FINAL

Antelope Valley Pesticide Container Disposal Site

Site Characterization
and
Disposal Recommendations

Prepared For:

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List of Acronyms and Abbreviations

ALS - ALS Laboratory Group

bgs - below ground surface

BLM - Bureau of Land Management

°F - degrees Fahrenheit

EDR - Environmental Data Resources, Inc.

EM - electromagnetic

EPA - Environmental Protection Agency

ft. - feet

GPS global positioning system

MCL - maximum contaminant limit

NDEP Nevada Division of Environmental Protection

µg/L - micrograms per liter

PA - Preliminary Assessment

PID - photoionization detector

site - Antelope Valley Pesticide Container Disposal Site

SLUP - Special Land Use Permit

SOW - scope of work

USCS - Unified Soil Classification System

Weston - Weston Solutions, Inc.

1.0 Introduction

On behalf of the Bureau of Land Management (BLM), Weston Solutions, Inc. (Weston) completed field work described in the January 7, 2010 Work Plan for Site Characterization and Disposal Recommendations for the Antelope Valley Disposal Site (Work Plan Weston, 2010).

Section 1.0 of this report describes the project purpose and objectives and includes a brief background of the Antelope Valley Pesticide Container Disposal Site (site). Section 2.0 summarizes field activities. Sections 3.0 summarize the field observations and analytical data reported for environmental samples. Sections 4.0 and 5.0 provide environmental impact conclusions and disposal recommendations for the remediation of the site, respectively. The historic documents used to develop the Proposal and the Work Plan are listed in Section 6.0.

1.1 Purpose

The purpose of this site characterization and disposal recommendation project was to determine the presence of environmental impacts at the site resulting from the pesticide container disposal activities. In addition, suspected drum burial areas were evaluated and site remediation and disposal recommendations were developed.

1.2 Objectives

In order to collect sufficient data to provide reasonable site characterization and disposal recommendations, the following objectives were outlined in the Work Plan:

- Identify potential sources other than the disposal trench by reviewing available historic aerial photographs and completing a geophysical survey;
- Estimate the volume of buried material utilizing geophysical survey;
- Evaluate the nature and extent of impacted soil by collecting surface and subsurface soil samples and analyzing the samples for pesticide constituents;
- Evaluate the nature and extent of impacted groundwater (if encountered) by collecting groundwater samples and analyzing the samples for pesticide constituents; and,
- Evaluate the liquid content of the containers present at the site by sampling liquids (if present) and analyze the samples for pesticide constituents.

1.3 Background

The site is located within Antelope Valley in Lander County, Nevada at latitude 40˚ 02’ 30” N and longitude 117˚ 14’ 30” W (Figure 1). The site, as shown on the 7.5 minute Mt. Moses Quadrangle Map (USGS, 1990), is located approximately 5.5 miles west of Route 305, which connects the Towns of Battle Mountain, Nevada and Austin, Nevada. The Town of Austin, near the interchange of Routes 305 and 50, lies approximately 47 miles south of the site. Battle

Mountain, adjacent to the interchange of Route 305 and Interstate 80, lies approximately 42 miles north. The legal description of the site is NW 1/4 SE 1/4, Section 18, Township 25 N, Range 42 E, MDM. The site lies within an undeveloped area at the end of an unimproved access road approximately 0.5 miles south of the county road leading to Antelope Valley.

The site is located at the northern end of the Bridges Hills at an approximate elevation of 4,920 feet (ft.) above mean sea level. Slope at the site is from west to east (away from the Bridges Hills) at about 12%. The major topographic feature in the area is Antelope Valley, which is drained by the ephemeral Cain Creek. The main axis of Antelope Valley occurs west of the site and is bounded by the Augusta Mountains on the west, the Fish Creek Mountains on the north and the Bridges Hills on the east. The valley narrows as it bends eastward around the Bridges Hills, opening again into the Middle Reese River Valley. Cain Creek lies approximately 0.25 miles north of the site and flows northeasterly into the Reese River, which in-turn flows northward toward Battle Mountain.

The region has an arid climate receiving between 6 and 16 inches average precipitation per year. The average annual temperature is around 48 degrees Fahrenheit (˚F), but freezing temperatures have been recorded in every month of the year, and as much as 130˚F differences between the high and the low have been recorded. The air is generally clear, but and strong winds are common throughout the spring, summer, and fall. Winds are mainly from the southwest.

