



Nez Perce

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
P.O. BOX 365 • LAPWAI, IDAHO 83540-0365 • (208) 843-7375 / FAX: 843-7378

0075975

✓ OK
Sampling

January 25, 2000

Mr. Jamie Zeisloft
U.S. DOE
3350 George Washington Way
HO-12
Richland, Washington 99352

RECEIVED
FEB 06 2008

RE: DDT Sampling on Hanford's North Slope

EDMC

Dear Mr. Zeisloft

The Nez Perce Tribe retains reserved treaty rights in the Mid-Columbia under the 1855 and 1863 treaties with the United States government. These rights have been recognized and affirmed in subsequent federal and state actions. These actions protect Nez Perce rights to utilize their usual and accustomed resources and resource areas in the Hanford Reach of the Columbia River and elsewhere. Accordingly, ERWM has support from the U.S. Department of Energy (DOE) to participate in and monitor relevant DOE activities.

In the fall of 1999 the ERWM partnered with DOE and Bechtel Hanford Inc. to collect and analyze soil and invertebrate samples at control sites for DDT on Hanford's North Slope. The attached report summarizes the results of that effort. We look forward to working with DOE and its contractors on other projects. If you have any questions about this report please contact Dan Landeen at 208-843-7375 or email at danl@nezperce.org.

Sincerely,

Patrick Sobotta

Interim Manager ERWM

Cc:	Ken Gano	Bechtel Hanford Inc.	Doug Mosich WDOE
	Jay McConnaughey	WSDFW	Ray Johnson Fluor Daniel
	Barbara Harper	Yakama Indian Nation	Doug Sherwood EPA
	Susan Hughes	Oregon DOE	Mike Wilson Ecology
	Jake Jakobosky	BLM	JR Wilkinson CTUIR
	Tom O'Brien	USFWS	Kevin Clarke DOE

**Sampling for Residual DDT
on Hanford's North Slope**

**Nez Perce Tribe Environmental Restoration
and Waste Management Department**

January 2000



Executive Summary

The Nez Perce Tribe retains reserved treaty rights in the Mid-Columbia under the 1855 and 1863 treaties with the United States government. These rights have been recognized and affirmed in subsequent federal and state actions. These actions protect Nez Perce rights to utilize their usual and accustomed resources and resource areas in the Hanford Reach of the Columbia River and elsewhere. Accordingly, ERWM has support from the U.S. Department of Energy (DOE) to participate in and monitor relevant DOE activities.

Recently, the area of land referred to as the North Slope was turned over to the United States Fish and Wildlife Service (USFWS) to be managed as part of their national refuge system. Previous to this action the waste sites that were located on the North Slope had been remediated and pronounced clean by the Tri-Parties. This land is located on the north side of the Columbia River and parts of it were used by the military during the formative years of the Manhattan Project and throughout World War II. The USFWS conducted a Level III Preacquisition Environmental Contaminants Survey on the Hanford North Slope (North Slope) and the Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE) in 1998. The results of that effort detected low levels of DDE (a metabolite of DDT) in darkling beetles and other biota at several of the sites.

The Department of Energy (DOE) conducted a follow-up investigation patterned after the USFWS preacquisition study in the summer of 1999. Results from the Department of Energy follow-up study indicated levels of DDE on the North Slope comparable to those found in the 1998 USFWS Preacquisition Survey. Many of the remediated North Slope waste sites sampled in both the USFWS and DOE studies are close to agricultural fields and orchards, which suggests that a background concentration of DDT and its metabolites may be higher in general on the North Slope. North Slope DDT concentrations found at the remediated waste sites might merely reflect historical widespread application rather than a hazardous release. The Hanford Natural Resource Trustee Council, briefed with these findings thought it was important to conduct a "control" soil and beetle collection on the North Slope, to determine a "background" level of DDT and its metabolites.

