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August 22, 2008

Mr. Jeff Inglis
c/o Ms. Joan Simmons
U.S. Environmental Protection Agency
75 Hawthorne Street, SFD 9-1
San Francisco, CA 94105

Subject: Mariano Lake Mine, Preliminary Assessment Report

Attached is the Preliminary Assessment report for the Mariano Lake Mine (EPA ID: NNN000908585) site, prepared by Weston Solutions, Inc. (WESTON). Also included are the Report Package Checklist, Transmittal List, Site Reconnaissance Interview and Observation Report/Photographic Documentation, Contact Reports, Latitude and Longitude Calculation Worksheet, photocopies of references, EPA Quick Reference Fact Sheet, HRS Scoresheets and Rationale.

If the EPA has comments regarding this report, they should be received by WESTON within one month of this submittal. WESTON will address these comments and resubmit the report within 2 weeks. If you have any questions regarding this report, please do not hesitate to contact me at a.reilly@westonsolutions.com.

Respectfully submitted,

Amanda K.C. Reilly
Site Leader

Attachments

COMPONENTS FOR SITE ASSESSMENT REPORT PACKAGES

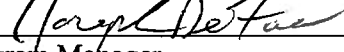
****Applicable to APA, PA, PA/SI ,SI and ESI report packages****

(to be submitted to EPA by the contractor, state agency, or tribe)

Site Name: Mariano Lake Mine

EPA ID No: NNN000908585

- 1. Cover Letter
- 2. Site Assessment Report (Including table of contents and list of appendices, tables, and figures)
- 3. Appendix A, Transmittal List
- 4. Appendix B, Site Reconnaissance Interview and Observation Report/Photographic Documentation
- 5. Appendix C, Contact Log and Contact Reports
- 6. Appendix D, Latitude and Longitude Calculations Worksheet
- 7. Appendix E, References
- 8. Appendix F, EPA Quick Reference Fact Sheet: (*Site Assessment: Evaluating Risks at Superfund Sites*)
- 9. Appendix G, Sampling and Analysis Plan
 - Not applicable to non-sampling sites**
- 10. Appendix H, Analytical Results (From EPA-sponsored sampling event only)
 - Not applicable to non-sampling sites**
- 11. Appendix I, EPA Region 9 Remedial Site Assessment Decision Form (**To be completed by EPA**)
- 12. Confidential Information Packet - separately bound (Including HRS Scoresheets, HRS Rationale, and GIS Report)

Approved by: 
Program Manager
Weston Solutions, Inc.

Approved by: _____
USEPA Task Monitor
U.S. Environmental Protection Agency, Region 9

**Preliminary Assessment Report
Mariano Lake Mine
McKinley County, New Mexico**

**EPA ID No.: NNN000908585
USACE Contract No.: W91238-05-F-0052
Document Control No.: 12767.063.490**

August 2008

**Prepared for:
U.S. Environmental Protection Agency
Region 9**

**Prepared by:
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Appendix C: Contact Log and Contact Reports
Appendix D: Latitude and Longitude Calculations Worksheet
Appendix E: References
Appendix F: EPA Quick Reference Fact Sheet

LIST OF ACRONYMS

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cpm	Counts per Minute (divide cpm by 1,000 for a general conversion to $\mu\text{R/hr}$)
EPA	United States Environmental Protection Agency
HRS	Hazard Ranking System
NMBGMR	New Mexico Bureau of Geology and Mineral Resources
NPL	National Priorities List
PA	Preliminary Assessment
RCRAInfo	Resource Conservation and Recovery Act Information
SARA	Superfund Amendments and Reauthorization Act
WESTON	Weston Solutions, Inc.

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), Weston Solutions, Inc. (WESTON®) has been tasked to conduct a Preliminary Assessment (PA) of the Mariano Lake Mine site, located in McKinley County, New Mexico.

The purpose of the PA is to review existing information on the site and its environs, to assess the threat(s), if any, posed to public health, welfare, or the environment, and to determine if further investigation under CERCLA/SARA is warranted. The scope of the PA includes the review of information available from federal, state, tribal, and local agencies and performance of an on-site reconnaissance visit.

Using the sources of existing information, the site is then evaluated using the U.S. Environmental Protection Agency's (EPA's) Hazard Ranking System (HRS) criteria to assess the relative threat associated with actual or potential releases of hazardous substances at the site. The HRS has been adopted by the EPA to help set priorities for further evaluation and eventual remedial action at hazardous waste sites. The HRS is the primary method of determining a site's eligibility for placement on the National Priorities List (NPL). The NPL identifies sites at which the EPA may conduct remedial response actions. This report summarizes the findings of these preliminary investigative activities.

The Mariano Lake Mine site was identified as a potential hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on April 14, 2008 (EPA ID No.: NNN000908585) (1).

More information about the Superfund program is available on the EPA web site at <http://www.epa.gov/superfund>. The attached fact sheet describes EPA's site assessment process (Appendix F).

1.1 Apparent Problem

The apparent problems at the Mariano Lake Mine site, which contributed to EPA's determination that a PA was necessary, are as follows:

- Between 1977 and 1982, the site operated as a uranium mine producing at least 2 million pounds of uranium (2).
- In July 2008, field screening data collected onsite indicated gamma radiation measurements to be significantly above background measurements (3).

2.0 SITE DESCRIPTION

2.1 Location

The Mariano Lake Mine site is located in the southeastern portion of the Navajo Nation in McKinley County, New Mexico. The site lies approximately 25 miles east of the city of Gallup. The geographic coordinates for the site are 35° 22' 54" North latitude and 108° 16' 59" West longitude (4). A site location map is presented in Figure 2-1.

2.2 Site Description

The Mariano Lake Mine site is located in a rural area of northwestern New Mexico. The site consists of two distinct source areas, the eastern source area and the western source area. The eastern source area occupies approximately 12.5 acres and the western source area occupies approximately 18.5 acres. The site is generally flat and surrounded in all directions by sparsely vegetated desert. Approximately 6 residences are located in the vicinity of the source areas. The residence nearest to a source area is a double-wide mobile home located approximately 110 feet east of the eastern source area boundary. In addition, one drinking water well, the Mariano Lake Well, is located approximately 678 feet southwest of the eastern source area (4, Appendix B). A site layout map is presented in Figure 2-2.

During operations, the site consisted of a single mine shaft at a depth of approximately 519 feet deep. The shaft was located in the eastern source area. The western source area of the site was reportedly used as a dewatering pond (5, App. B).

2.3 Operational History

From 1977 to 1982, Gulf Mineral Resources Co. conducted mining operations on the Mariano Lake Mine site. Current and historic ownership information regarding the site is unknown at this time (2).

