

START

DOCT 26 1993

Station # 12

ENGINEERING DATA TRANSMITTAL

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Environmental Restoration	4. Related EDT No.: NA
5. Proj./Prog./Dept./Div.: ER	6. Cog. Engr.: S. G. Weiss	7. Purchase Order No.: NA
8. Originator Remarks: Release to distribution		9. Equip./Component No.: NA
		10. System/Bldg./Facility: NA
11. Receiver Remarks:		12. Major Assm. Dwg. No.: NA
		13. Permit/Permit Application No.: NA
		14. Required Response Date: October 30, 1993

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-EN-AP-127		0	Description of Work for 200 Areas Ecological Sampling	3Q	1,2	1	

16. KEY					
Impact Level (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
1, 2, 3, or 4 (see MRP 5.43)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)											
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	(H)
1,2	1	Cog. Eng. S. G. Weiss	<i>S. G. Weiss</i>	10/21/93	H6-02	Central Files (2)			L8-04	3	
1,2	1	Cog. Mgr. R. A. Carlson	<i>R. A. Carlson</i>	10/20/93	H6-03	EPIC (2) (1)			H6-08	3	
		QA *see signature below				ERC			H6-07	3	
		Safety				IRA (2)			H4-17	3	
		Env.									
1,2	1	R. M. Mitchell	<i>R. M. Mitchell</i>	10/25/93	H6-04						
1	1	*R. L. Hand (QA)	<i>R. L. Hand</i>	10/22/93	H4-16						

18. S. G. Weiss <i>S. G. Weiss</i> 10/21/93 Signature of EDT Originator Date	19. _____ Authorized Representative Date for Receiving Organization	20. <i>M. J. Lauterbach</i> M. J. Lauterbach 10/25/93 Cognizant/Project Engineer's Manager Date	21. DOE APPROVAL (if required) Ltr. No. _____ <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
--	--	---	--

BD-7400-172-2 (07/91) GEF097



BD-7400-172-1 (07/91)

0510 602478

lab

Date Received: 3/26/93 **INFORMATION RELEASE REQUEST** Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose <input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape		<input type="checkbox"/> Reference <input type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input checked="" type="checkbox"/> Other		ID Number (include revision, volume, etc.) <u>WHC-SD-EN-AP-127, Rev. 0</u>
List attachments.				
None				
Date Release Required				
3/30/93				

Title Description of Work for 200 Areas Ecological Sampling Unclassified Category UC- Impact Level 3Q

New or novel (patentable) subject matter? No Yes
 If "Yes", has disclosure been submitted by WHC or other company?
 No Yes (Disclosure No(s))

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
 No Yes (Identify)

Copyrights? No Yes
 If "Yes", has written permission been granted?
 No Yes (Attach Permission)

Trademarks?
 No Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting NA Group or Society Sponsoring

Date(s) of Conference or Meeting City/State Will proceedings be published? Yes No
 Will material be handed out? Yes No

Title of Journal

CHECKLIST FOR SIGNATORIES

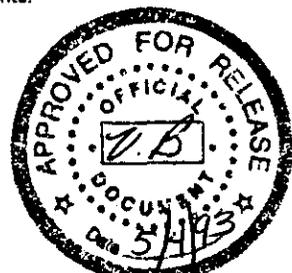
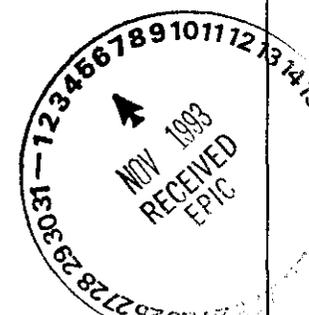
Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature	Indicates Approval	Name (printed)	Signature	Date
Classification/Uncontrolled	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Nuclear Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Legal - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Applied Technology/Export Controlled Information or International Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
WHC Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Communications	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
RL Program/Project	<input type="checkbox"/>	<input type="checkbox"/>					
Publication Services	<input checked="" type="checkbox"/>	<input type="checkbox"/>			<u>L.A. Brown</u>	<u>[Signature]</u>	<u>5/3/93</u>
Other Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>					

Information conforms to all applicable requirements. The above information is certified to be correct.