Consequently, the Nez Perce Tribe Department of Environmental Restoration and Waste Management (ERWM) agreed to partner with Bechtel Hanford Inc. and the DOE to collect and analyze control samples of invertebrates and soil on the North Slope. Soil and invertebrate samples were subsequently collected in the fall of 1999. None of the 28 samples that were analyzed detected any levels of DDT. It appears that the DDT residues on the North Slope are probably associated with waste sites. The extent of any natural resource injuries from DDT to biota on the North Slope can only be determined if more data is collected.

Sampling for Residual DDT on Hanford's North Slope

1.0 Introduction

The Nez Perce Tribe retains reserved treaty rights in the Mid-Columbia under the 1855 and 1863 treaties with the United States government. These rights have been recognized and affirmed in subsequent federal and state actions. These actions protect Nez Perce rights to utilize their usual and accustomed resources and resource areas in the Hanford Reach of the Columbia River and elsewhere. Accordingly, ERWM has support from the U.S. Department of Energy (DOE) to participate in and monitor relevant DOE activities.

The Nez Perce Tribe considers the protection of the Columbia River and the Hanford ecosystem to be of the utmost priority. The Tribe is especially concerned about Hanford work activities that may impact or destroy undisturbed sagebrush steppe and riparian habitat along the Columbia River.

Recently, the area of land referred to as the North Slope was turned over to the United States Fish and Wildlife Service to be managed as part of their national refuge system. This land is located on the north side of the Columbia River and is also known as the Wahluke Slope. Parts of it were used by the military during the formative years of the Manhattan Project and throughout World War II. Previous to this action the waste sites that were located on the North Slope had been remediated and pronounced clean by the Tri-Parties. This land is adjacent to the Saddle Mountain Wildlife Refuge that has been under U.S. Fish and Wildlife Service management for several years.

The Nez Perce Tribe supports this transfer and believes that protecting and preserving the North Slope will fulfill the DOE land use policy issued by the Secretary of Energy in December of 1994. This policy specifically states that it is DOE policy to manage its land as a valuable national resource and that DOE stewardship will be based on the principles of ecosystem management and sustainable development. The protection and preservation of the North Slope is a step in the right direction in initiating this policy at the Hanford Site.

In 1998, the USFWS conducted a Level III Preacquisition Environmental Contaminants Survey on the Hanford North Slope (North Slope (Roy, 1998)). Their survey detected low levels of DDE (a metabolite of DDT) in darkling beetles, bird eggs and other biota at several of the waste sites.

DDT was first used in 1939 in the United States as an insecticide until it was banned in 1972. DDT and its metabolites can persist in the food chain for years and it has been documented to have detrimental reproductive effects on several species of birds. Egg shell thinning is one of the detrimental effects of DDT. Although it is no longer used in the United States, many other nations including Mexico continue to apply it which means that migratory birds can still be exposed.

The USFWS results raised concerns because these particular North Slope waste sites had been pronounced clean by the Tri-Parties and a Record of Decision had been issued. Concerns were raised about the potential injuries to natural resources at these sites. A meeting was convened in February of 1999 by the USFWS and other government agencies including the Hanford affected tribes to determine a course of action. At that meeting, the USFWS proposed that a starling or kestrel nest box study be conducted with the purpose of generating a dose response curve that would determine any potential injuries to individuals or populations at some of the waste sites of concern. This dose response curve would also be able to be applied at other Hanford waste sites by simply determining levels of contaminants in small mammals or invertebrates. One of the benefits of this approach was that actual data could be used to make cleanup decisions. Many of the cleanup decisions that are made at Hanford many times are based on a conceptual model approach that has not been verified or validated.

The DOE did not endorse this approach and directed Bechtel to do a follow-up investigation patterned after the USFWS pre-acquisition study. In the summer of 1999 DOE conducted this follow-up study at four waste sites that had the highest DDE beetle concentrations and examined the extent and distribution of residual DDT/DDE at these sites. These sites were PSN-90, PSN-01, and H-06-LE on the Hanford North Slope (North Slope) and at the Horseshoe Landfill on ALE. A control site was also sampled on ALE. There was no control site for a background level comparison on the North Slope.

Results from the DOE follow-up study at these four sites indicated levels of DDE comparable to those found in the 1998 USFWS Preacquisition Survey. The DOE data in the opinion of many still did not definitely answer all of the concerns about potential injuries to natural resources from DDT uptake on the North Slope.