The Mariano Lake mine practiced underground stope leaching processes for extracting the uranium ore from the mined rock. The underground stope leaching mining system involves applying leach solutions to mineralized rock that has been fragmented by blasting ore in place, or by backfilling empty stopes. Only enough material is removed from the underground mining area (stope) to allow for adequate expansion during the blasting. After blasting, leach solution containing chemicals and/or bacteria is circulated through the fragmented ore to dissolve the target mineral. The resulting solution containing the dissolved mineral (pregnant leach solution) is pumped to the surface where the product is removed, and the leach solution is regenerated for recycling underground. Reportedly, the solution was pumped to a dewatering pond in the western source area of the Mariano Lake Mine site. Over the five years that uranium mining operations occurred on the site, an approximate 505,489 tons of uranium ore and 2,265,405 pounds of uranium were produced. The uranium

deposits were mined from the Brushy Basin Member in the upper portion of the Morrison Formation (6, 7, 8, App. B).

The Mariano Lake Mine site lies within the Grants Uranium Region of the San Juan Basin. Historically, the San Juan Basin has been the most productive uranium mining area in the United States, having produced approximately 40 percent of the nation's uranium ore. Most of the production has been from the Morrison Formation and to a lesser extent the Dakota Sandstone (6).

In July 2006, the Navajo Nation Environmental Protection Agency conducted a site reconnaissance on the Mariano Lake Mine site. Gamma radiation measurements were collected throughout the eastern source area and a maximum reading of 160,000 counts per minute (cpm) was detected (9).

In July 2008, WESTON conducted a field screening on the Mariano Lake Mine site and gamma radiation measurements were collected throughout the site. A background reading that exhibited 10,000 cpm was collected from a location that appeared to be undisturbed and not associated with mining activities. Gamma radiation measurements collected from the western source area of the site displayed readings at background levels. Elevated readings were detected in the eastern source area, having a maximum reading of 343,000 cpm (3, App. B). A gamma reading location and measurement map is presented in Figure 2-2.

As of July 2008, the site was vacant and no mining operations were occurring onsite. In addition, the Mariano Lake Well was temporarily not operating due to a technical problem. The well was being serviced and was expected to be in operation shortly (App. B).

2.4 Regulatory Involvement

2.4.1 U.S. Environmental Protection Agency

The Mariano Lake Mine site is not listed in the Resource Conservation and Recovery Act Information (RCRAInfo) database, as of August 14, 2008 (10).

3.0 HAZARD RANKING SYSTEM FACTORS

3.1 Sources of Contamination

For HRS purposes, a source is defined as an area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance.

Potential hazardous substance sources associated with the Mariano Lake Mine site include, but may not be limited to:

- Excavated onsite mine workings from previous uranium mining with elevated gamma radiation measurements (3).

3.2 Groundwater Pathway

In determining a score for the groundwater migration pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to groundwater; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and 3) the people (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on the number of people who regularly obtain their drinking water from wells that are located within 4 miles of the site. The HRS emphasizes drinking water usage over other uses of groundwater (e.g., food crop irrigation and livestock watering), because, as a screening tool, it is designed to give the greatest weight to the most direct and extensively studied exposure routes.

3.2.1 Hydrogeological Setting

The Mariano Lake Mine site lies within the San Juan Hydrologic Basin that has four major underlying aquifers and various smaller shallow alluvial aquifers. These major aquifers in descending order are the San Juan Unit, Dakota (D-), Navajo (N-), and Coconino (C-) aquifers. The San Juan Unit and D-aquifers provide domestic water to a majority of the drinking water wells in the southeastern portions of the Navajo Nation (11).

The depth to groundwater beneath the site is unknown; however the 519-foot deep onsite mineshaft is below the water table and therefore in contact with groundwater beneath the site. The direction of groundwater flow has not been clearly defined, however, based upon regional topography, it is estimated to flow in a northeasterly direction. Geologic materials in the unsaturated zone between ground surface and the top of the aquifer are unknown; however, the site is underlain by Quaternary-age alluvium, which extends to an unknown depth. The net precipitation in the area is approximately 10.7 inches annually (8, 12, App. B).

3.2.2 Groundwater Targets

The closest drinking water well is the Mariano Lake Well, located approximately 678 feet southwest of the eastern source area on the Mariano Lake Mine site. This well is approximately 600 feet deep and serves approximately 20 people in the surrounding area. There are an additional 10 drinking water wells within 4 miles of the site. There are no public water systems within 4 miles of the site. These wells are private domestic drinking water wells likely serving individual households. The county multiplier for McKinley County is 3.44 (8, 13, App. B).

3.2.3 Groundwater Pathway Conclusion

Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to groundwater beneath the site. The depth to groundwater beneath the site is unknown; however the 519-foot deep onsite mineshaft is below the water table and therefore in contact with groundwater beneath the site. There is one drinking water well onsite that serves approximately 20 people. Geologic materials in the unsaturated zone between ground surface and the top of the aquifer are unknown; however, the site is underlain by Quaternary-age alluvium, which extends to an unknown depth (3, 8, App. B).

3.3 Surface Water Pathway

In determining the score for the surface water pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to surface water (e.g., streams, rivers, lakes, and oceans); 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, persistence, bioaccumulation potential, and quantity); and 3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on drinking water intakes, fisheries, and sensitive environments associated with surface water bodies within 15 miles downstream of the site.

Surface water runoff from the western source area of the Mariano Lake Mine site runs into an intermittent stream located along the northern border of the site. This stream continues to run west and connects with additional unnamed streams downgradient of the site. Surface water runoff from the eastern source area of the Mariano Lake Mine site runs into an intermittent stream located along the northeast of the site. This stream continues to run north and connects with additional unnamed streams downgradient of the site. There are no known drinking water intakes associated with these surface water bodies within 15 miles of the site. It is unknown if these streams are used by local residents for fishing (4, 8, App. B).

3.4 Soil Exposure and Air Pathways

In determining the score for the soil exposure pathway, the HRS evaluates: 1) the likelihood that there is surficial contamination associated with the site (e.g., contaminated soil that is not covered by pavement or at least 2 feet of clean soil); 2) the characteristics of the hazardous substances in the surficial contamination (i.e., toxicity and quantity); and 3) the people or sensitive environments (targets) who actually have been or potentially could be, exposed to the contamination. For the targets component of the evaluation, the HRS focuses on populations that are regularly and currently present on or within 200 feet of surficial contamination. The four populations that receive the most weight are residents, students, daycare attendees, and terrestrial sensitive environments.

In determining the score for the air migration pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to ambient

outdoor air; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and 3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on regularly occupied residences, schools, and workplaces within 4 miles of the site. Transient populations, such as customers and travelers passing through the area, are not counted.

3.4.1 Physical Conditions

The Mariano Lake Mine is located in a rural area surrounded in all directions by sparsely vegetated desert. The entire site is unpaved. The eastern and western source areas are surrounded by separate chain linked fences that are topped with barbed wire (App. B).

3.4.2 Soil Exposure Targets

Approximately 6 residences are located on the Mariano Lake Mine site. During the July 2008 field screening, two gamma measurements were collected from locations adjacent to the mobile home residence located 110 feet from the eastern boundary of the eastern source. These locations exhibited readings of 23,000 cpm and 98,000 cpm. The background gamma measurement exhibited a reading of 10,000 cpm (3, App. B).