The site consists of a 12.5-acre parcel with unmarked boundary corners. A two-acre fenced enclosure is located near the presumed center of the 12.5-acre parcel (Figure 2). The 8-ft. high fence consists of metal poles and chain-link fencing with two strands of barbed wire on top. The 417 by 209 ft. fenced enclosure contains a small structure and one partially open disposal trench oriented approximately north-south, located approximately 35 ft. away from the western fence. The trench is approximately 119 ft. by 27 ft. by 10 ft. (with an additional 37 ft. of backfilled material on the northern end). A ramp at the south end of the trench provides access to the disposal area, and exposed metal drums and glass containers are presently exposed at the surface, as shown in Appendix A (Photographic Log).

Access to the site is through a locked gate located in the northeast corner of the fenced enclosure. The combination lock on the access gate is the property of the BLM Battle Mountain District, who was present during the on-site activities. Lack of any rubbish other than the permitted pesticide containers indicates the area within the fenced enclosure apparently has been utilized solely for disposal of pesticide containers. The glass containers were recently left among the empty metal drums, as reported by the BLM. The gate and fence are in good condition and have posted warning signs. A one to two feet high earthen berm surrounds the fence to divert surface runoff from entering the fenced area. The structure and an attached trellis, reportedly were used for rinsing empty pesticide containers prior to disposal.

1.3.1 Site History

The two acre fenced enclosure is BLM owned land that was selected in 1971 for disposal of empty pesticide/herbicide containers. An application for a Special Land Use Permit (SLUP) containing a Statement of Environmental Impact-Draft (Zieg, 1971) was submitted to the BLM in September 1971 by the Lander County Commissioners. The SLUP was approved for one year in October 1971 and extended indefinitely in January 1973. In 1985, BLM proposed the sale of the property to Lander County under Sections 206 and 209 of the Federal Land Policy and Management Act of 1976 (Kershaw, 1988). The land was appraised and a Preliminary Assessment (PA) Report on the hazards was generated (AEPCO, 1986). Payment was made to the BLM in October 1986 for the entire 12.5-acres containing the fenced enclosure, but final patent was not issued. Weston was retained in 1988 to conduct a site inspection prior to issuing the patent. No soil contamination was identified during the 1988 inspection. In September 1992, drums still containing fluid were repackaged to prevent leaking. The Nevada Division of Environmental Protection (NDEP) requested that these overpacked drums be disposed of at a hazardous waste landfill, the trench capped with 12 inches of clay, and that the BLM conduct annual groundwater monitoring for five years. The referenced drums were shipped to a hazardous waste landfill in January 1994. A detailed chronology of site events is available in the PA Report (AEPCO, 1986).

1.3.2 Previous Environmental Investigations

The site has been previously assessed by AEPCO and Weston. The previous assessment results for the site indicate no soil contamination exists. However, one soil sample collected during the October, 1986 sampling was reported with a detection of alpha-Endosulfan, and liquid was reported to be present in several glass containers within the disposal trench. Groundwater and surface water were not encountered at the site, but groundwater is used down gradient for domestic, irrigation and stock uses (Weston, 1988). See Section 6.0 for a full list of the previous environmental investigation reports for the site.

The State of Nevada Department of Agriculture conducted a groundwater sampling event from five domestic wells and one agricultural well in Antelope Valley during September 2009. All the wells sampled were within eight miles of the site. Two in particular, the Section 8 Ranch domestic well and the Demas domestic well, were sampled downgradient of the site. The Section 8 Ranch well is located approximately 0.9 miles north-northeast of the site. The Demas well is located approximately 1.5 miles east of the site. The groundwater samples collected were analyzed for 94 pesticide compounds. The analytical results indicate there are no detections of any of the pesticide constituents in the groundwater samples collected from these domestic wells downgradient of the site.

2.0 Summary of the Field Activities

Weston mobilized a geoscientist and a direct push drilling subcontractor to the site between January 11 and January 14, 2010. The following Sections summarize the activities conducted. Appendix B includes field sheets produced during the field work implementation.

2.1 Geophysical Survey

In conjunction with a review of available aerial photographs, on-site reconnaissance, and discussions with BLM personnel, an EM-31 magnetometer was used within the fenced enclosure and in selected areas outside of the fenced enclosure to collect evidence of buried metallic debris and soil disturbance.

The EM-31 was used to "flag" suspected subsurface anomalies. The flagged areas were noted for evaluation during soil sampling. The EM-31 was also used to estimate the volume of buried metal drums within the northern portion of the disposal trench. The in-phase portion of the magnetometer response reacts to surface and subsurface metal. The conductivity response of the magnetometer reacts to changes in subsurface soil conductivity that could indicate soil disturbances such as trenching and backfilling.