Many of the remediated North Slope waste sites sampled in both the USFWS and DOE studies are located in the vicinity of agricultural fields and orchards, which suggests that a background concentration of DDT and its metabolites may be higher in general on the North Slope. North Slope DDE concentrations found at the remediated waste sites might merely reflect historical widespread application rather than a hazardous release. The Hanford Natural Resource Trustee Council, briefed with these findings, felt that it was important to conduct a "control" soil and beetle collection on the North Slope, along a 5-10 mile long transect unrelated to former waste sites, to determine a "background" level of DDT and its metabolites.

One of the concerns of the Nez Perce Tribe ERWM is that in the future, lands on the North Slope may be utilized by tribal members for root gathering activities and the collection of plants for ceremonial purposes. As such it is important to document the presence or absence of contaminants like DDT in biota that could potentially have detrimental effects.

Consequently, the Nez Perce Tribe ERWM agreed to partner with Bechtel Hanford Inc. and DOE to collect and analyze control samples of invertebrates and soils on the North Slope. ERWM involvement consisted of helping to write the sample plan, establishing sample locations, and funding the laboratory analyses. DOE and Bechtel provided administrative and field support, mapping, field logs, data validation, and coordinated with

a Hanford laboratory facility to have the samples stored and shipped to the analytical lab in Pennsylvania.

The purpose of this report is to provide the results and an interpretation of this control sampling effort. Results of the previous sampling efforts by the USFWS and DOE can be found in Roy, 1998 and Linville et al, 1999 respectively.

2.0 Objectives

The objectives of the study were:

- Determine the extent and distribution of residual DDE across the North Slope by sampling soil and ground-dwelling insects at non-waste sites;
- Compare these "control" values to those found in the 1998 USFWS Preacquisition Survey and the 1999 DOE follow-up study; and
- Examine the probability that DDE contamination at remediated waste sites is a result of application, rather than release. Past farming versus a waste site release.

3.0 Methods

3.1 Sample Locations

A 10 mile transect was established in September 1999 parallel to Highway 24 (Figure 1). Eighteen insect collection pit traps spaced approximately 1/2 mi. apart were established. Traps were placed a minimum of 300 feet from the highway. In some cases traps were placed on both sides of the road. At twelve of the sites soil samples were also collected. Figure 1 indicates the locations of the North Slope sample sites. All sample locations were mapped using a Global Positioning System (Table 1).

3.2 Sample Collection

3.2.1 Invertebrate Samples – Darkling beetles were collected based upon the fact that they are resident species, live within the soil column, and had been collected in the USFWS and DOE studies. Darkling beetles are preyed upon by passerine birds and some species of small mammals. Darkling beetles were collected in pit traps and by hand within the immediate environs of the sample areas. Darkling beetles were sampled on September 20, 24, and 28, 1999. Nitrile gloves were worn by field personnel during the collecting periods. Captured beetles were placed in labeled containers indicating the date and location of capture (trap number), then frozen. At least five grams of beetles were collected at each sample location where possible. At three of the sites composite samples were made to obtain the minimum of five grams.

Pit traps were installed by excavating a small hole and placing three 4.5 in diameter plastic containers in the hole, and contouring the surrounding soil to overlap the rim of the

container. Each trap was covered with a 7-9 in piece of pegboard that was elevated about 2 in above the ground surface and anchored with stick or nail. Each trap location was marked with a florescent pin flag.

3.2.2 Soil Samples - Surface soil was excavated to a depth of 2 cm and placed into a glass sample jar using a sterilized scoop. Nitrile gloves and new scoops were used for each sample to prevent cross-contamination.

3.3 Sample Handling and Custody Requirements

All sample handling, shipping, and custody requirements were performed in accordance with the following procedures found in BHI-EE-01:

- Procedure 3.1, "Sample Packaging and Shipping"
- Procedure 3.0, "Chain of Custody"
- Procedure 4.2, "Sample Storage and Shipping Facility."