There are no schools or daycare facilities on, or within 200 feet, of the site. In addition, there are no terrestrial sensitive environments onsite (App. B).

3.4.3 Soil Exposure and Air Pathway Conclusions

Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to onsite soil and the soil surrounding the site. Six residences are located onsite. There are no schools or daycare facilities on, or within 200 feet, of the site. In addition, there are no terrestrial sensitive environments onsite (3, App. B).

4.0 EMERGENCY RESPONSE CONSIDERATIONS

The National Contingency Plan [40CFR 300.415 (b) (2)] authorizes the EPA to consider emergency response actions at those sites that pose an imminent threat to human health or the environment. For the following reasons, a referral to Region 9's Emergency Response Office does appear to be necessary:

- Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to groundwater beneath the site. The depth to groundwater beneath the site is

unknown; however the 519-foot deep onsite mineshaft is below the water table and therefore in contact with groundwater beneath the site. There is one onsite drinking water well, the Mariano Lake Well that serves approximately 20 people (3, 8, App. B).

- Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to onsite soil and to the soil surrounding the site. During the July 2008 field screening, two gamma measurements were collected from locations adjacent to the mobile home residence located 110 feet from the eastern boundary of the eastern source. These locations exhibited readings of 23,000 cpm and 98,000 cpm. The background gamma measurement exhibited a reading of 10,000 cpm (3, App. B).

5.0 SUMMARY

The Mariano Lake Mine site is located in the southeastern portion of the Navajo Nation in McKinley County. The site is located in a rural area of northwestern New Mexico. During operations, the site consisted of a single mine shaft at a depth of approximately 519 feet deep. The shaft was located in the eastern source area of the site. The western source area of the site was reportedly used as a dewatering pond for the mine which utilized underground stope leaching processes.

Between 1977 and 1982, uranium mining operations occurred on the Mariano Lake Mine site. During operations an approximate 505,489 tons of uranium ore and 2,265,405 pounds of uranium were produced.

In July 2008, WESTON conducted a field screening on the Mariano Lake Mine site and gamma radiation measurements were collected throughout the site. A background reading that exhibited 10,000 counts per minute (cpm) was collected from a location that appeared to be undisturbed and not associated with mining activities. Gamma radiation measurements collected from the western source area of the site displayed readings at background levels. Elevated readings were detected in the eastern source area, having a maximum reading of 343,000 cpm.

The following pertinent Hazard Ranking System factors are associated with the site:

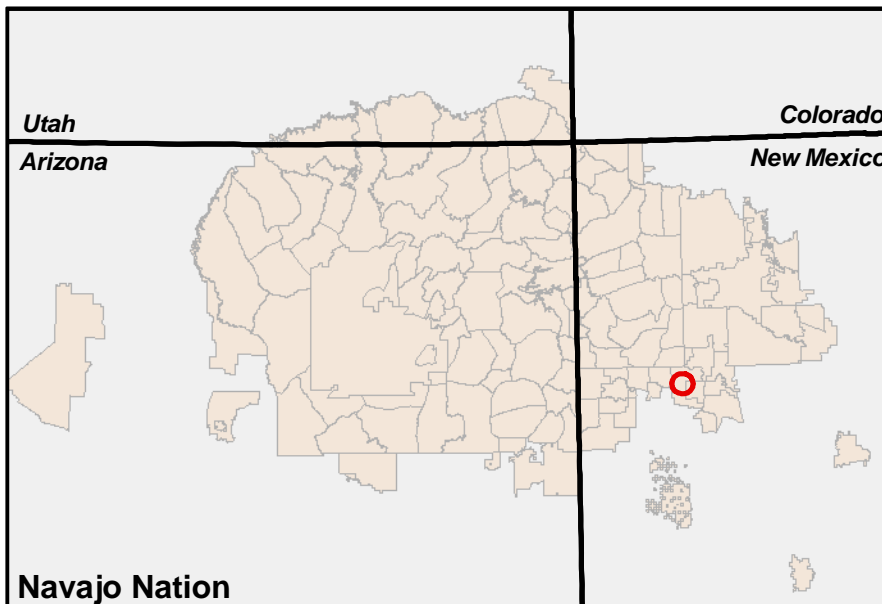
- Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to groundwater beneath the site. The depth to groundwater beneath the site is unknown; however the 519-foot deep onsite mineshaft is below the water table and therefore in contact with groundwater beneath the site. There is one onsite drinking water well (Mariano Lake Well) that serves approximately 20 people. Geologic materials in the unsaturated zone between ground surface and the top of the aquifer are unknown; however, the site is underlain by Quaternary-age alluvium, which extends to an unknown depth.

- Surface water runoff from the western source area of the Mariano Lake Mine site runs into an intermittent stream located along the northern border of the site. This stream continues to run west and connects with additional unnamed streams downgradient of the site. Surface water runoff from the eastern source area of the Mariano Lake Mine site runs into an intermittent stream located along the northeast of the site. This stream continues to run north and connects with additional unnamed streams downgradient of the site. There are no known drinking water intakes associated with these surface water bodies within 15 miles of the site. It is unknown if these streams are used by local residents for fishing.
- Based on the historic mining operations and the results of the onsite gamma measurements collected on the Mariano Lake Mine site, there is a potential that contaminants may have been released to onsite soil and the soil surrounding the site. Six residences are located onsite. There are no schools or daycare facilities on, or within 200 feet, of the site. In addition, there are no terrestrial sensitive environments onsite.

