

# **Removal Completion Report**

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## **Double H Farms**

Grandview, WA

**Prepared For**  
United States  
Environmental Protection Agency  
Region 10  
Seattle, WA

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## **1.0 Introduction**

In March 2009, the United States Environmental Protection Agency (EPA) began investigating a private landfill on property referred to as the Double H Farms (Site A). The purpose of the investigation was to determine if hazardous materials were present and if those materials had impacted the surrounding environment. Along with household and agricultural rubbish, empty and partially-filled pesticide containers, as well as oil containers were found in the landfill.

Following the initial investigation, the EPA entered into an Administrative Settlement Agreement and Order on Consent (AOC) with the potentially responsible parties (PRP). The scope of work defined by the AOC was to remove and dispose of any hazardous materials found to be present at Site A, determine the extent of groundwater contamination at Site A, and investigate an additional site (referred to as Site B) to determine if hazardous materials were present at that site and if those materials have impacted the surrounding environment.

A Removal Action Work Plan was developed that described the actions that were to be taken to meet the requirements of the AOC (*Removal Action Work Plan, Riverside Associates, July 2009*). The scope of work identified in the Removal Action Work Plan was implemented in July 2009 and had been on-going until October 1, 2010, at which time the final containers and debris were removed from the site and shipped to a Subtitle C Landfill operated by Waste Management and located in Arlington, Oregon.

This document summarizes the results of the investigation for both Site A and Site B, which was, subsequent to implementing the Removal Action Work Plan, divided into two sub sites referred to as Site B1 and B2.

## **1.1 Site Background**

Double H Farms consists of several parcels of land with Range 23 Township 8, located near Grandview, Washington in Yakima County (Figure 1). The surrounding area is predominantly agricultural. Both Site A and Site B are adjacent to vineyards. Site A is within Parcel 41001 and Site B is within Parcel 41003.

Both Parcels of land have been in continuous use for greater than 75 years. The land adjacent to Site A is currently planted in grapes used for grape juice. Prior crops grown in the area adjacent to Site A include corn, asparagus, and mint.

The parcel of land on which Site B sits was acquired by the current owners approximately 50 years ago. The former owners grew hops on the land and had a hop picker and kiln located on the parcel. The former hop picker building and kiln building currently stand on the parcel and have been renovated for a number of activities over the years, including being used to process eggs, as a small country store to sell eggs and chickens, and for packing cherries. There is a shop area where farm implements have been maintained. Also, there is a residential home adjacent to Site B that has been used as rental property for farm workers and their families.

## **1.2 Site History of Use**

Site A originally was a composting area for chicken manure from off-site chicken growing and egg producing operations. The chicken manure would be composted at Site A during the growing season and then spread onto the land following harvest. In the late 1970's and 1980's, the chicken operations slowly declined and composting at Site A slowly ceased. Site A was then used as a private landfill for household and agricultural wastes. The site was unsupervised and unsecured.

Site B1 originated as a foundation for a proposed chicken raising building. The foundation for the building (approximately 200 ft by 50 ft) was built but the building was never constructed, due to a lack of funds and resistance for a chicken raising operation by local residents. The foundation lay open for several years and agricultural and household wastes were periodically placed in the foundation. In approximately 2006, the foundation was flattened and the excavated hole filled in with soil. Filling in the excavation was done over a 3-4 month period and the work was unsupervised and unsecured. Site B2 has been used primarily to grow alfalfa.

## **2.0 Removal Action Objectives**

The objectives of the Removal Action at the Double H landfill were two-fold. At Site A, some of the contaminated materials and soils had been removed from the ground in an earlier response. The objectives at Site A were to:

1. Confirm the extent of contaminated soil,
2. Excavate and segregate any remaining contaminated material from the ground,
3. Properly dispose of contaminated material and uncontaminated debris,
4. Backfill the excavation, and,
5. Assess the groundwater to determine if the groundwater had been impacted and the nature and extent of possible contamination.

Site B had not been assessed, therefore, the objectives for Site B were to:

1. Using ground penetrating radar and other geophysical methods, survey site to identify anomalies, which may indicate the presence of hazardous substances,
2. Excavate suspected burial sites to determine if the anomaly is a hazardous substance(s),
3. Recover, characterize, segregate, and dispose of any contaminated material (including soils and debris) or containers of hazardous substances,
4. If necessary, assess the groundwater to determine the nature and extent of possible contamination.

### **3.0 Cleanup Levels**

Site A was the first site where pesticide containers were found. The initial, preliminary investigation conducted by the USEPA through their START contractor Ecology & Environment, found that the containers were either empty or partially filled. Analytical data suggested that free liquid, soil contaminated with pesticides and/or oil-range organics or diesel-range organics, and possibly groundwater contaminated with oil-range organics, diesel-range organics and/or pesticides had been found. Arsenic was seen in water samples collected on site. The primary objective for Site A was to confirm the presence of contaminated material and remove any contaminated material that posed a threat to human health or the environment. We used the Washington State Model Toxics Control Act (MTCA) as the Applicable or Relevant and Appropriate Requirement (ARAR) for both pesticides and the oil-range and diesel-range organics.