Laboratory standard operating procedures (SOPs) and QA plans used included corporate analytical procedures and QA Plans from the laboratory. Laboratory SOPs are based on the SW-846, Chapters 1 through 4 (EPA 1996). Detection limits achievable by the laboratory will be dependent upon sample quantity available. The minimum size sample that can be analyzed is 1 gram. The target sample size for this study was 5 grams. Once collected, the samples were kept hard frozen and shipped to the laboratory in a frozen state. The laboratory was instructed to thoroughly mix the sample material before extracting aliquots for analysis. All samples were analyzed for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT using the sample method 8081_PESTPCB_GC. All samples were sent to RECRA Environmental Laboratory in Lionville, PA which was the same lab utilized by the DOE in their study.

When the data was returned, it was validated using the criteria defined in a level C validation. This process includes evaluating all available laboratory QC, hold times, detection limits, and completeness (WHC-SD-EN-SPP-001 Rev 1, Data Validation Process for Radiological Analysis, 1993; and WHC-SD-EN-SPP-002 Rev 1, Data Validation Process for Chemical Analysis, 1993).

3.3.1 Health and Safety

All field operations were performed in accordance with BHI health and safety requirements outlined in BHI-SH-01, Hanford ERC Environmental, Safety and Health Program. The Activity Hazard Analysis (AHA) that was used in the DOE study was also used in this project.

4.0 Results and Conclusions

Analytical results for beetle and soil samples are presented in Tables 2 and 3. DDT or its metabolites were not detected in any of the soil or invertebrate samples. If there is residual DDT on the North Slope as a result of historical spray applications it was not detected in this study. This data leads one to believe that the DDT residues on the North Slope are probably associated with previously identified waste sites. Most of the waste sites on the North Slope are a result of military activities in the 1940s and 1950s. At that time DDT and other herbicides like 2-4D were widely used throughout the Hanford environs.

The question of whether or not to further investigate DDT levels at some of the North Slope waste sites is still an open question. Most toxicological experts who have reviewed the data collected by the USFWS and DOE agree that there is not enough definitive data to determine the extent of any natural resource injuries. Part of the problem is the small number of samples collected and values that are relatively low. In both the USFWS and DOE studies there is not enough data to do a valid statistical analyses.

The USFWS and DOE studies were reviewed by two nationally recognized scientists (Thomas Custer and Larry Blus) who have experience with DDT uptake issues. Both of these scientists indicated that not enough is known about the effects of DDT on passerine populations in arid environments to make any conclusive statements. Both scientists recommended more intense studies utilizing starling or kestrel nest boxes to collect the kind of data needed to answer the questions regarding potential adverse affects to natural resources from DDT on the North Slope.

5.0 References

Linville, J.K., Gano, K.A. and S.G. Weiss 1999. Reassessment of Residual DDE on Three Remediated Hanford North (Wahluke) Slope Waste Sites and at the Horseshoe Landfill, Hanford, Washington. Bechtel Hanford Inc.