6.0 REFERENCE LIST

1. U.S. Environmental Protection Agency, Envirofacts Warehouse CERCLIS query results, <http://www.epa.gov/enviro/html/multisystem.html>, accessed August 14, 2008.
2. McLemore, Virginia T., Chenoweth, William L., New Mexico Bureau of Mines and Mineral Resources, Uranium Mines and Deposits in the Grants district, Cibola and McKinley Counties, New Mexico, December 1991.
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4. Google Earth, 35° 22' 54" North, -108° 16' 60" West, <http://earth.google.com/>, accessed August 14, 2008.
5. New Mexico Bureau of Geology and Mineral Resources, Database of Uranium Mines, Prospects, Occurrences, and Mills in New Mexico, April 3, 2002.
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7. United States Department of the Interior, Bureau of Mines, Stope Leaching Reduces Surface Environmental Impacts From Underground Mining, May 1994.
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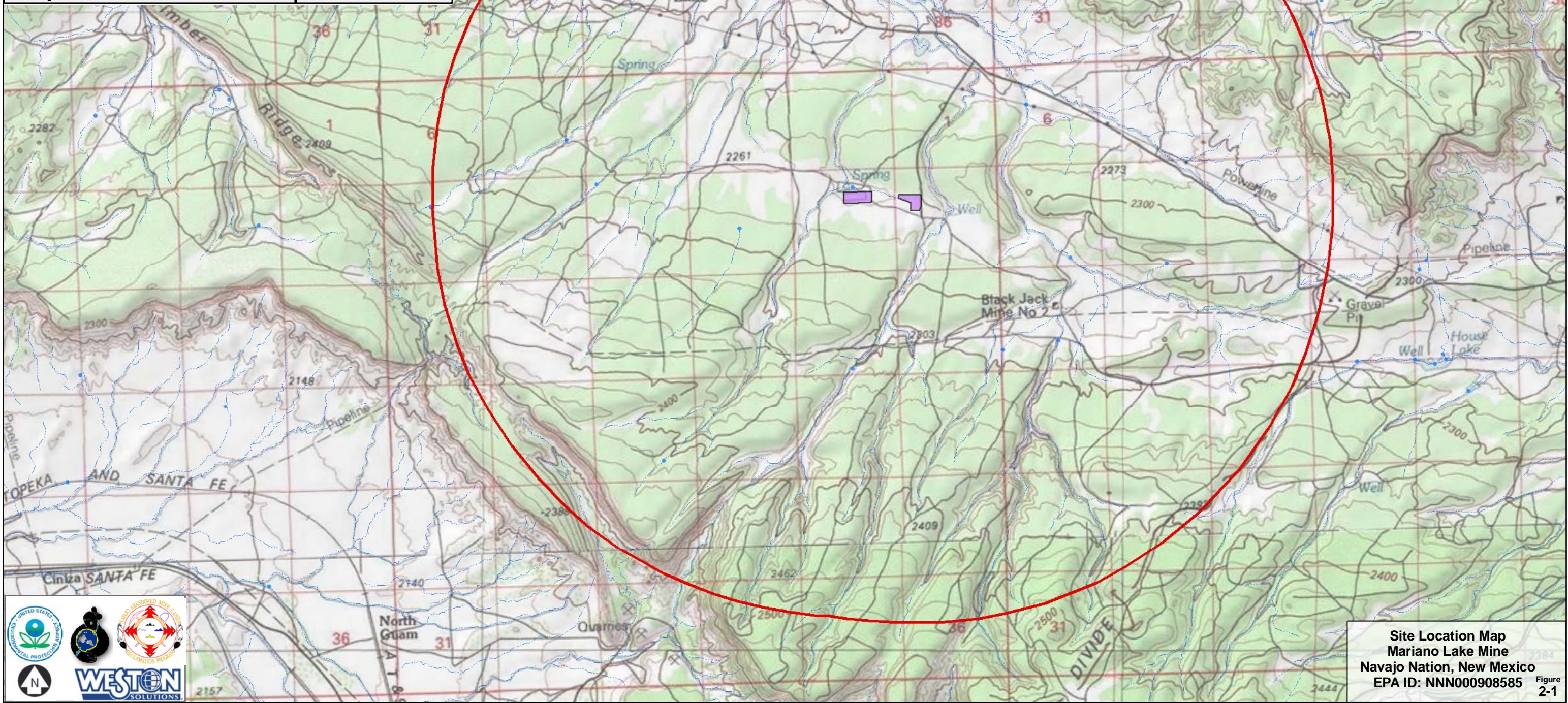
9. Malone, Diane, Navajo Nation Environmental Protection Agency, Navajo Superfund Program, Site Screen Form, Mariano Lake Mine, September 22, 2006.
10. U.S. Environmental Protection Agency, Envirofacts Warehouse RCRAInfo query results, http://www.epa.gov/enviro/html/rcris/rcris_query_java.html, accessed August 14, 2008.
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12. Western Regional Climate Center, Thoreau ENE, New Mexico, <http://www.wrcc.dri.edu/summary/Climsmnm.html>, accessed August 14, 2008.
13. U.S. Census Bureau, State and County Quickfacts, McKinley County, New Mexico, <http://quickfacts.census.gov/qfd/states/35/35031.html>, accessed August 14, 2008.



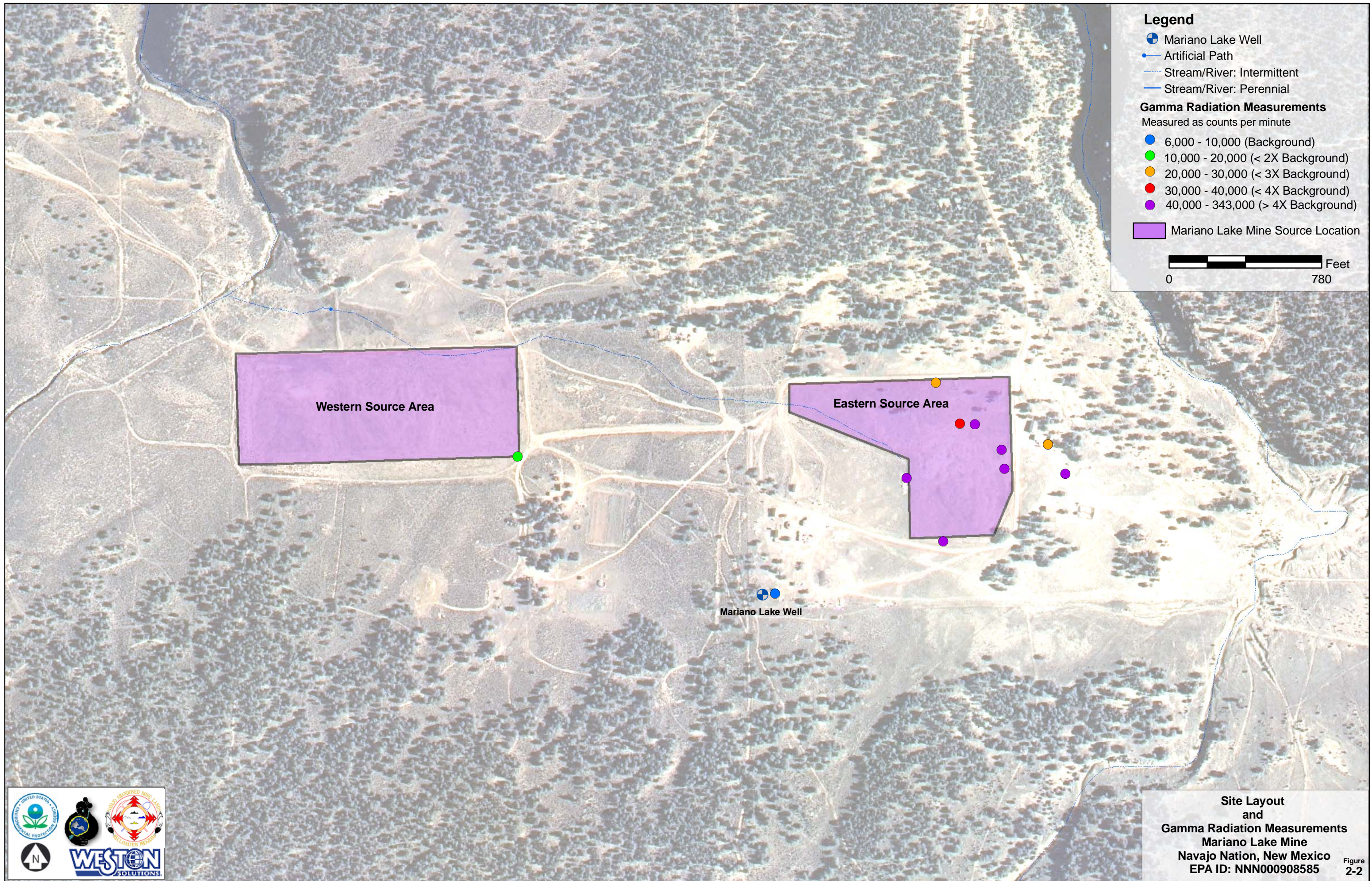
Legend

- Surface Water
- Artificial Path
- Stream/River: Intermittent
- Stream/River: Perennial
- Mariano Lake Mine 4-Mile Radius
- Mariano Lake Mine Location