Double H Farms is located in a rural setting and the contamination found at Site A was found in soil and a shallow, non-drinking water aquifer. MTCA Method B for unrestricted use as the cleanup level for soils and groundwater was used in determining cleanup compliance. Table 3.1 shows the cleanup levels for the main pesticides initially found at Site A, as well as for the oil-range and diesel-range organics found at the site. Table 3.1 also shows the cleanup for benzene, toluene, ethyl benzene, and xylenes.

**Table 3.1 Cleanup Levels for Site A**

<b>Contaminant of Concern (COC)</b>	<b>Cleanup Level for Soil (mg/kg)</b>	<b>Cleanup Level for Groundwater (µg/liter)</b>
<b>Dimethoate</b>	<b>16</b>	<b>3.2</b>
<b>Carbaryl</b>	<b>8,000</b>	<b>1,600</b>
<b>Glyphosate</b>	<b>8,000</b>	<b>700<sup>1</sup></b>
<b>Oil-Range Organics</b>	<b>2,000</b>	<b>500</b>
<b>Diesel-Range Organics</b>	<b>2,000</b>	<b>500</b>
<b>Benzene</b>	<b>18</b>	<b>5.0</b>
<b>Toluene</b>	<b>6,400</b>	<b>1,000</b>
<b>Ethylbenzene</b>	<b>8,000</b>	<b>700</b>
<b>Xylenes</b>	<b>16,000</b>	<b>1,000</b>
<b>Arsenic</b>	<b>24</b>	<b>0.058</b>

<sup>1</sup>Based on EPA MCL for drinking water

We also analyzed samples for Aminomethylphosphonic Acid (AMPA), which is the primary degradation product of Glyphosate in plants, soils, and water. To our knowledge there is no cleanup level for AMPA. For some selected samples, we also analyzed for Diquat, Pendimethalin, Abamectin, PCB's and metals.

## **4.0 Removal Action Approach for Site A**

The characteristics of Site A and Site B are significantly different in the steps that were needed to complete the requirements of the AOC; therefore, each will be discussed in separate sections. Site A will be discussed in the current section and Site B in Section 5.0.

### **4.1 Boundary Delineation**

To determine the boundary for excavation at Site A, soil samples were collected from two (2) depths at 16 locations outside the excavation boundary established by EPA's original emergency action (EPA Excavation; shown in Figure 4.1.1). Two lines were drawn that passed transversely through the EPA Excavation with two additional transverse lines being drawn off-set 45 degrees from the first two lines. The initial samples were collected at approximately 5 ft from the edge of the EPA Excavation along these lines (referred to as primary samples). Additional samples (secondary samples) were collected along the same line, 20 ft from the primary sample locations. A Geoprobe was used to collect sample cores at a depth of approximately 3 ft and at a depth of approximately 6 ft. Samples were collected following the sampling plan in the Quality Assurance Project Plan (QAPP). All samples were sent to OnSite Environmental, Inc. Analytical Laboratory and analyzed for the COCs identified in Table 3.1. The analyses of the samples were done as per the QAAP.

The result of the soil sampling was used to establish the lateral boundary for the additional excavation that occurred at Site A. The primary samples tested negative for the COCs and therefore the additional excavation was limited to the area approximately five (5) feet from the EPA Excavation.

## **4.2 Excavation at Site A**

We had expected that the excavation would consist of re-excavating the EPA Excavation that had been partially backfilled when the EPA ceased operations in April 2009; however, as we began excavating the former landfill we found that a substantial amount of material remained. An excavator and back hoe was used to excavate soil, debris, and containers from Site A. The landfill at Site A was excavated until no evidence of buried wastes remained. The depth of excavation was approximately fifteen (15) feet and the lateral boundary extended to the position of our primary sampling described above.

Containers, regardless of their previous content, were hand separated from the material as it was excavated from the landfill. These containers were stockpiled with the containers originally removed during the EPA Excavation. The remaining soil and debris was stockpiled into several piles for sampling prior to segregation of soil and debris.

## **4.3 Confirmation Sampling of Soil Piles**

According to the Removal Action Plan, no material was to be removed from the site until confirmation analysis as to the nature and level of contamination had been established. To establish if the debris was contaminated with pesticides or petroleum products, we sampled each of the soil piles before segregation.

At Site A, twelve (12) soil and debris piles were created. Figure 4.1.2 shows the approximate location of the soil piles. Four (4) soil piles were on site at the initiation of the AOC and as a result of the initial EPA Excavation. These soil piles were labeled EPA 1-4. Eight (8) additional soil piles were created as a result of the excavation described in Section 4.1.1. These soil piles were labeled alphabetically.