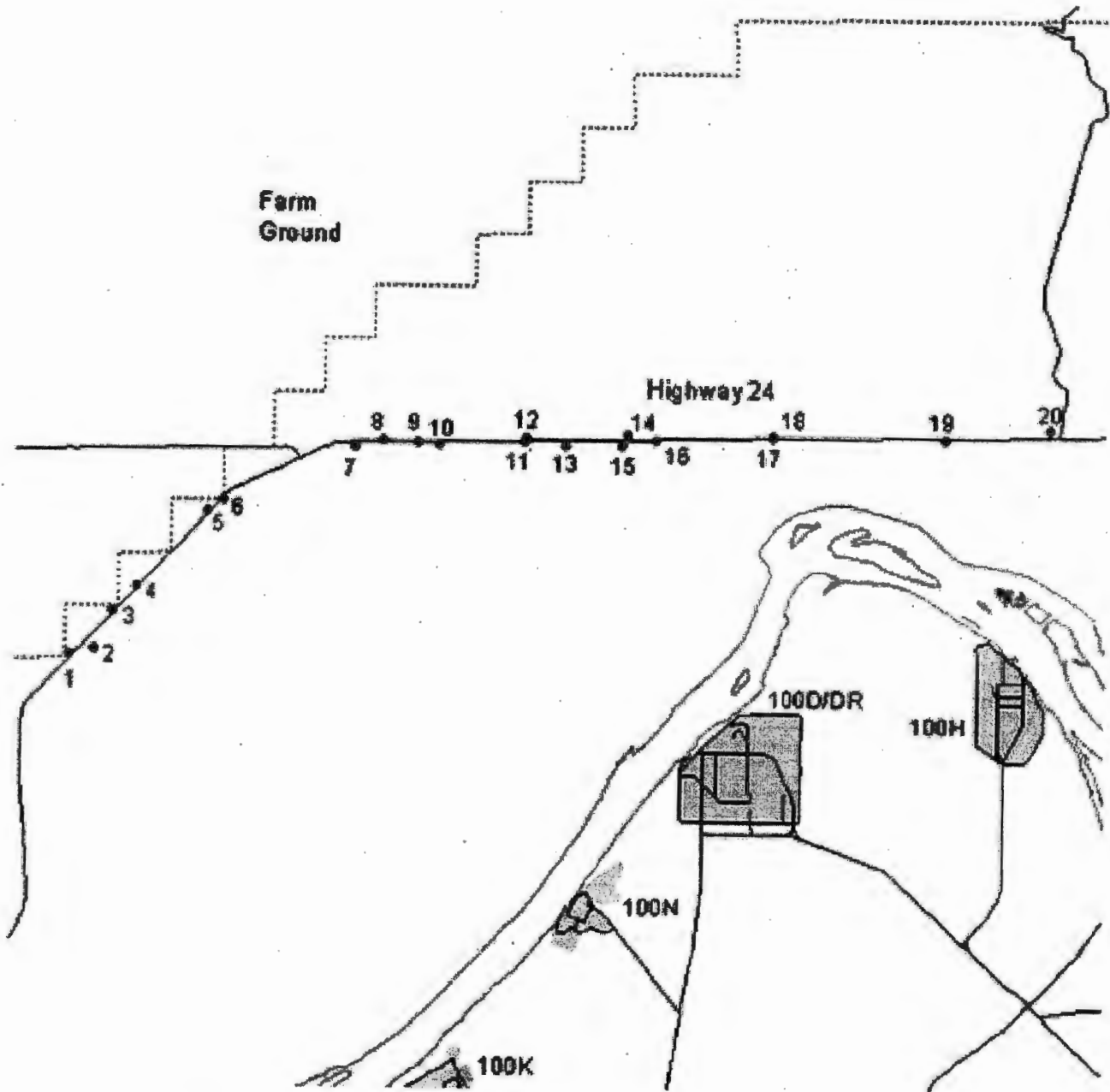
EPA, 1986. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, 3rd Edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Roy, R.R. 1998. *Report of the Preliminary Findings of the Level III Preacquisition Environmental Contaminants Survey for the Hanford North (Wahluke) Slope and the Arid Lands Ecology Reserve, Hanford Reservation, Washington*, U.S. Fish and Wildlife Service, Upper Columbia River Basin Field Office, Moses Lake, Washington.

WHC, 1993a, *Data Validation Process for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993b, *Data Validation Process for Radiochemical Analyses*, WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington

Figure 1. North Slope Sample Locations



- Sample Sites
- ~ Columbia River
- ~ Roads
- - - Hanford Site Boundary
- Reactor Areas