2.2 Soil Sampling

Surface soil samples were collected in each of two drainages located within the fenced enclosure (Figure 3). These samples were collected from depositional areas to determine the potential for impacts to surface soil/sediment. The surface soil samples were collected utilizing a decontaminated hand trowel from 0 to 1 ft. below ground surface (bgs).

The subsurface soil sampling was conducted utilizing direct push drilling techniques. Subsurface soil borings were lithologically logged using the Unified Soil Classification System (USCS) codes. Additionally, moisture content, and photoionization detector (PID) readings were noted on the soil boring logs. No soil staining or odors were observed. The soil borings were advanced to bedrock refusal and, no water was encountered. Soil boring logs are included in Appendix C. Soil cuttings generated during the drilling were returned to the borehole and the remainder of the voids were plugged with bentonite. All direct push cutting shoes and sampling equipment were decontaminated between drilling locations.

Based on field observations and PID measurements, one subsurface soil sample was collected from each soil boring for laboratory analysis. The sample was collected from the interval that exhibited soil staining, odor, or elevated PID readings. If none of these observations were made during logging, the subsurface soil sample was collected from directly above the water table. If groundwater was not encountered above the bedrock refusal depth, the subsurface soil sample was collected directly above the bedrock surface.

The direct push drilling program within the fenced area was completed utilizing a quadrant approach and a random number generator to select boring locations. Figures 2 and 3 show the

soil sampling locations, as determined by the quadrant random number generation defined in Weston's Work Plan. The area outside of the fenced enclosure was evaluated by installing four soil borings at locations selected based on site reconnaissance and geophysical survey results. Each soil sampling location was surveyed with a Trimble ProXRS global positioning system (GPS) unit. The GPS data for the soil sampling locations are provided in Table 1.

Soil collected for analysis was placed into laboratory supplied sample jars. The headspace was minimized by filling the jars as completely as possible then tightly securing the container lid. Completed labels identifying the sample name, date, time, and analysis were affixed to sample containers immediately after sampling.

After labeling, the sample jars were immediately sealed in zip lock bags and placed in the designated cooler with ice. All sampling information was recorded in the field logbook. Finally, a Chain-of-Custody was completed. Prior to shipping, fresh ice was added and a Custody Seal affixed to the cooler for shipping.

The soil samples were submitted to a State of Nevada certified laboratory, ALS Laboratory Group (ALS) of Fort Collins, Colorado, under proper chain-of-custody for pesticide analyses including Organochlorinated Pesticides by Environmental Protection Agency (EPA) Method 8081A and Organophosphorus Pesticides by EPA Method 8141A.

2.3 Disposal Trench Sampling

Two samples were collected from within the disposal trench for analysis of the pesticides listed above. The first sample was an additional soil sample collected using the direct push drilling rig. The soil sample was collected, after discussions with BLM personnel, in order to determine if pesticides had migrated from drum waste into the soil immediately below the drums.

The second sample was a composite of the liquid collected from several glass jars recently left on-site. The "product" sample was collected in order to identify the contents of the jars. Due to the limited volume in each of the jars, available fluid was poured directly into the laboratory provided container. The container was then labeled and package as described above. The liquid sample was submitted for the same analyses as the soil samples, as described above.

3.0 Summary of Findings

The following section summarizes the results obtained from the work outlined above. Appendix A shows the photographs collected during the site reconnaissance.

3.1 Geophysical Survey Results

Based on the site reconnaissance, a review of historic aerial photos compiled by Environmental Data Resources, Inc. (EDR) report included as Appendix D, and the EM-31 survey results, subsurface burial of metallic pesticide containers was confirmed in the known trench disposal area and, no evidence of additional subsurface burials within the 12.5-acre site was found.

The results of the EM-31 survey are illustrated on Figure 4. The in-phase EM-31 data clearly recorded the aboveground presence of metal consisting of a northern property boundary fence, the fenced enclosure and a BLM truck parked near the gate. Surface metallic responses are shown in green on Figure 4. The in-phase data also outlines the presence of subsurface metal in the area to the north of the open excavation (shown in dark yellow and red). The EM-31 conductivity data indicates and area of soil disturbance within the buried drum area north of the open excavation.

Based on the EM-31 response, the area of the buried disposed of drums is approximately 1,000 square feet. The measured depth of the disposal trench is 10 ft. bgs, which corresponds to a volume of buried material (soil and crushed containers) of 10,000 cubic ft. or 370 cubic yards.