Depending on the size of each soil pile, between two (2) and six (6) composite samples were collected to establish the existence and nature of potential contaminants. Each composite sample consisted of a composite of 10 subsamples. Samples were collected according to the methods described in the Removal Action Plan and following the protocols described in the QAPP. Each sample was analyzed for the COCs listed in Table 3.1.



#### **4.4 Segregation of Soil and Debris**

At Site A, laboratory analysis showed that all soil piles were either non-detect or below the established clean-up level for the contaminants of concern (see Section 6, Results). Once it had been established that the soil in any particular pile was uncontaminated, a shaker screen was brought in and used to separate the soil from the debris. The debris was stockpiled and examined prior to shipment off-site. If found, containers, tires, and batteries were removed from the debris piles for separate management.

#### **4.5 Confirmation Sampling of the Excavated Pit at Site A**

The Removal Action Work Plan identified a procedure to confirm all contaminated material was removed from the landfill. This procedure called for the collection and analysis of samples from the sidewalls and floor of the excavated pit. This plan was not implemented at Site A for the following reasons. First, the excavation extended to the boundary established during the initial boundary delineation (discussed in Section 4.1). The samples collected during the initial boundary delineation, in effect, represented the boundary sampling for the excavation at Site A. Since those samples were non-detect for the contaminants of concern, no further sampling was deemed necessary. Second, and of greater significance, no contamination above cleanup levels was found in the soil excavated from the site. While pesticide and oil containers were recovered from the landfill, most were empty or contained a small amount of liquid. We reasoned that if there were a significant amount of pesticides or oil originally in the containers recovered at the site there would be evidence of that in the soil excavated from the landfill. Approximately sixty-two (62) composite soil samples were collected from material excavated from the landfill and all samples were either non-detect or well below the clean-up level for the contaminants of concern (see Section 6, Results). Our reasoning was that since we did not detect contamination in the soil excavated from the site, and since we had already collected and analyzed samples from the boundary area, no further sampling was needed.

#### **4.6 Off-site Disposal of Material Excavated from Landfill**

Five (5) categories of material were excavated from the landfill at Site A: 1) pesticide and petroleum containers; 2) non-contaminated soil; 3) non-contaminated household wastes; 4) 12 volt automobile batteries; and, 5) tires.

Uncontaminated debris was hauled to the Cheyne Landfill, located at 4970 Cheyne Road in Zillah, WA and operated by the Yakima County Solid Waste Department. The Yakima County Solid Waste Department was contacted and informed of the material that was to be transported to the landfill, its origin, and the circumstances surrounding the removal and shipment of the material. Operators at the landfill inspected the contents of each transport.

The batteries from Site A were combined with those collected at Site B and transported to Interstate Battery Systems of Southern Washington in Union Gap for recycling (see Section 6 for more information). The tires were disposed of at the Cheyne Landfill. All containers were placed in a lined trailer and moved to Site B where they were stored until they could be disposed by shipment to the Subtitle C Landfill in Arlington, Oregon, operated by Waste Management (For further discussion, see Section 6, Results).

With one exception (to be discussed in Section 6), all soil was left on site and used as backfill for the excavated pit.

#### **4.7 Groundwater Monitoring**

Four (4) groundwater monitoring wells were installed at Site A following the excavation, segregation, and off-site disposal of the non-contaminated material.

The wells were installed by Cascade Drilling of Woodinville, WA. Wells were constructed to meet the requirements of Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC). Each well was constructed with 2-inch diameter, Schedule 40 PVC, flush-threaded casing, with commercially fabricated screens. The well screen slot size was 0.010inch and the wells were screened from a few feet above the initial depth to water to the bottom of the well. The well depth ranged from approximately twenty (20) feet below ground surface to approximately twenty-five (25) feet below ground surface. Clean, inert sand pack materials (10-20 mesh) was placed over the screened interval to two feet above the top of the screen. Bentonite and cement/bentonite seals were placed along the entire length of the annular space (between the boring and the PVC well) from the top of the gravel pack to the surface.

Samples were collected at 5-foot intervals during drilling using a split spoon sampler. Core samples were placed in labeled plastic zip-lock bags. A portion of the split spoon samples were analyzed for grain size. A steel, 6-inch diameter, outer protective casing was installed over the PVC well. The steel casing extended to a depth of approximately two feet below ground. The top of the outer casing was flush with the ground surface and fitted with a lock. Well logs were prepared following completion of all wells (see Appendix A).

Following completion, the wells were developed by the driller until the water removed from the borehole was free of sediment, as defined in the QAPP. A state well tag with a unique ID number was attached to each new well.

After development of the wells, groundwater was collected following the procedures described in the QAPP. The samples were analyzed for the COCs identified in Table 3.1. The results of this first round of sampling are discussed in Section 6 of this report.