2 0 2 4 6 Kilometers

Table 1. North Slope Beetle and Soil Sample Locations

Trap Location	Latitude	Longitude	Soil Samples	Soil Sample #	Beetle Sample #
1	464231.3	1194020.3	S ₁	BOWH33	B0WD83
2	464233.3	1194002.6			B0WD84
3	464252.6	1193948.9	S ₃	BOWH34	B0WD85
4	464304.8	1193932.1			B0WD86
5	464342.0	1193840.4	S ₅	BOWH35	B0WD87
6	464346.8	1193829.3	S ₆	BOWH36	B0WD88
7	464413.4	1193652.2	S ₇	BOWH37	Compsite to #8
8	464416.8	1193631.7	S ₈	BOWH38	B0WD93
9	464415.5	1193604.5			Compsite to #8
10	464415.0	1193549.6	S ₁₀	BOWH39	B0WD95
11	464415.8	1193447.6			B0WD96
12	464417.9	1193447.4	S ₁₂	BOWH40	Compsite to #1
13	464414.3	1193417.7	S ₁₃	BOWH41	B0WD98
14	464418.6	1193332.9	S ₁₄	BOWH42	B0WD99
15	464414.0	1193336.8			B0WDB0
16	464416.3	1193311.2			B0WDB1
17	464416.9	1193145.8	S ₁₇	BOWH43	Empty
18	464418.3	1193145.7			B0WDB3
19	464416.0	1192940.5			B0WDB4
20	464420.5	1192824.5	S ₂₀	BOWH44	B0WDB5

Table 2. North Slope Beetle Results

Beetle ID #	Beetle DDE	Beetle DDD	Beetle DDT	Beetle DDD	Beetle DDT
B0WD83	38U*	38U	38U	38U	38U
B0WD84	32U	32U	32U	32U	32U
B0WD85	28U	28U	28U	28U	28U
B0WD86	26U	26U	26U	26U	26U
B0WD87	31U	31U	31U	31U	31U
B0WD88	34U	34U	34U	34U	34U
B0WD93	24U	24U	24U	24U	24U
B0WD95	32U	32U	32U	32U	32U
B0WD96	27U	27U	27U	27U	27U
B0WD98	36U	36U	36U	36U	36U
B0WD99	34U	34U	34U	34U	34U
B0WDB0	23U	23U	23U	23U	23U
B0WDB1	18U	18U	18U	18U	18U
B0WDB3	19U	19U	19U	19U	19U
B0WDB4	27U	27U	27U	27U	27U
B0WDB5	29U	29U	29U	29U	29U
B0WDC7	1.1U	1.1U	1.1U	1.1U	1.1U
B0WDC8	1.0U	1.0U	1.0U	1.0U	1.0U

Table 3 North Slope Soil Results

SOIL ID #	SOIL DDT	SOIL DDT	SOIL DDE	SOIL DDD	SOIL DDT
BOWH35	3.3U*	3.3U	3.3U	3.3U	3.3U
BOWH36	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH37	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH38	3.9U	3.9U	3.9U	3.9U	3.9U
BOWH39	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH40	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH41	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH42	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH43	3.3U	3.3U	3.3U	3.3U	3.3U
BOWH44	3.3U	3.3U	3.3U	3.3U	3.3U

* U indicates that the compound was analyzed but not detected
The minimum detection limit is reported with the U

Description of Work for: Reassessment of Residual DDE on 3 Remediated Hanford North Slope Waste Sites and the Horseshoe Landfill

1.0 INTRODUCTION

From the discovery of its insecticidal properties in 1939 to its ban in the United States in 1972, DDT was widely used for the control of insects in many agricultural communities. Once liberally applied, DDT and its metabolites have persisted in soils and the food chain long after use was discontinued. Known to impair reproductive success in avian species such as the Peregrine Falcon and the Brown Pelican, persistence of DDT is of concern as a risk to wildlife. It is still in use in Mexico, South America, and many tropical nations where migratory birds can be exposed to it.

In 1998, the U.S. Fish and Wildlife Service (USFWS) conducted a Level III Preacquisition Environmental Contaminants Survey on the Hanford North Slope (North Slope) and the Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE) (Roy, 1998). Their survey detected low levels of DDE (a metabolite of DDT) in darkling beetles and other biota at several of the sites. As a follow-up investigation, the U.S. Department of Energy will examine the extent and distribution of residual DDT/DDE on the 4 sites with the highest concentrations in beetle tissues. These sites are PSN-90, PSN-01, and H-06-LE on the Hanford North Slope (North Slope) and at the Horseshoe Landfill on ALE. A control site will also be sampled on ALE.