References Available to Intended Audience	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Transmit to DOE-HQ/Office of Scientific and Technical Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Author/Requestor (Printed/Signature)	Date	
<u>R. M. Mitchell</u> <u>[Signature]</u>	<u>3/25/93</u>	
<u>S. Weiss</u> <u>[Signature]</u>	<u>3-25-93</u>	
Intended Audience		
<input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External		
Responsible Manager (Printed/Signature)	Date	
<u>R. P. Hencke</u> <u>[Signature]</u>	<u>3-25-93</u>	

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

Date Cancelled _____ Date Disapproved _____

1510*6016*66

SUPPORTING DOCUMENT

1. Total Pages 16

<p>2. Title Description of Work for 200 Areas Ecological Sampling</p>	<p>3. Number WHC-SD-EN-AP-127</p>	<p>4. Rev No. 0</p>
<p>5. Key Words Ecological, Sampling, 200 Areas, Waste Sites</p> <p style="text-align: center;">APPROVED FOR PUBLIC RELEASE <i>V. Burkland 5/4/93</i></p>	<p>6. Author Name: R. M. Mitchell S. G. Weiss <i>R.M. Mitchell</i> <i>S.G. Weiss</i> Signature Organization/Charge Code 81320 PLB3A</p>	
<p>7. Abstract Ecological sampling of 200 area waste sites to get bioconcentration data is proposed</p>		
<p>8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.</p> <p>PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.</p> <p>DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>	<p>10. RELEASE STAMP</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>OFFICIAL RELEASE BY WHC 11</p> <p>DATE OCT 26 1993</p> <p><i>Station # 12</i></p> </div>	
<p>9. Impact Level III Q</p>		

451009.0152

CONTENTS

1.0 SCOPE OF WORK 1

2.0 GENERAL REQUIREMENTS 1

3.0 SAMPLING 1

 3.1 DATA QUALITY OBJECTIVES 1

 3.2 PROPOSED ECOLOGICAL ENDPOINTS 3

 3.2.1 Assessment Endpoints 4

 3.2.2 Measurement Endpoints 4

 3.3 SAMPLING AND FIELD ACTIVITIES 6

 3.3.1 Sample Site Selection 6

 3.3.2 Sample Media 8

4.0 HEIS SAMPLE LABELING 11

5.0 ANALYSES 11

6.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS 11

7.0 SCHEDULE 13

8.0 CHANGES TO DESCRIPTION OF WORK 13

9.0 REFERENCES 13

FIGURES:

1. 200 East Area Map Showing Sample Locations 9

2. 200 West Area Map Showing Sample Locations 10

TABLES:

1. Sampling Summary 7

2. Summary of Waste Sites Selected for Ecological Investigation 8

3. Sample Collection Data 12

9313089.0153

1.0 SCOPE OF WORK

This description of work (DOW) details the sampling that will be conducted during the spring and summer of 1993 at the 200 Aggregate Areas. The sampling is part of the Limited Field Investigations for the Qualitative Risk Assessments (QRAs) to be conducted in the 200 Areas, in support of decisions on possible Interim Remedial Measures. This DOW covers FY 1993 planned field activities: vegetation, insect, soil, and small mammal sampling at analog waste sites (terrestrial and riparian) at the 200 Areas to aid in the quantification of contaminant pathways.

2.0 GENERAL REQUIREMENTS

All personnel performing work according to this description will comply with the following:

- WHC-EP-0383, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan* (WHC 1990)
- WHC-CM-4-10, *Radiation Protection* (WHC 1988d)
- WHC-CM-4-11, *ALARA Protection Manual* (WHC 1988c)
- WHC-CM-4-3, *Industrial Safety Manual*, Vols. 1-3 (WHC 1987)
- WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1988e)
- WHC-CM-7-7, *Environmental Investigations and Site Characterizations Manual* (WHC 1988a)
- Site-specific job safety analysis.

The field activities will conform to the requirements of a site-specific safety assessment to be completed prior to the initiation of activities. The requirements of this safety assessment may affect specific sampling protocol. Any major changes resulting from this assessment will be documented with a 200 Areas Ecological Sampling Project Change Form.

3.0 SAMPLING

3.1 DATA QUALITY OBJECTIVES

This plan relies on the Data Quality Objectives (DQO) work that has already been completed for the 200 Aggregate Area Management Study (see Chapter 8 in DOE-RL 1992a). Additional specific DQO information for the ecological characterization, and DOW, follows. Much of this information is provided for background to explain the rationale for the sampling.

933009.0154

EPA (1989a) lists the expected output of an ecological characterization to be a basic inventory of the site's biota, an estimate of the current level of ecological effects based on the endpoints, an estimate of the magnitude of the toxic effects, and an estimate of the degree these effects are from contaminants and not habitat destruction.