## **5.0 Removal Action Approach for Site B**

Site B was originally defined as the location of a former foundation for a proposed chicken raising building. The foundation for the building (approximately 200 ft by 50 ft) was built but the building was never constructed, due to a lack of funds and resistance for a chicken raising operation by local residents. The foundation lay open for several years and agricultural and household wastes were periodically placed in the foundation. In approximately 2006, the foundation was flattened and the excavated hole filled in with soil. Filling in the excavation with surrounding soil was done over a 3-4 month period and the work was unsupervised and unsecure.

Upon initiation of the investigation of Site B, we were shown aerial photographic evidence from the Department of Ecology that indicated that there were one or more possible landfills in an area east of the former Hop Picker building (referred hence forth as the office). The possible landfills were in an area that was planted in alfalfa.

With this new information, the investigation of Site B was expanded to include both areas, which were subsequently referenced as Site B1 (foundation area) and Site B2 (alfalfa field). These locations are shown in Figures B1 and B2.

Site B1 and B2 had not been investigated before the implementation of the AOC; therefore, the investigation included an Electromagnetic Survey, a Ground Penetrating Radar Survey, and excavation and investigation of any anomalies discovered during the surveys.

### **5.1 Electromagnetic Survey**

Electromagnetic data were collected using a Geonics EM31 Ground Conductivity meter. Apparent conductivity and in-phase response data were collected at 0.2 second intervals on transects spaced approximately 2.5 meters apart (row spacing of vines). Data was digitally recorded with DGPS data on an Allegro Field PC. Electromagnetic data contours were mapped and used to help define anomalies that could be further investigated using ground penetrating radar.

### **5.2 Ground Penetrating Radar Survey**

A ground penetrating radar survey (GPR) was conducted using a GSSI SIR3000 control unit and a 270 MHz antenna. Location control was established using a Trimble ProXRS DGPS. GPR data were collected over all anomalies identified in the electromagnetic survey. Data were interpreted in the field and recorded for later data analysis. Anomalies were marked in the field and mapped using a Trimble ProXRS DGPS. The reports for the Electromagnetic and GPR Surveys are provided in Appendix B.

### **5.3 Investigation of Anomalies**

Following the surveys described above, we began excavating areas where the survey results indicated that there were anomalies. This involved several separate excavations using either a tracked excavator or a wheeled backhoe. Excavated material was handled as described in Section 4.0 for the Site A. As material was excavated, any containers that could be removed from the excavated material were removed and stockpiled on plastic until we could develop a final disposition plan for them. Overburden material (soil and debris) was segregated into piles and sampled prior to further segregation.

Detailed notes were taken during the excavation process, along with photos to memorialize the excavation and subsequent sampling, analysis, and management of the excavated material.

### **5.4 Excavation at Site B1 and B2**

At Site B1 there were two main areas where further investigation was needed. Site B1 was a former foundation that was rectangular in shape running mainly east and west. Small anomalies were observed at the west end during the GPR survey; however, when we began excavating that area we found no evidence of debris burial. A total of 3 pits were excavated at the west end of Site B1 to a depth of approximately six (6) feet. No evidence of previous disturbance or the burial of wastes was observed and the pits were backfilled after photographing the excavation activity.

On the east end of Site B1, excavation of a suspected landfill site revealed that concrete construction wastes, five (5) gallon oil containers, and miscellaneous trash and debris had been placed in the foundation. One large pit was excavated until no further evidence of containers and or debris remained. During the excavation, any containers or other identifiable hazardous material (batteries, etc.) that could be removed from the excavated material were removed and stockpiled on plastic until we could develop a final disposition plan for them. The remaining soil and debris was stockpiled onto plastic sheets to await further analysis and management. Five (5) piles of varying size were created from the excavation.

At Site B2, the investigation of the anomalies identified from the GPR survey revealed eight (8) individual landfills. An excavator and back hoe was used to excavate soil, debris, and a variety of pesticide and non-pesticide containers from these separate landfills. As with all earlier excavations, any containers or other identifiable hazardous material (batteries, etc.) that could be removed from the excavated material were removed and stockpiled on plastic until we could develop a final disposition plan for them. The remaining soil and debris was stockpiled onto plastic sheets to await further analysis and management. Sixteen (16) soil and debris piles were created during the excavation of the landfills at Site B2.

## **5.5 Confirmation Sampling of Soil Piles**

As was performed at Site A, to establish if the debris was contaminated with pesticides or petroleum products, we sampled each of the soil piles before segregation.

Depending on the size of each soil pile, between one (1) and six (6) grab samples were collected to establish the existence and nature of potential contaminants. Samples were collected according to the methods described in the Removal Action Plan and following the protocols described in the QAPP. The major regulated waste found at Site B was empty or partially filled lube oil containers. We also found a number of car batteries at Site B. We reasoned that the primary contaminants of concern would be oil and grease and possibly heavy metals; therefore, each sample was analyzed for TPH and RCRA metals.