0 2 Miles



Site Location Map
Mariano Lake Mine
 Navajo Nation, New Mexico
 EPA ID: NNN000908585 Figure 2-1



Legend

- Mariano Lake Well
- Artificial Path
- Stream/River: Intermittent
- Stream/River: Perennial

Gamma Radiation Measurements
Measured as counts per minute

- 6,000 - 10,000 (Background)
- 10,000 - 20,000 (< 2X Background)
- 20,000 - 30,000 (< 3X Background)
- 30,000 - 40,000 (< 4X Background)
- 40,000 - 343,000 (> 4X Background)

Mariano Lake Mine Source Location

0 Feet 780



Site Layout and Gamma Radiation Measurements Mariano Lake Mine Navajo Nation, New Mexico
EPA ID: NNN000908585 Figure 2-2

**APPENDIX A:
Transmittal List**

TRANSMITTAL LIST

Date: August 2008
Site Name: Mariano Lake Mine
EPA ID No.: NNN000908585

A copy of the Preliminary Assessment report for the above-referenced site should be sent to the following recipients:

David Martinez
Chapter President
Mariano Lake Chapter
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Smith Lake, New Mexico 87365

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Navajo Superfund Program
Navajo Nation EPA
P.O. Box 2946
Window Rock, AZ 86515

Melvin Yazzie
Navajo AML Shiprock Office
P.O. Box 3605
Shiprock, NM 87420

APPENDIX B:
**Site Reconnaissance Interview and Observation Report/
Photographic Documentation**

SITE RECONNAISSANCE INTERVIEW AND OBSERVATIONS REPORT/PHOTOGRAPHIC DOCUMENTATION

DATE: July 1, 2008

OBSERVATIONS MADE BY: Joseph DeFao

SITE: Mariano Lake Mine

EPA ID: NNN000908585

A site visit was conducted on July 1, 2008. The following information was obtained and photographs were taken during the site visit:

The weather was hot and sunny. The temperature was approximately 90°F.

Personnel from USEPA, NNEPA, and WESTON conducted a site visit of the Mariano Lake Mine. The following people were present: Jeff Inglis (USEPA), Stanley Edison (NNEPA), and Joe DeFao, Nels Johnson, and Tommy Evans (WESTON). During the visit, gamma radiation readings were collected throughout the site using a stand-alone sodium-iodide scintillation detector. The Mariano Lake Mine site is comprised of two separate areas, an eastern area and a western area. Both areas are generally flat and surrounded by a chain linked fence topped with barbed wire. Although both sections of the site are fenced, WESTON observed cattle grazing in the eastern area. Background radiation readings were collected with the screening instrument near the southeast corner of the eastern area in a section of the site that appeared to be undisturbed by the mining operations. The background radiation readings indicated gamma radiation at 10,000 counts per minute (cpm).

WESTON entered the eastern area of the site with a vehicle and collected several gamma radiation readings along with GPS waypoints. WESTON observed a maximum radiation reading of 343,000 cpm in the eastern area. Additionally, readings were collected in the western section of the site by foot. No readings above the background level were detected.

No water runoff was observed during the visit; however, there are intermittent drainages to the north and northeast that likely receive surface water runoff. Approximately six residences were observed surrounding the eastern section of the site. The nearest residence was located approximately 100 feet east of the eastern area boundary. Radiation readings were collected near this residence, and maximum readings of 98,000 were observed. The owner of the residence indicated that approximately 20 people live in the residences surrounding the eastern area. One well, serving this population, was located to the southwest of the eastern area. The well was out of service due to a broken pump; however, well casings on the ground indicated that the well was approximately 600 feet deep. GPS and radiation readings were collected at the well. The radiation readings did not exceed background levels. An additional residence was located southeast of the western area. The owner of this residence indicated that the western area of the site was used as a storage pond for water that was removed from a mine shaft located in the eastern area.

*Photographic Documentation
Mariano Lake Mine Site
McKinley County, New Mexico*



Photo 1: View of the eastern area of the Mariano Lake Mine site facing northwest.



Photo 2: View of the eastern area of the Mariano Lake Mine site facing north. The nearest residence is located approximately 500 feet beyond the trees.

*Photographic Documentation
Mariano Lake Mine Site
McKinley County, New Mexico*



Photo 3: WESTON collecting gamma radiation readings with a sodium-iodide scintillation detector.



Photo 4: Both areas of the Mariano Mine Lake site were surrounded by a chain linked fence topped with barbed wire.

APPENDIX C:
Contact Log and Contact Reports

CONTACT LOG

SITE: Mariano Lake Mine
EPA ID: NNN000908585

(Note: No Contact Reports were required for the completion of this report)

APPENDIX D:
Latitude and Longitude Calculations Worksheet

Latitude and Longitude Calculation Worksheet (7.5' quads) Using an Engineer's Scale (1/50)

Site Name CERCLIS #

AKA

Address

City State ZIP

Site Reference Point

USGS Quad Name Scale

Township Range Section ¼ ¼ ¼

Map Datum 1927 1983 (Check one) Meridian

Map coordinates at southeast corner of 7.5' quadrangle (attach photocopy)

Latitude ° ' "N Longitude ° ' "W

Map coordinates at southeast corner of 2.5' grid cell

Latitude ° ' "N Longitude ° ' "W

Calculations

LATITUDE(x)

A) Number of ruler graduations between 2.5' (150") grid lines (a)

B) Number of ruler graduations between south grid line and the site reference point (b)

C) Therefore, $a/150 = b/x$, where $x =$ Latitude in decimal seconds, north of the south grid line

Expressed as minutes and seconds ($1' = 60''$) = ° ' "N

Add to grid cell latitude = ° ' "N + ° ' "N

Site latitude = 3 5 ° 2 2 ' 5 4 "N

LONGITUDE(y)

A) Number of ruler graduations between 2.5' (150") grid lines (a)

B) Number of ruler graduations between south grid line and the site reference point (b)

C) Therefore, $a/150 = b/x$, where $x =$ Longitude in decimal seconds, west of the east grid line

Expressed as minutes and seconds ($1' = 60''$) = ° ' "W

Add to grid cell longitude = ° ' "N + ° ' "N

Site longitude = 1 0 8 ° 1 6 ' 5 9 "W

APPENDIX E
References

APPENDIX F
EPA Quick Reference Fact Sheet



SITE ASSESSMENT: Evaluating Risks at Superfund Sites

Office of Emergency and Remedial Response
Hazardous Site Evaluation Division 5204G