EPA (1989b) enlarges on these expected outputs with several potential objectives for an environmental characterization:

- (1) Determine the actual or potential threat of damage to the environment
- (2) Define the extent of contamination
- (3) Determine the actual or potential effects of contaminants on protected species, habitats, or special environments
- (4) Document actual or potential adverse effects of contaminants
- (5) Develop remediation criteria
- (6) Evaluate the ecological effects of remedial alternatives, as part of a Feasibility Study.

EPA (1988) specifies that the characterization information should be used for an ecological risk assessment, which is to be conducted by the U.S. Department of Energy for the U.S. Environmental Protection Agency (EPA) and the Washington Department of Ecology (see DOE-RL 1992b).

Some of these objectives are not practical to accomplish at this time, or the work has already been done. For instance, because of the preliminary nature of remediation alternatives, the use of ecological information to develop remediation criteria and to evaluate the ecological effects of remedial alternatives in the 200 Areas is premature. Defining the extent of contamination is also of less concern in this environmental characterization, because more accurate information on the extent of the contamination is being gathered by operable unit limited field investigation characterization activities, such as well and borehole drilling and soil sampling. These data also will be used in the ecological QRAs. The QRAs will estimate the actual or potential effects of contaminants and will be used to guide interim actions and remedial actions.

Little if any information exists in the literature on bioconcentration factors of radionuclides and hazardous chemicals by vegetation and insects in arid regions. Most of the available uptake factors or transfer coefficients are for agricultural crops or high rainfall regions of the United States. The availability of Hanford Site-specific data will benefit both qualitative and quantitative ecological risk assessments by providing environmentally relevant exposure scenarios for the conceptual model and values for the transfer coefficient.

93-7089-0155

Thus, the primary objectives of the overall ecological characterization for the 200 Areas are as follows:

- (1) A summary of recent and applicable ecological research already accomplished on the Hanford Site, and especially the 200 Areas, related to past contamination levels, species lists, threatened and endangered species, potential endpoints, sensitive habitats, and potentially significant pathways
- (2) An estimate of the current level of ecological contamination to provide Hanford-specific transfer coefficients for the QRA conceptual model
- (3) An estimate of the habitat destruction from physical alteration, to separate these effects from those of contaminants
- (4) Support for interim actions (ecological QRAs will help identify needs for interim actions)
- (5) Support for ecological risk assessments.

This DOW covers only objective 2; Section 3.3 describes the locations and samples necessary to collect the sampling data. To determine the types of data to be collected, the assessment and measurement endpoints have been proposed. Section 3.2 covers the choice of these endpoints.

3.2 PROPOSED ECOLOGICAL ENDPOINTS

Available information on 200 Area ecology has been used to propose interim assessment and measurement endpoints, which are needed to direct this sampling effort. Final endpoints will be established through the formal ecological risk assessment process.

Types of endpoint information that might be gathered are species diversity, biomass, fecundity, behavior, age/size class structure, and the toxic effects from tissue concentrations (EPA 1989a). Because of the severe habitat alterations that have occurred from facility construction, many of these endpoints are not applicable. For instance, the construction of significant numbers of facilities, the loss of native vegetation to either bare cobble or cheatgrass stands, and the addition of several riparian areas will overwhelm many attempts to determine the effects of contamination. However, site screening, which has occurred for many years (e.g., through PNL's site-wide environmental surveillance and WHC's near-facility environmental monitoring programs), indicates that levels of contaminants in plant and animal tissues are sometimes measurable. These levels are generally low in the open environment (Woodruff et al. 1992) and unlikely to cause population-level effects. Regardless, there is potential that individuals of a species may get enough of a dose from these low levels to have a chronic toxic effect.

93109 1156

3.2.1 Assessment Endpoints

Assessment endpoints should have ecological relevance (reflect important characteristics of the ecosystem and be functionally related to other endpoints), be reflective of societal values and policy goals, and be sensitive to the type of effects caused by the contaminant (EPA 1992). The assessment endpoints proposed for use are as follows:

- (1) The health of riparian vegetation, because of its high ecological value in a desert environment, which makes it important in contaminant pathways. It should be recognized that riparian vegetation in the 200 Areas (except for some of West Lake) is an artifact of waste management processes. Upon cessation of the fluid releases, the riparian growth will revert to dryland vegetation
- (2) The health and contamination levels of small mammal populations (e.g., all species of mice), because of their abundance, past history of contamination, and importance to predators as prey and pathway
- (3) The health of a game species population (e.g., mule deer), because of its societal value for hunting and wildlife observation
- (4) The health of a common predator (e.g., raptors, the loggerhead shrike), because of its local abundance, position on the pathway as consumer of both mice and insects, and protected status (state and federal candidate species).