Both geophysical survey data sets (in-phase and conductivity) indicated an anomalous area between the fenced enclosure and the northern property boundary fence. During subsurface soil sampling this anomaly was determined to be indicative of shallow basaltic bedrock. The basaltic bedrock is rich in metals such as iron and magnesium, and in the area north of the site the basaltic bedrock was observed to be less than two feet deep.

3.2 Soil Sample Results

Pesticides were not reported above the laboratory reporting limit in any of the 27 soil samples collected from the site. Additionally, all reporting limits were below the EPA Region 9 Regional Screening Levels (RSL) for an industrial site. Analytical Laboratory Reports are provided in Appendix E and results are summarized on Table 2. Bedrock refusal was encountered in all soil borings between 2 ft. bgs and 15 ft. bgs.

Groundwater was not observed in any of the soil sampling locations.

3.3 Composite Liquid Sample Results

A composite “product” sample, collected from several open glass jars recently left on-site (AVDS-PROD-011410), was reported to have Alpha-BHC and Heptachlor Epoxide at concentrations of 88 micrograms per liter (µg/L) and 380 µg/L, respectively.

Neither Alpha-BHC nor Heptachlor Epoxide are EPA registered pesticides. These chemicals are not currently approved for use by the EPA and there are currently no published regulatory limits for either chemical in soil. There is no regulatory limit for the two chemicals as a waste; however there is an EPA Maximum Contaminant Level (MCL) for Heptachlor Epoxide in drinking water (0.20 µg/L).

4.0 Conclusions

The following conclusions are based on a review of historic environmental reports, the field observations, and analytical results reported for samples collected during implementation of the SOW.

- Based on the EM-31 survey, the volume of buried material (soil and crushed containers) within the known disposal trench is 10,000 cubic ft. or 370 cubic yards.
- The site reconnaissance, EDR report and EM-31 survey did not indicate additional burial areas within the 12.5-acre site.
- Soil sample analytical results were all below the EPA Region 9 RSLs for industrial property use.
- Two surface soil samples collected within depositional areas of the two unnamed drainages within the fenced enclosure were reported as non-detect for all pesticides.
- Subsurface soil samples collected from within the fenced enclosure area (21 samples) and outside the fenced enclosure area (four samples) were reported as non-detect for all pesticides.
- The composite product sample collected from glass containers within the disposal trench was reported to contain Alpha-BHC at 88 µg/L and Heptachlor Epoxide at 380 µg/L.
- Groundwater was not encountered within the maximum depth of soil sampling of alluvial deposits above the Antelope Valley basaltic bedrock.
- Based on the State of Nevada Department of Agriculture groundwater sampling event in September 2009, the groundwater in two downgradient domestic wells is not impacted with pesticides.

5.0 Disposal Recommendations

The following recommendations are based on a review of historic environmental reports, field observations, and analytical results reported for samples collected during previous investigations and the January 2010 site characterization field work.

- In order to eliminate the risk of potential exposure and environmental impacts associated with the on-site burial of pesticide containers within the known disposal trench, Weston recommends the BLM either cap the backfilled trench with a low permeability material or remove all exposed and buried containers.

- Any liquids observed in exposed containers should be handled as hazardous waste and disposed of at a properly licensed facility.

- Weston recommends the BLM close the disposal site. Site closure should include prohibiting further disposal of pesticide containers at the site and removal of the structure and security fence.

- Based on Weston's findings of no impacted on-site soil and the State of Nevada Department of Agriculture findings of no impacts to bedrock groundwater at domestic groundwater wells downgradient of the site, Weston does not recommend any further groundwater investigation activities at the site.

6.0 References

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Other Historic References

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BLM 1989. Letter to Lander County Supervisor concerning the field visit on March 28, 1989, April 12, 1989.

Disposal Control Service, Inc, 1992. Sample Results, October 30, 1992.

Ecology & Environment, Inc. 1988. Reassessment of Antelope Valley Pesticide Container Disposal Site Memorandum to EPA Region 9 Site Screening Coordinator, July 6, 1988.

EPA, 1973. Potential Hazardous Waste Site – Identification and Preliminary Assessment, Antelope Valley Pesticide Container Site, December 10, 1979.

NDEP, 1992. Letter to BLM District Manager concerning the closure requirements for the disposal site, December 28, 1992.

NDEP, 1993a. Letter to BLM District Manager concerning the transportation and disposal of the repackaged pesticide containers, March 30, 1993.

NDEP, 1993b. Letter to BLM District Manager follow-up to the April 28, 1993 site meeting, May 19, 1993.

Appendix A

Photographic Log

Appendix B

Field Sheets

Appendix C

Boring Logs

Appendix D

EDR Report

Appendix E

Analytical Laboratory Reports