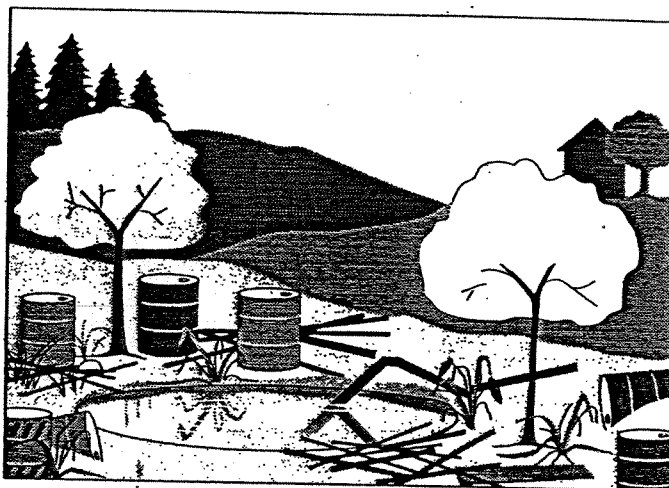
Quick Reference Fact Sheet

The Challenge of the Superfund Program

A series of headline-grabbing stories in the late 1970s, such as Love Canal, gave Americans a crash course in the perils of ignoring hazardous waste. At that time, there were no Federal regulations to protect the country against the dangers posed by hazardous substances (mainly industrial chemicals, accumulated pesticides, cleaning solvents, and other chemical products) abandoned at sites throughout the nation. And so, in 1980 Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, to address these problems.

The major goal of the Superfund program is to protect human health and the environment by cleaning up areas, known as "sites," where hazardous waste contamination exists. The U.S. Environmental Protection Agency (EPA) is responsible for implementing the Superfund program.

At the time it passed the Superfund law, Congress believed that the problems associated with uncontrolled releases of hazardous waste could be



handled in five years with \$1.6 billion dollars. However, as more and more sites were identified, it became apparent that the problems were larger than anyone had originally believed. Thus, Congress passed the Superfund Amendments and Reauthorization Act (SARA) in 1986. SARA expanded and strengthened the authorities given to EPA in the original legislation and provided a budget of \$8.5 billion over five years. Superfund was extended for another three years in 1991.

What is EPA's Job at Superfund Sites?

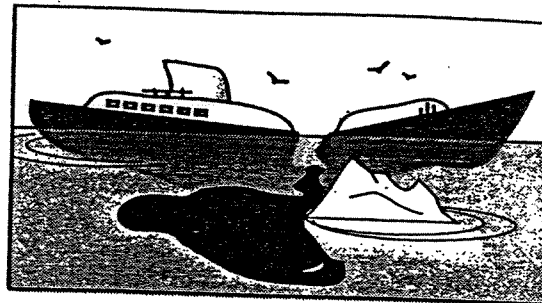
For more than 10 years, EPA has been implementing the Superfund law by:

- Evaluating potential hazardous waste sites to determine if a problem exists;
- Finding the parties who caused the hazardous waste problems and directing them to address these problems under EPA oversight or requiring them to repay EPA for addressing these problems; and
- Reducing immediate risks and tackling complex hazardous waste problems.

The Superfund site assessment process generally begins with the discovery of contamination at a site and ends with the completion of remediation (i.e., cleaning up the waste at a site) activities. This fact sheet explains the early part of the process, called the *site assessment* phase.

The National Response Center

The National Response Center (NRC), staffed by Coast Guard personnel, is the primary agency to contact for reporting all oil, chemical, and biological discharges into the environment anywhere in the U.S. and its territories. It is responsible for:



- Maintaining a telephone hotline 365 days a year, 24 hours a day;
- Providing emergency response support in specific incidents; and
- Notifying other Federal agencies of reports of pollution incidents.

To report a pollution incident, such as an oil spill, a pipeline system failure, or a transportation accident involving hazardous material, call the NRC hotline at **800-424-8802**.

1

Site
Discovery

2

Preliminary
Assessment

Hazardous waste sites are discovered in various ways. Sometimes concerned residents find drums filled with unknown substances surrounded by dead vegetation and call the NRC, EPA, or the State environmental agency; or an anonymous caller to the NRC or EPA reports suspicious dumping activities. Many sites come to EPA's attention through routine inspections conducted by other Federal, State, or local government officials. Other sites have resulted from a hazardous waste spill or an explosion. EPA enters these sites into a computer system that tracks any future Superfund activities.

After learning about a site, the next step in the site assessment process is to gather existing information about the site. EPA calls this the *preliminary assessment*. Anyone can request that a preliminary assessment be performed at a site by petitioning EPA, the State environmental agency, local representatives, or health officials.

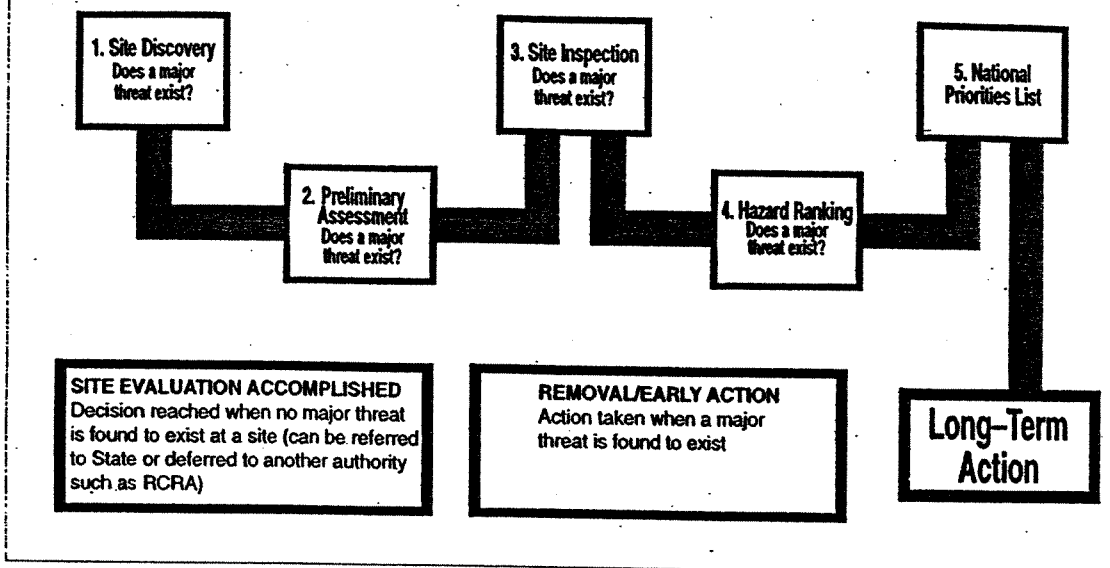
During the preliminary assessment, EPA or the State environmental agency:

- ◆ Reviews available background records;
- ◆ Determines the size of the site and the area around it;

- ◆ Tries to determine whether hazardous substances are involved;
- ◆ Identifies actual or potential pollution victims, such as the nearby population and sensitive environments;
- ◆ Makes phone calls or interviews people who may be familiar with the site; and
- ◆ Evaluates the need for early action using EPA's removal authority.