All assessment endpoints have significance to society and the particular biota have the ability to take in and retain contaminants in tissue.

3.2.2 Measurement Endpoints

Because assessment endpoints are not always easily measured directly with respect to the effects from contaminations (e.g., raptor or shrike populations), measurement endpoints can provide an indication of the effects. In some cases, e.g., assessment endpoints numbers 1, 2, and 3 above, the assessment endpoint is directly measurable. The measurement endpoints must be relevant to the assessment endpoints and practical (EPA 1992).

3.2.2.1 Riparian Vegetation Endpoint. The health of riparian vegetation can be inferred from contamination levels in tissue, related to known ecotoxicological effects. Recent growth of bulrush, cattails, and willows near ponds and ditches inside and outside of the fenced 200 Areas should be sampled to determine the uptake by riparian vegetation, important in the contaminant pathways for many wildlife species. The contamination levels in willows will also give an indication of potential waterfowl intake from aquatic vegetation, since in the 200 Areas, both riparian and aquatic vegetation rely to a large extent on the same water source.

3.2.2.2 Small Mammal Endpoint. Mice (Great Basin pocket mice, deer mice, house mice) can be found virtually all over the 200 Areas and consume cheatgrass seeds (a large portion of the biomass on disturbed areas such as

waste sites), other vegetation, and insects. They are also significant in a contaminant pathway to many raptors and predators, such as loggerhead shrikes, owls, and red-tailed hawks. A limited trapping program for small rodents near selected waste sites and riparian areas will give an indication of the average high body burdens in the 200 Areas. These levels in individual rodents, related to known ecotoxicological data, will give an indication of the health of the populations and the potential for contaminant migration to predators. Mice will be trapped most often, but other small mammals (e.g., Townsend ground squirrel) will also be analyzed if caught.

3.2.2.3 Terrestrial Vegetation, Soil, and Insect Endpoint. To help quantify the contaminant movement through the pathways from soil to predators, samples of deep-rooted vegetation, grasses (at terrestrial sites), soil, and insects will also be taken from the same locations as the small mammals. While the results will be only an approximation of contaminant transfer coefficients, they will provide a check of modeled data against actual levels.

3.2.2.4 Game Species Endpoint. Previous sampling (e.g., Woodruff et al. 1991) showed that Hanford Site deer can have measurable contamination. The measurement endpoint for the health of game species will be the contamination levels in deer tissue (muscle and bone) related to known ecotoxicological data. However, instead of collecting deer specifically for this project, the results of analysis on deer collected for the site-wide surveillance project will be used. In addition, PNL's site surveillance program has begun a study of contamination in and movements of feral rock doves. Samples to be collected include will feces and eggshells. Feral rock doves are in the same family as mourning doves, a more commonly hunted species, and likely represent the same trophic level. As with deer, no samples will be taken as part of this DOW, but rather data from the PNL study will be incorporated.

3.2.2.5 Predator Endpoint. Predators (loggerhead shrikes) and federal and state candidate classified species are not easily sampled because of legal and societal restrictions. Thus, some measurement endpoints for predators will be the prey base (e.g., insects, small rodents) as described above. Additionally, a concurrent PNL program surveying raptor pellets for gamma-emitting radionuclides will also be referenced to help verify if the lower trophic level results are indicative of raptor contamination consumption and thus potential retention.

3.2.2.6 Supporting Information. The sampling proposed in this DOW for the measurement endpoints will provide "real world" data to be used in qualitatively evaluating the results of modeled risk assessments.

Other tasks will also support the interpretation of measurement endpoints data and satisfy the identified data quality objectives (these tasks are not covered under this DOW, and their results will be reported separately):

- A summary of trends from past ecological monitoring
- A summary of the current knowledge of 200 Area ecology, species of concern and their habitat preferences and temporal occurrences, more detailed conceptual model and key pathways, and potential problems

9510-6807-56

- A delineation of sensitive habitats (as described in DOE-RL 1992b)
- A literature search on the ecotoxicology of contaminants of concern will greatly help in defining actual or potential affects.

