sandia National Laboratories/New Mexico (SNL/NM), February 1994, draft. "Program Implementation Plan for Albuquerque Potential Release Sites," Sandia National Laboratories, Albuquerque, New Mexico.

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14. RUST-Geotech, Inc., December 1994. "Final Report, Surface Gamma Radiation Surveys for Sandia National Laboratories/New Mexico Environmental Restoration Project," RUST-Geotech, Inc., Grand Junction, Colorado.