Passerine birds common to the Hanford Site that are most likely to be impacted by residual contamination in the study areas are the Western Meadowlark (*Sturnella neglecta*), the Horned Lark (*Eremophila alpestris*), and the Sage Sparrow (*Amphispiza belli*). Observation of resident birds at each sampling site will be performed to determine the number of species and nesting pairs. Insects will be collected in pit traps, and one egg from each meadowlark and/or horned lark nest encountered (if any) during the sampling process will be collected for analysis.

2.0 OBJECTIVES

The following are the objectives of this study

- Determine the extent and distribution of residual DDE across the 4 waste sites by sampling ground-dwelling insects and bird eggs;
- evaluate the use of insects for monitoring contamination pathways; and
- Determine the species of Passerine birds present and the number of pairs present.

3.0 SAMPLE LOCATIONS

Three sites on the North Slope and two sites (including one control) on the Arid Lands Ecology Reserve will be sampled (see figure 1). The following is a brief description of each site:

1. **PSN-01 (North Slope)** - The PSN-01 site was formerly an anti-aircraft gun site used by the United States Army. The remediated area was approximately 0.25 acres which will be sampled and characterized in this study.
2. **PSN-90 (North Slope)** - The PSN-90 site was formerly an anti-aircraft gun site. Approximately 3 acres have been previously remediated, and will be sampled and characterized in this study.