3.3 SAMPLING AND FIELD ACTIVITIES

At each of the selected site sample locations, four to six vegetation samples will be collected. At riparian sites, vegetation known to uptake contaminants such as willows, cattails, or bulrushes will be selected for sampling. At those sites where terrestrial species are predominant, deep-rooted plants such as tumbleweed, rabbitbrush, or sagebrush will be collected. Since grasses and their seed heads are also consumed by granivorous rodents, grasses will also be collected on the terrestrial sites to investigate this potential pathway. In addition, at each site small mammals will be collected utilizing "Sherman" or snap-traps set out in transects along the site boundaries. Collected animals will be designated as to species, sex, weight, and age class. Finally, at each of the sampling sites, insects will be collected. Samples will be collected using a combination of methods including sweep nets, pit-can traps, and aspirators. An attempt will be made to collect 10 to 20 g of insects for each of two samples. In the event that the sample size collected is not adequate, the two samples proposed for each site may be composited into one sample.

In an effort to correlate the potential for pathway transfer of contaminants from waste sites to affected biota, surface soils (depth = 1 ft or less) will also be collected from each of the sampling sites.

Control samples for each of the media will be collected from offsite locations in the Vantage area or other upwind locations. Table 1 contains a summary of the proposed sampling effort.

3.3.1 Sample Site Selection

In order to meet the scope and purposes of the proposed FY 1993 ecological assessment of the 200 Areas, selection of appropriate sites for sampling was a primary focus. In order to provide the most useful information based on a limited field investigation, it was necessary that the sites selected for study meet the following criteria.

- They should have a ranking of 28 or higher on the Hazard Ranking System Scale (Stenner et al. 1988).
- They must be accessible and of reasonably large size to allow collection of the required sampling media.
- Human disturbance should be relatively low or infrequent at the site.
- Natural vegetation had to be rather abundant at the site, or proximal to it to provide food and shelter for the organisms to be sampled.

6910-6806156

Table 1. Sampling Summary

Sample Media	Number Sites	Number Samples	Total	Sample Type	Collection Method	Control Samples
Mammals	4	4	16	Small	Snap traps "Sherman" traps	2
Vegetation Riparian	2	4	8	Bulrush, willows, cattails	Clipping	2
Terrestrial	2	6	12	Grasses, sagebrush, rabbit- brush, tumbleweed	Clipping	2
Insects	4	2*	8*	All	Sweep nets, pit- can traps, aspirators	1
Soils	4	4	16	Surface	Trowel scoop	2

*Provided at least 20 g of material can be collected for each sample. If not, the material collected will be submitted as a single sample.

- The site should have a known or current history of surface or biological contamination.
- Being ranked on the Environmental Protection Contamination Control list (Huckfeldt 1991, Winship and Hughes 1992) was preferred, but not critical.

To initiate site selection the Hazard Ranking System report (Stenner et al. 1988) was reviewed to develop a list of candidate sites in the 200 Areas with rankings of 28 or higher. This preliminary list was then utilized in conjunction with site maps and experienced professionals to develop a second site list that met the above criteria. This effort identified a total of 10 candidate sites located in 200 East Area and another 18 potential sites in 200 West Area.

This screened list of candidate sites was then used as the basis for site visits and walk-throughs by individuals who were knowledgeable concerning contamination history, ecological systems, and environmental monitoring and surveillance of the 200 Areas. Personnel from the Biological Sciences Team, Environmental Protection, and Environmental Restoration Engineering comprised the site investigation team.

0910760116

The field screening effort resulted in the identification of four primary sites (Table 2) for ecological investigations representing two major habitat types (riparian and terrestrial) and four different facility types (pond, ditch, crib, and trench). The locations of these sample sites are provided in Figures 1 and 2. To alleviate any potential conflicts with proposed projects or other operational or remediation efforts which could affect sampling activities, alternative sites were selected (Table 2) that also scored high during the field screening effort. They will be utilized if efforts at the primary sites are restricted for any reason or meet with limited success.

Table 2. Summary of Waste Sites Selected for Ecological Investigations.

Area	Site Designation	Facility Type	Habitat Type	HRS Score	EP Score
200E	216-B-3	Pond	Riparian	"High"	-
200W	216-U-14	Ditch	Riparian	45.3	13
200E	216-B-12	Crib	Terrestrial	62.9	-
200W	216-U-11	Trench	Terrestrial	37.8	-

Alternate sites include: 216-A-24, 216-A-40, 216-S-4, 216-S-17, 216-S-21

3.3.2 Sample Media

3.3.2.1 Vegetation. Deep-rooted plants, grasses, and riparian vegetation will be collect in accordance with Environmental Investigation Instruction (EII) 5.3 "Biotic Surveying Sampling," Appendix C (WHC 1988a).