## **5.6 Confirmation Sampling of the Excavated Pits at Site B1 and B2**

With the exception of the pits excavated at the west end of Site B1, confirmation soil samples were collected from the sidewalls and floors of the excavation pits at Site B1 and B2 once we concluded that the boundary of the landfill had been reached. We used visual information to reach that conclusion, which included the observation that the excavations were in undisturbed soil and that no further debris was observed. In some cases, the pit contained water and it was not possible to collect a soil sample from the floor of the pit. In that case, a water sample was collected.

## **5.7 Segregation of Soil and Debris**

A shaker screen was brought in and used to separate the soil from the debris if laboratory analysis indicated that a particular soil pile was either non-detect or below the established clean-up level for the contaminants of concern. The debris was stockpiled and examined prior to shipment off-site. If found, containers, tires, and batteries were removed from the debris piles for separate management. If laboratory analysis indicated that a particular soil pile was contaminated, we assumed all the debris in the pile was also contaminated. In this case the soil pile (along with the debris contained in the soil pile) was stockpiled in a separate area so it could be shipped to a secure landfill.

## **5.8 Off-site Disposal of Material Excavated from Landfill**

Six (6) categories of material were excavated from the landfills at Site B1 and B2: 1) petroleum containers (along with a few other containers); 2) contaminated soil; 3) non-contaminated soil; 4) non-contaminated household wastes; 5) 12 volt automobile batteries; and, 6) tires.

Uncontaminated debris was hauled to the Cheyne Landfill, located at 4970 Cheyne Road in Zillah, WA and operated by the Yakima County Solid Waste Department. The Yakima County Solid Waste Department was contacted and informed of the material that was to be transported to the landfill, its origin, and the circumstances surrounding the removal and shipment of the material. Operators at the landfill inspected the contents of each transport.

The batteries from Site B were combined with those collected at Site A and transported to Interstate Battery Systems of Southern Washington in Union Gap for recycling (see Section 6 for more information). The tires were disposed of at the Cheyne Landfill.

All containers were placed inside the former Hop building. Originally, it was believed that all containers would be shipped to the Subtitle C Landfill in Arlington, Oregon and are operated by Waste Management. As the project progressed, the decision was made to leave the oil containers on site until the completion of the AOC and the regulatory oversight was transferred from the USEPA to the Washington Department of Ecology (WDOE). The non-oil containers were shipped to the Subtitle C Landfill in Arlington, Oregon, along with the containers collected at Site A.

All non-contaminated soil and concrete was left on site and used as backfill for the excavated pits. The contaminated soil and debris was shipped to the Subtitle C Landfill in Arlington, Oregon.

## **5.9 Groundwater Monitoring**

Five (5) groundwater monitoring wells were installed at Site B following the excavation, segregation, and off-site disposal of the non-contaminated material.

The wells were installed by Cascade Drilling of Woodinville, WA. Wells were constructed to meet the requirements of Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC). Each well was constructed with 2-inch diameter, Schedule 40 PVC, flush-threaded casing, with commercially fabricated screens. The well screen slot size was 0.010inch and the wells were screened from a few feet above the initial depth to water to the bottom of the well. The well depth ranged from approximately twenty (20) feet below ground surface to approximately twenty-five (25) feet below ground surface. Clean, inert sand pack materials (10-20 mesh) was placed over the screened interval to two feet above the top of the screen. Bentonite and cement/bentonite seals were placed along the entire length of the annular space (between the boring and the PVC well) from the top of the gravel pack to the surface.

Samples were collected at 5-foot intervals during drilling using a split spoon sampler. Core samples were placed in labeled plastic zip-lock bags. A portion of the split spoon samples were analyzed for grain size. A steel, 6-inch diameter, outer protective casing was installed over the PVC well. The steel casing extended to a depth of approximately two feet below ground. The top of the outer casing will be flush with the ground surface and fitted with a lock. Well logs were prepared following completion of all wells (see Appendix A).

Following completion, the wells were developed by the driller until the water removed from the borehole was free of sediment, as defined in the QAPP. A state well tag with a unique ID number was attached to each new well.

After development of the wells, groundwater was collected following the procedures described in the QAPP. The samples were analyzed for the COCs identified in Table 3.1. The results of this first round of sampling are discussed in Section 6 of this report.

## **6.0 Results**

The majority of material removed from both Site A and Site B was non-hazardous and represented either non-hazardous household or agricultural wastes. Material deemed to be dangerous wastes varied considerably between Site A and Sites B1 and B2. Site A consisted mostly of pesticide containers while Site B1 and B2 mostly of oil containers and approximately 33 batteries. Site A samples were analyzed for Diesel, Lube Oil, BTEX, Arsenic, Dimethoate, Carbaryl, Glyphosate and Amintomethylphosphonic Acid (AMPA). Samples collected at Site B were analyzed for Diesel, Lube Oil, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver.

Groundwater samples from wells installed at Site A were analyzed for the same compounds as the soil at Site A while wells from Site B were analyzed for all the same compounds as found in the soil at Site B.