By gathering information and possibly visiting the site, EPA or the State environmental agency is able to determine if major threats exist and if cleanup is needed. Many times, the preliminary assessment indicates that no major threats exist.

The Site Assessment Process



However, if hazardous substances do pose an immediate threat, EPA quickly acts to address the threat. When a site presents an immediate danger to human health or the environment—for example, there is the potential for a fire or an explosion or the drinking water is contaminated as a result of hazardous substances leaking out of drums—EPA can move quickly to address site contamination. This action is called a *removal* or an *early action*. Additional information on early actions can be found on page 4.

EPA or the State environmental agency then decides if further Federal actions are required. Of the more than 35,000 sites discovered since 1980, only a small percentage have needed further remedial action under the Federal program.

A report is prepared at the completion of the preliminary assessment. The report includes a description of any hazardous substance release, the possible source of the release, whether the contamination could endanger people or the environment, and the pathways of the release. The information outlined in this report is formed into hypotheses that are tested if further investigation takes place. You can request a copy of this report once it becomes final—just send your name and address to your EPA regional Superfund office. See page 8 for further information on these contacts.

Sometimes it is difficult to tell if there is contamination at the site based on the initial information gathering. When this happens, EPA moves on to the next step of the site assessment, called the *site inspection*.

Making Polluters Pay

One of the major goals of the Superfund program is to have the responsible parties pay for or conduct remedial activities at hazardous waste sites. To accomplish this goal, EPA:

- ◆ Researches and determines who is responsible for contaminating the site;
- ◆ Issues an order requiring the private parties to perform cleanup actions with EPA oversight; and
- ◆ Recovers costs that EPA spends on site activities from the private parties.

Removals/Early Actions

EPA can take action quickly if hazardous substances pose an immediate threat to human health or the environment. These actions are called *removals* or *early actions* because EPA rapidly eliminates or reduces the risks at the site. EPA can take a number of actions to reduce risks, including:

- ◆ Fencing the site and posting warning signs to secure the site against trespassers;
- ◆ Removing, containing, or treating the source of the contamination;
- ◆ Providing homes and businesses with safe drinking water, and, as a last resort,
- ◆ Temporarily relocating residents away from site contamination.

“EPA can take action quickly if hazardous substances pose an immediate threat to human health or the environment.”

3

Site Inspection

If the preliminary assessment shows that hazardous substances at the site may threaten residents or the environment, EPA performs a site inspection. During the site inspection, EPA or the State collects samples of the suspected hazardous substances in nearby soil and water. EPA may initiate a concurrent SI/remedial investigation at those sites that are most serious and determined early as requiring long-term action. Sometimes, wells have to be drilled to sample the ground water. Site inspectors may wear protective gear, including coveralls and respirators, to protect themselves against any hazardous substances present at the site. Samples collected during the site inspection are sent to a laboratory for analysis to help EPA answer many questions, such as:

- ◆ Are hazardous substances present at the site? If so, what are they, and approximately

how much of each substance is at the site?

- ◆ Have these hazardous substances been released into the environment? If so, when did the releases occur, and where did they originate?
- ◆ Have people been exposed to the hazardous substances? If so, how many people?
- ◆ Do these hazardous substances occur naturally in the immediate area of the site? At what concentrations?
- ◆ Have conditions at the site gotten worse since the preliminary assessment? If so, is an early action or removal needed? (See box above.)

Often, the site inspection indicates that there is no release of major contamination at the site, or that the hazardous substances are safely contained and have no possibility of being released into the environment. In these situations, EPA decides that no further Federal inspections or remedial actions are needed. This decision is referred to as *site evaluation accomplished*. (See page 5 for more details on the *site evaluation accomplished* decision.)

At the completion of the site inspection, a report is prepared. This report is available to the public—call your EPA regional Superfund office for a copy. See page 8 for the phone numbers of these offices.

“During the site inspection, EPA or the State collects samples of the suspected hazardous substances in nearby soil and water.”

At sites with particularly complex conditions, EPA may need to perform a second SI to obtain legally defensible documentation of the releases.

Because EPA has limited resources, a method has been developed to rank the sites and set priorities throughout the nation. That method, known as the *Hazard Ranking System*, is the next step in the site assessment process.

4

Hazard Ranking System

EPA uses the information collected during the preliminary assessment and site inspection to evaluate the conditions at the site and determine the need for long-term remedial actions. When evaluating the seriousness of contamination at a site, EPA asks the following questions:

- ◆ Are people or sensitive environments, such as wetlands or endangered species, on or near the site?
- ◆ What is the toxic nature and volume of waste at the site?
- ◆ What is the possibility that a hazardous substance is in or will escape into ground water, surface water, air, or soil?

Based on answers to these questions, each site is given a score between zero and 100. Sites that score 28.5 or above move to the next step in the process: listing on the *National Priorities List*. Sites that score below 28.5 are referred to the State for further action.

5

National Priorities List

Sites that are listed on the *National Priorities List* present a potential threat to human health and the environment, and require further study to determine what, if any, remediation is necessary. EPA can pay for and conduct

Site Evaluation Accomplished

In many instances, site investigators find that potential sites do not warrant Federal action under the Superfund program. This conclusion can be attributed to one of two reasons:

- ◆ The contaminants present at the site do not pose a major threat to the local population or environment; or
- ◆ The site should be addressed by another Federal authority, such as EPA's Resource Conservation and Recovery Act (RCRA) hazardous waste management program.

When investigators reach this conclusion, the site evaluation is considered accomplished. A site can reach this point at several places during the site assessment process, namely at the conclusion of the preliminary assessment or the site inspection, or once the site is scored under the Hazard Ranking System.

remedial actions at NPL sites if the responsible parties are unable or unwilling to take action themselves. There are three ways a site can be listed on the National Priorities List:

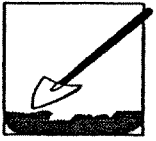
- ◆ It scores 28.5 or above on the Hazard Ranking System;
- ◆ If the State where the site is located gives it top priority, the site is listed on the National Priorities List regardless of the HRS score; or
- ◆ EPA lists the site, regardless of its score, because all of the following are true about the site:
 - ▼ The Agency for Toxic Substances and Disease Registry (ATSDR), a group within the U.S. Public Health Service, issues a health advisory recommending that the local population be *dissociated* from the site (i.e., that the people be temporarily relocated or the immediate public health threat be removed);
 - ▼ EPA determines that the site poses a significant threat to human health; and
 - ▼ Conducting long-term remediation activities will be more effective than

addressing site contamination through early actions.

The list of proposed sites is published in the *Federal Register*, a publication of legal notices issued by Federal agencies. The community typically has 60 days to comment on the list. After considering all comments, EPA publishes a list of those sites that are officially on the National Priorities List. When a site is added to the National Priorities List, the site assessment is completed. Long-term actions take place during the next phase. See page 6 for more details on long-term actions.