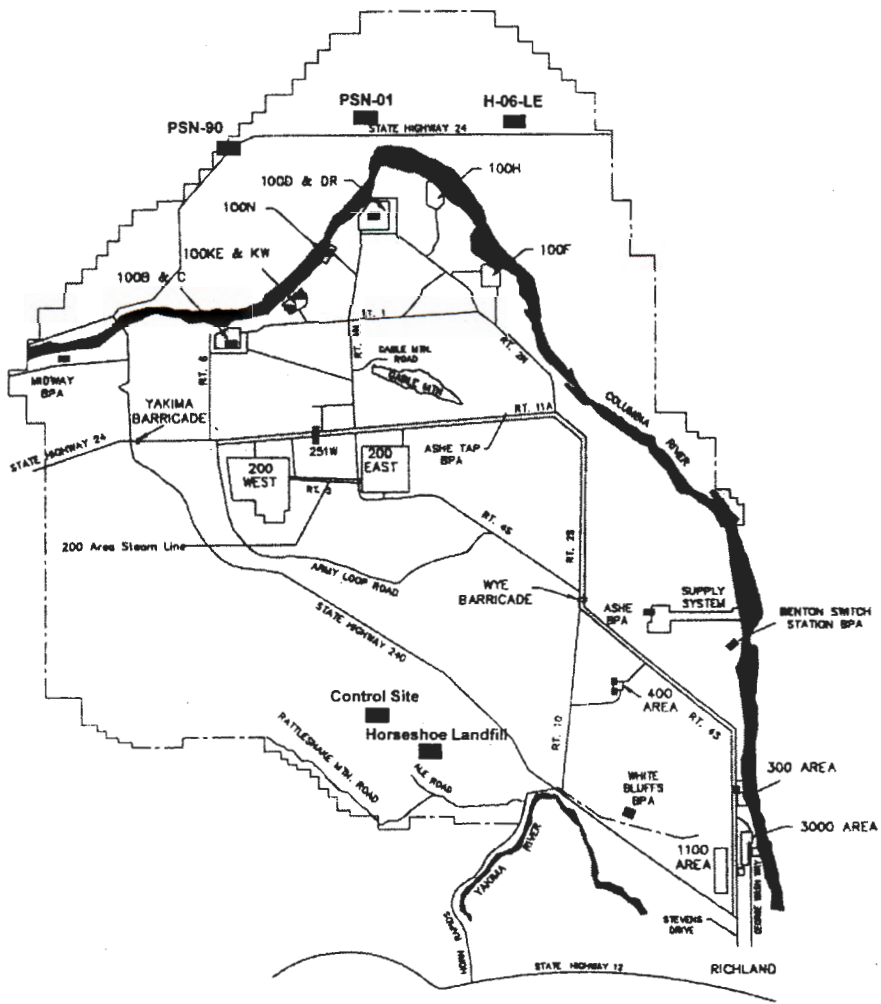


Figure 1. Map of the Hanford Site showing the five sampling locations

3. **H-06-LE (North Slope)** - H-06-LE was formerly a disposal site of the United States Army on the North Slope. Approximately 6 acres have been previously remediated, and will be sampled and characterized in this study.
4. **Horseshoe Landfill (ALE)** - The Horseshoe Landfill resides on the Arid Lands Ecology Reserve (ALE), and was a known landfill of the nearby Nike Missile Site. Horseshoe Landfill spans approximately 7 acres that will be sampled and characterized in this study.
5. **Control Site (ALE)** - The control site for this study will be located on ALE, west of the Headquarters Buildings in habitat similar to that of the Horseshoe Landfill. This area has not been disturbed during Cold War Hanford activities.

4.0 SAMPLE COLLECTION METHODS

Field Observation - Field observation will be conducted at each sampling location. The number and species of Passerine birds and the approximate area and location of a breeding territory will be established if possible. The number of singing males will be used to indicate the number of breeding pairs. If available, the number and location of active nests in the study area will also be recorded along with the dominant vegetative cover type.

Invertebrate Samples - Ground-dwelling invertebrates will be sampled at each study location. The anticipated number of samples will be 15-20 on the Horseshoe Landfill, 15 on the Control, 15 on H-06-LE, 3-6 on PSN-90, and 1-3 on PSN-01. Pit traps will be arranged in linear transects forming a grid. Pit traps will be emptied twice weekly or as necessary until sufficient mass is collected for laboratory sample analysis. Nitrile gloves will be worn when collecting insects to prevent cross-contamination between plots. Additional insects may be collected by hand by searching the areas between grid points. Insects found in this manner will be combined with those of the nearest grid point. Captures will be placed in labeled containers indicating the date and location of capture (trap number), then frozen.

Avian Egg Samples - If active ground nests are encountered in the study area, one egg from each nest will be collected for residual DDT/DDE analysis by the Laboratory. Samples may be combined (by site) to meet sample analysis minimum weight requirements.

Control Samples - The control site will be located in an undisturbed area on ALE. Samples from the control site will be collected with the same procedures aforementioned.

Field Notes

- A controlled logbook will be used to record daily activities.
- The waste sites and control site will be located on a map using a Global Positioning System.
- Hand sketches will be made for waste sites, including nest locations and trap locations

Sample Handling and Custody Requirements

All sample handling, shipping, and custody requirements will be performed in accordance with the following procedures found in BHI-EE-01:

- Procedure 3.1, "Sample Packaging and Shipping"
- Procedure 3.0, "Chain of Custody"
- Procedure 4.2, "Sample Storage and Shipping Facility."

Laboratory standard operating procedures (SOPs) and QA plans to be used include corporate analytical procedures and QA Plans from the laboratory. Laboratory SOPs are based on the SW-846, Chapters 1 through 4 (EPA 1996). Detection limits achievable by the laboratory will be dependent upon sample

quantity available. The minimum size sample that can be analyzed is 1 gram. The target sample size for this study will be 5 grams. Once collected, the samples will be kept hard frozen and shipped to the laboratory in a frozen state. The laboratory will be instructed to thoroughly mix the sample material before extracting aliquots for analysis. All samples will be analyzed for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT using the sample method 8081_PESTPCB_GC.

When the data is returned, it will be validated by reviewing it using the criteria defined in a level C validation. This process includes evaluating all available laboratory QC, hold times, detection limits, and completeness (WHC-SD-EN-SPP-001 Rev 1, Data Validation Process for Radiological Analysis, 1993; and WHC-SD-EN-SPP-002 Rev 1, Data Validation Process for Chemical Analysis, 1993).

Health and Safety

All field operations will be performed in accordance with BHI health and safety requirements outlined in BHI-SH-01, Hanford ERC Environmental, Safety and Health Program. An Activity Hazard Analysis (AHA) will also be prepared for this project.