General results from the Removal Action at each site (Site A and Site B) will be discussed separately. The discussion of the waste material designated for shipment to Waste Management's Facility in Arlington, Oregon will be in Section 7.

### **6.1 Site A Results**

#### **6.1.1 Soil Analytical Results**

A summary spreadsheet for the results of analysis at Site A are provided in Table 2 (Appendix C). Raw Laboratory Data is provided in Appendix G. Sixty-two (62) soil samples were collected

at Site A and all were either non-detect (ND) or at least one order of magnitude below the cleanup level for the contaminants of concern (COCs). During the excavation and segregation of soil and landfill waste material, we observed some soil that appeared to be contaminated. That material was segregated and put into a separate stockpile. That stockpile was sampled in April, 2010 and found to be non-detect or below the cleanup level for all COCs (see Samples 809A324-809A327 in Appendix C). However, we decided to ship to the Waste Management Landfill in Arlington, OR because the costs of remobilizing the excavation contractor, and shipping the landfill material to a local landfill was deemed to be greater than the cost of shipping the material to the Waste Management Landfill in Arlington, OR.

Following the segregation of the soil from the debris in the soil, the soil was placed back into the landfill pit from which it was excavated.

### **6.1.2 Uncontaminated Debris Disposition**

As discussed in earlier sections of this report, uncontaminated debris was hauled to the Cheyne Landfill, located at 4970 Cheyne Road in Zillah, WA and operated by the Yakima County Solid Waste Department. We did not keep accurate records of the amount of debris that was hauled to the landfill from Site A versus Site B; however, according to Tri-Valley Construction, the contractors who hauled the material to the landfill, approximately three hundred thirty five (335) tons of debris was hauled to the Cheyne Landfill.

Most of this debris was ordinary household garbage and trash. There were a few aerosol canisters (e.g., hairspray canisters) that seemed empty and they were included with the uncontaminated debris that was sent to the Cheyne Landfill.

### **6.1.3 Batteries and Tires**

Several tires were removed from both Site A and Site B. We determined that the tires could be taken to the landfill as long as they were separated from the ordinary trash. They were hauled to the Cheyne Landfill in the last load.

Most of these batteries that were recovered from Site A and Site B were recovered at Site B; however, all will be discussed in this section. Thirty three (33) batteries were recovered from Site A and Site B. Upon approval from EPA's representative, these batteries were hauled to Interstate Battery System of Southern Washington; Union Gap, WA 98903, where they were recycled. A receipt for these batteries is provided in Appendix D.

### **6.1.3 Containers**

Over two hundred sixty (260) non-petroleum containing containers were recovered from Site A and Site B. These containers were designated as solid waste and manifested for shipment to the



Waste Management Landfill in Arlington, OR (see Section 7 and Appendix E). Table 3 summarizes the information regarding these containers.

Many of the containers recovered at Site A and B were damaged and dented. Figures 3-6 show the typical container recovered from Site A. However, contrary to what we had been led to believe, we did not find a significant amount of evidence that the containers placed in the landfill at Site A had been systematically crushed either before or after placement in the landfill.

Whenever we recovered a container, its content (if any) was placed in a 350-gallon container. Most of the containers we recovered were empty or contained only a small amount of liquid. We calculated the total potential volume of all the containers recovered to be approximately 2,360 gallons. The amount of liquid recovered was 170 gallons, approximately 7% of the potential volume. This information was important as we investigated the likelihood that the soil and or groundwater had been impacted by the placement of the containers in the landfill. For example, given the total potential volume of the Glyphosate in the Glyphosate containers recovered at Site A, it would be reasonable to assume we would find some soil samples with concentrations greater than what we did find if the containers had contained a significant amount of liquid when they were placed in the landfill. As it was, the highest concentration we found was one sample of 4.5 ppm and most samples were non-detect for Glyphosate. This suggests that the containers were placed in the landfill either empty or with only small amounts of liquid in them.