As a Concerned Citizen, How Can I Help ?

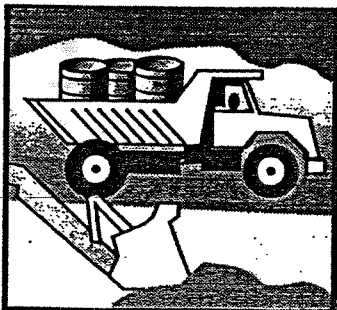
- ☛ Read this fact sheet.
- ☛ Call EPA with any potential sites in your area.
- ☛ Provide EPA with site information.
- ☛ Comment on proposed listing of sites on the National Priorities List.
- ☛ If the site is listed on the NPL, work with your citizens' group to apply for a technical assistance grant.



Addressing Sites in the Long Term

Once a site is placed on the National Priorities List, it enters the long-term or remedial phase. The stages of this phase include:

- ✓ Investigating to fully determine the nature and extent of contamination at the site, which can include a public health assessment done by the ATSDR;
- ✓ Exploring possible technologies to address site contamination;
- ✓ Selecting the appropriate technologies—also called remedies;
- ✓ Documenting the selected remedies in a record of decision (ROD);
- ✓ Designing and constructing the technologies associated with the selected remedies;
- ✓ If necessary, operating and maintaining the technologies for several years (e.g., long-term treatment of ground water) to ensure safety levels are reached; and
- ✓ Deleting the site from the National Priorities List, completing Superfund's process and mission.



Some Commonly Asked Questions

Q: What exactly is a site?

A: EPA designates the area in which contamination exists as the "site." Samples are taken to define the area of contamination. At any time during the cleanup process the site may be expanded if contamination is discovered to have spread further.

Q: How long will it take to find out if a threat exists?

A: Within one year of discovering the site, EPA must perform a preliminary assessment. The preliminary assessment allows EPA to determine if there is an immediate danger at the site; if so, EPA takes the proper precautions. You will be notified if you are in danger. EPA may also contact you to determine what you know about the site.

Q: What is the State's role in all these investigations?

A: The State can take the lead in investigating and addressing contamination. It also provides EPA with background information on (1) immediate threats to the population or environment, and (2) any parties that might be responsible for site contamination. The State shares in the cost of any long-term actions conducted by the Superfund program, comments on the proposal of sites to the National Priorities List, and concurs on the selected remedies and final deletion of sites from the National Priorities List.

Q: Why are private contractors used to assess sites?

A: EPA has a limited workforce. By using private contractors, EPA is able to investigate more sites. Also, EPA is able to draw on the expertise of private contracting companies.

Q: Why are there so many steps in the evaluation process? Why can't you just take away all the contaminated materials right now, just to be safe?

A: When EPA assesses a site, it first determines if contamination poses any threats to the health of the local population and the integrity of the environment. Dealing with worst sites first is one of Superfund's national goals. By evaluating contamination in a phased approach, EPA can quickly identify sites that pose the greatest threats and move them through the site assessment process. Once EPA understands the conditions present at a site, it searches for the remedy that will best protect public health and the environment. Cost is only one factor in weighing equally protective remedies. Many sites do not warrant actions because no major threat exists. However, if a significant threat does exist, EPA will take action.

about Superfund Sites

Q: If a site is added to the National Priorities List, how will we know when EPA has completed the cleanup efforts?

A: EPA notifies the public and requests their comments on the actions proposed to treat site contaminants. In addition, the community is notified when a site will be deleted from the National Priorities List. The entire process can take as long as 7 years; at sites where ground water is contaminated, it can take even longer.

Q: I live next door to a site and I see EPA and contractor personnel wearing "moon suits." Am I safe?

A: EPA and contractor personnel wear protective gear because they might actually be handling hazardous materials. Also, these people are regularly exposed to contaminants at different sites and do not always know what contaminants they are handling. EPA takes steps to protect the public from coming in contact with the site contamination. If a dangerous situation arises, you will be notified immediately.

Q: If a site is added to the National Priorities List, who pays for the activities?

A: EPA issues legal orders requiring the responsible parties to conduct site cleanup activities under EPA oversight. If the parties do not cooperate, Superfund pays and files suit for reimbursement from responsible parties. The sources of this fund are taxes on the chemical and oil industries; only a small fraction of the fund is generated by income tax dollars.

Q: How can I get more information on any health-related concerns?

A: Contact your EPA regional Superfund office for more information. The ATSDR also provides information to the public on the health effects of hazardous substances. Ask your EPA regional Superfund office for the phone number of the ATSDR office in your region.

Q: How can I verify your findings? What if I disagree with your conclusions?

A: You can request copies of the results of the site assessment by writing to your EPA regional Superfund office. The public is given the opportunity to comment on the proposal of a site to the National Priorities List and the actions EPA recommends be taken at the site. If a site in your community is listed on the National Priorities List, a local community group may receive grant funds from EPA to hire a technical advisor. Call your EPA regional Superfund office (see page 8) for the location of an information repository and for information on applying for a technical assistance grant.

Q: How can I get further information? How can I get a list of the sites EPA has investigated?

A: Contact your EPA regional Superfund office (see page 8) for more information and a list of sites in your area.

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Important Phone Numbers

For information on the Superfund program or to report a hazardous waste emergency, call the national numbers below.

U.S. EPA Headquarters Hazardous Site Evaluation Division

- ☐ Site Assessment Branch
703-603-8860

Federal Superfund Program Information

- ☐ EPA Superfund Hotline
800-424-9346

Emergency Numbers:

Hazardous Waste Emergencies

- ☐ National Response Center
800-424-8802

ATSDR Emergency Response Assistance

- ☐ Emergency Response Line
404-639-0615

For answers to site-specific questions and information on opportunities for public involvement, contact your region's Superfund community relations office.

EPA Region 1: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

- ☐ Superfund Community
Relations Section
617-565-2713

EPA Region 2: New Jersey, New York, Puerto Rico, Virgin Islands

- ☐ Superfund Community
Relations Branch
212-264-1407

EPA Region 3: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia

- ☐ Superfund Community
Relations Branch
800-438-2474

EPA Region 4: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee

- ☐ Superfund Site Assessment
Section
404-347-5065

EPA Region 5: Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

- ☐ Office of Superfund
312-353-9773

EPA Region 6: Arkansas, Louisiana, New Mexico, Oklahoma, Texas

- ☐ Superfund Management
Branch, Information
Management Section
214-655-6718

EPA Region 7: Iowa, Kansas, Missouri, Nebraska

- ☐ Public Affairs Office
913-551-7003

EPA Region 8: Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

- ☐ Superfund Community
Involvement Branch
303-294-1124

EPA Region 9: Arizona, California, Hawaii, Nevada, American Samoa, Guam

- ☐ Superfund Office of
Community Relations
800-231-3075

EPA Region 10: Alaska, Idaho, Oregon, Washington

- ☐ Superfund Community
Relations
206-553-2711