**Table 3. Containers Recovered at Double H**

# of Containers	Size (gallons)	Total Gallons Capacity	Constituent	Active ingredient	Waste Code	Note
26	15	390	Stylet Oil	Stylet Oil	n/a	Empty
41	30	1230	Glyphosate	glyphosate	WT02	Empty
12	30	360	Gramoxone	paraquat dichloride	WT02	Empty
5	2.5	12.5	Carbaryl	Carbaryl	U279	Empty
52	1	52	Complex	n/a	n/a	Empty
11	2.5	27.5	Calcium	calcium	n/a	Empty
9	1	9	Epimek	Abamectin	WT02	Empty
5	2.5	12.5	Sulfur	sulfur	n/a	Empty
2	2.5	5	Prowl	pendimethalin	WT02	Empty
23	0.25	5.75	Procure	Triflumizole	WT02	Empty
7	1	7	Insecticide Bait	n/a	WT02	Empty
1	1	1	Ortho Insecticide	n/a	WT02	Empty
2	1	2	K-salt	n/a	n/a	Empty
13	1	13	Antifreeze	n/a	n/a	Empty
1	5	5	Disulfoton	Disulfoton	P039	Empty
3	5	15	Gas	n/a	n/a	Empty
1	2.5	2.5	Goal	Oxyfluorfen	WT02	Empty
1	1	1	Ortho Rose Pride	n/a	WT02	Empty
1	1	1	Surfactant	n/a	n/a	Empty
2	5	10	Soap	n/a	n/a	Empty
1	5	5	Paint	n/a	n/a	Empty
15	2.5	37.5	unlabeled buckets	n/a	n/a	Empty
21	2.5	52.5	unlabeled containers	n/a	n/a	Empty
1	55	55	black metal drum	n/a	n/a	Empty
1	30	30	blue poly drum	n/a	n/a	Empty
1	10	10	10 gallon plastic tank	n/a	n/a	Empty
2	5	10	backpack sprayers	n/a	n/a	Empty

## **6.2 Site B Results**

### **6.2.1 Analytical Results for Stockpiled Soils**

A summary spreadsheet for the results of the soil analysis at Site B1 and B2 are provided in Table 2 (Appendix C). At Site B1, four (4) pits were excavated creating five (6) stockpiles (Figure B1). Pits 2, 3, and 4 were located at the west end of Site B1. While the ground penetrating radar had shown there to be a few anomalies at that location, during excavation, no landfill debris was recovered and the soil appeared to be undisturbed. The sample results from stockpile associated with these pits (Stockpile B) confirmed that there was no contamination at the west end of Site B1 (Table 2, Appendix C). We did not do confirmation sampling on the side walls or floor of Pits 2, 3, or 4.

During the excavation of Pit 1 at Site B1, a number of 5 gallon oil containers were recovered. Most of these containers were empty but a few of the containers had residual oil or oily sludge inside. An oily sheen was observed on the water surface that existed at the bottom of the pit. During the excavation of Pit 1, 5 stockpiles were created (designated A, D, E, F, and G).

Stockpile A was the largest stockpile from Site B1. A total of 10 grab samples were collected from Stockpile A and analyzed for lube oil and diesel. Eight (8) of the samples were non-detect for both compounds while one (1) sample had Diesel and Lube Oil well below the cleanup level (see Table 2, Appendix C). One sample taken from Stockpile A had lube oil of 3,300 parts per million (ppm), which is above the cleanup level of 2,000 ppm. Taken as a whole, the results indicated that Stockpile A was uncontaminated. After the debris was separated from the soil of Stockpile A, six (6) composite samples were collected to confirm the status of Stockpile A. The results confirmed that Stockpile A was uncontaminated and the one sample with the high level of lube oil was probably an anomaly. The soil from Stockpile A used as to backfill Excavation Pit 1 at Site B1.

Three samples were collected from Stockpile D and all were ND or at least one order of magnitude below the cleanup level for Diesel and Lube Oil. Stockpile D was screened and the soil was placed back into Excavation Pit 1.

Stockpiles E, F, and G were very small (less than about 2 cubic yards each) and one grab sample was collected from each pile for analysis. Stockpile G was subsequently found to be uncontaminated while Stockpiles E and F had Lube Oil levels above the cleanup level (see Table 2, Appendix C). Stockpile G was screened and the soil placed back into Excavation Pit 1.

Stockpiles E and F (along with the debris within these stockpiles) were combined and stockpiles in an area near Site B2 and were subsequently shipped to the Waste Management Landfill in Arlington, OR (see Section 7 for further discussion).

Eight (8) pits were excavated at Site B2. The excavated soil was stockpiled into sixteen (16) separate stockpiles (Stockpiles A through P, see Figure B2). Depending on the size of the stockpile, between 1 and 15 grab samples were collected and analyzed for diesel, lube oil, and RCRA metals. All the samples from these sixteen (16) stockpiles were either non-detect or below the cleanup level for the COCs (Table 2, Appendix C). Stockpiles H and N had many dark stains and we felt that, to be safe, we would designate these stockpiles for shipment to the Waste Management Landfill in Arlington, OR. Stockpiles H, N, E, and F were eventually combined and shipped to the Waste Management Landfill in Arlington, OR.

All other stockpiles at Site B2 were screened to separate the debris from the soil. The soils were subsequently backfilled into the Pits following confirmation sampling of each pit (see Section 6.2.2).

### **6.2.2 Confirmation Sampling of Excavation Pits at Site B1 and B2**

Samples were collected from the sidewalls and floor of every pit at Site B1 and B2 except Pit 1, 4, 5, 7, and 8 as water was at the bottom of these pits and it was deemed unsafe to collect a soil sample. Water samples were collected from the bottom of these pits.

All soil samples collected from the side walls and floor of the pits were either ND or below the cleanup levels for the contaminants of concern (see Table 2). Two water samples were collected from Pit 1. One sample was non-detect for diesel and lube oil while the other sample was above the cleanup level for both of these compounds.

Water samples collected at the bottom of Pits 5 and 8 were above the cleanup level for Lube Oil and some metals (arsenic, cadmium, chromium, and lead). The water samples in Pits 4 and 7 were above the cleanup level for arsenic, barium, chromium, and lead.

No action was taken to remove water from the bottom of these pits. It was felt that since any potential source of further contamination had been removed and the fact that there was a paucity of contamination found on the soils of these pits, the risk of impacting human health or the environment from these isolated results was minimal.

## **6.3 Groundwater Monitoring Results**

The results of samples collected from the monitoring wells installed at Site A and B are shown in Table 2 (Appendix C). All groundwater samples were either ND or well below the cleanup levels for the contaminants of concern. In addition, water samples were collected from the office sink

and bathroom sink in the shop building. These samples were ND or well below cleanup levels for all contaminants of concern (see Table 2, Appendix C).

## **7.0 Material Shipped to Waste Management Facility**

Following the removal action described in this report, we were left with twelve (12) groupings of material that needed to be profiled, manifested, and shipped to Arlington, Oregon for disposal at the Waste Management Facility. Table 4 summarizes these groupings and provides a summary of the waste codes and Waste Management Method of Disposal. Copies of the original profile sheets, manifests, and Certificates of Disposal are found in Appendix E.

In addition to these groupings, one hundred thirty one (131) petroleum containers remain on site and will be disposed of following consultation with WDOE.

The material listed in Table 3 was stored on site, either at Site A or Site B until it was transported to Waste Management on October 1, 2010.

**Table 4. Summary of Waste Codes and Disposal Methods for Material Shipped to Waste Management.**

<b>Current Location</b>		<b>Description</b>	<b>WM Profile #</b>	<b>WM CODING</b>	<b>WM Method of Disposal</b>	<b>WM CoD</b>
<b>SITE B</b>	<b>1</b>	30-gallon white poly	OR297859	WT02	Solidification	
<b>SITE A</b>	<b>2</b>	Soil & debris (1 pile ~10 tons) 8 cubic yards	OR297860	WT02	Direct Landfill	X
<b>SITE B</b>	<b>3</b>	350-gallon poly, ~200 gallons solution 170 gallons	OR297861	D018	Incineration	
<b>SITE B</b>	<b>4</b>	Non-haz empty containers (*Note:profile listed ~273 containers)	OR297465	WT02	Direct Landfill	XX
<b>SITE B</b>	<b>5</b>	Soil & debris (1 pile ~20 tons) 10 cubic yards	OR297466	WT02	Direct Landfill	XX
<b>SITE B</b>	<b>6</b>	Lime sulfur solution (2 30-gallon polys overpacked in 55-gallon drums)	OR297462	WT02	Solidification	
<b>SITE B</b>	<b>7</b>	Glyphosate (1 30-gallon poly overpacked in 55-gallon drum)	OR297463	WT02	Solidification	
<b>SITE B</b>	<b>8</b>	Pendimethalin (1 30-gallon poly overpacked in 55-gallon drum)	OR297464	WT02	Solidification	
<b>SITE B</b>	<b>9</b>	Lime sulfur soils (A1P4#4. 1 30-gallon drum w/ ~10 gallons)	OR297532	WT02	Direct Landfill	
<b>SITE B</b>	<b>10</b>	Unknown non hazardous liquid (A1P4#2. 30-gallon poly overpacked in 40-gallon drum)	OR297531	WT02	Solidification	
<b>SITE B</b>	<b>11</b>	Disulfoton Container (One empty container)	OR302452	P039	Macro-encapsulation	
<b>SITE B</b>	<b>12</b>	Carbaryl Containers (Five 2.5 gallon empty)	OR302453	U279	Macro-encapsulation	

## **8.0 Summary**

Over the course of several months in 2009 and 2010, ten (10) private landfills spread over 3 sites were excavated and investigated to determine the contents of the landfills and to determine if hazardous wastes had been placed in the landfills and if so, to what extent the placement of those wastes had impacted the environment.

Two hundred sixty (260) miscellaneous pesticide and one hundred thirty (130) petroleum containers were recovered from the two sites. Over two hundred twenty five (225) samples were collected from Site A and B. None of the samples collected at Site A showed levels above the cleanup levels established for the contaminants of concern. At Site B, three (3) soil samples were above the cleanup levels for the contaminants of concern. In addition, while three (3) samples collected at the bottom of the pits that contained water had concentrations greater than the cleanup levels, none of the groundwater samples exhibited concentrations greater than the cleanup levels established for the contaminants of concern.

All of the material designated as dangerous wastes have been profiled, manifested and ship to the Subtitle C landfill in Arlington, OR and operated by Waste Management.