3.3.2.2 Small Animals. The collection and preservation of small mammal samples will be conducted following the guidance provided in EII 5.3, "Biotic Surveying and Sampling".

3.3.2.3 Insects. For insect samples the collection and preservation requirements will follow EII 5.3, "Biotic Surveying and Sampling".

3.3.2.4 Soils. Soil samples will be collected and preserved in accordance with the requirements outlined in EII 5.2, "Soil and Sediment Sampling."

9513089.0161

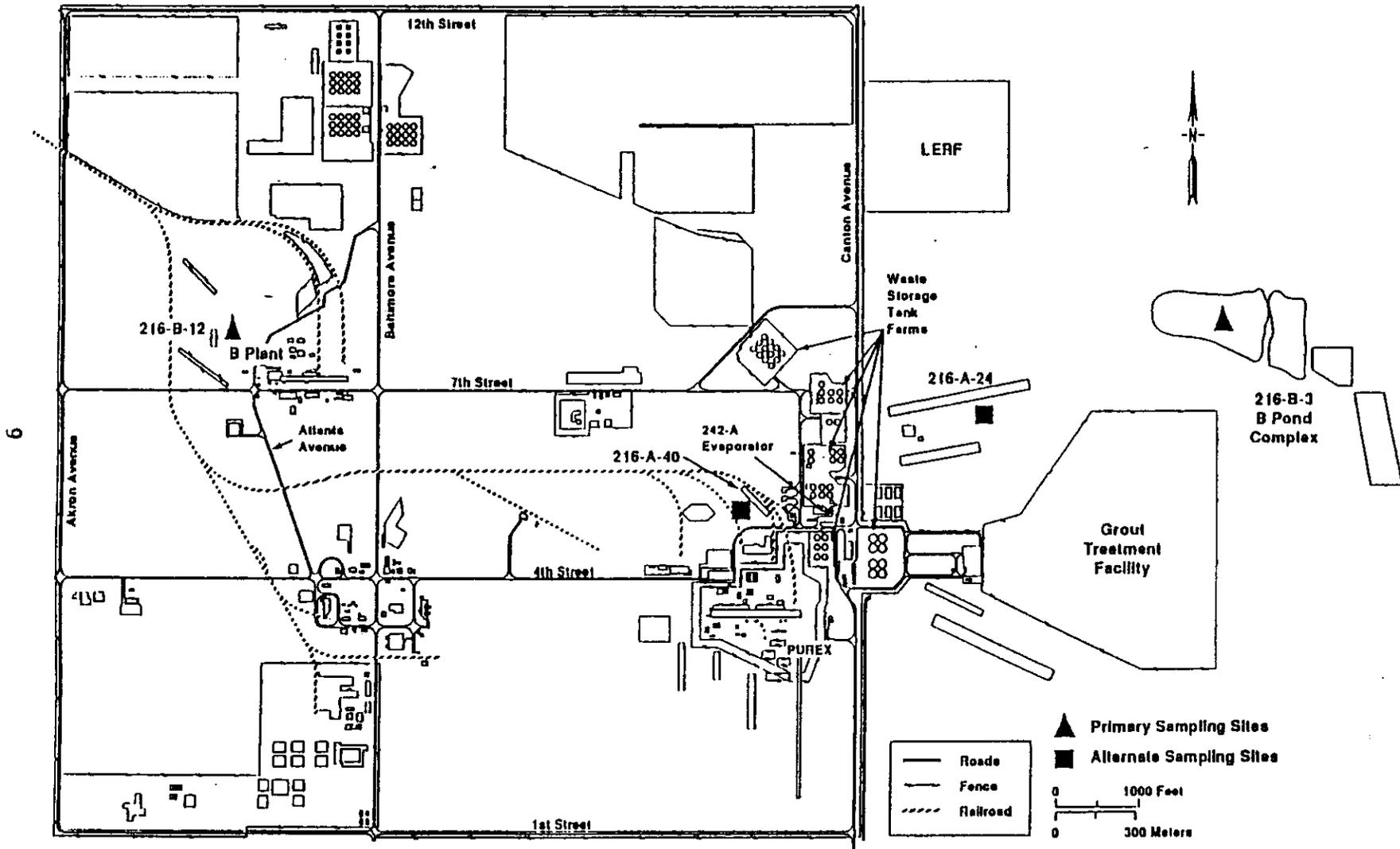
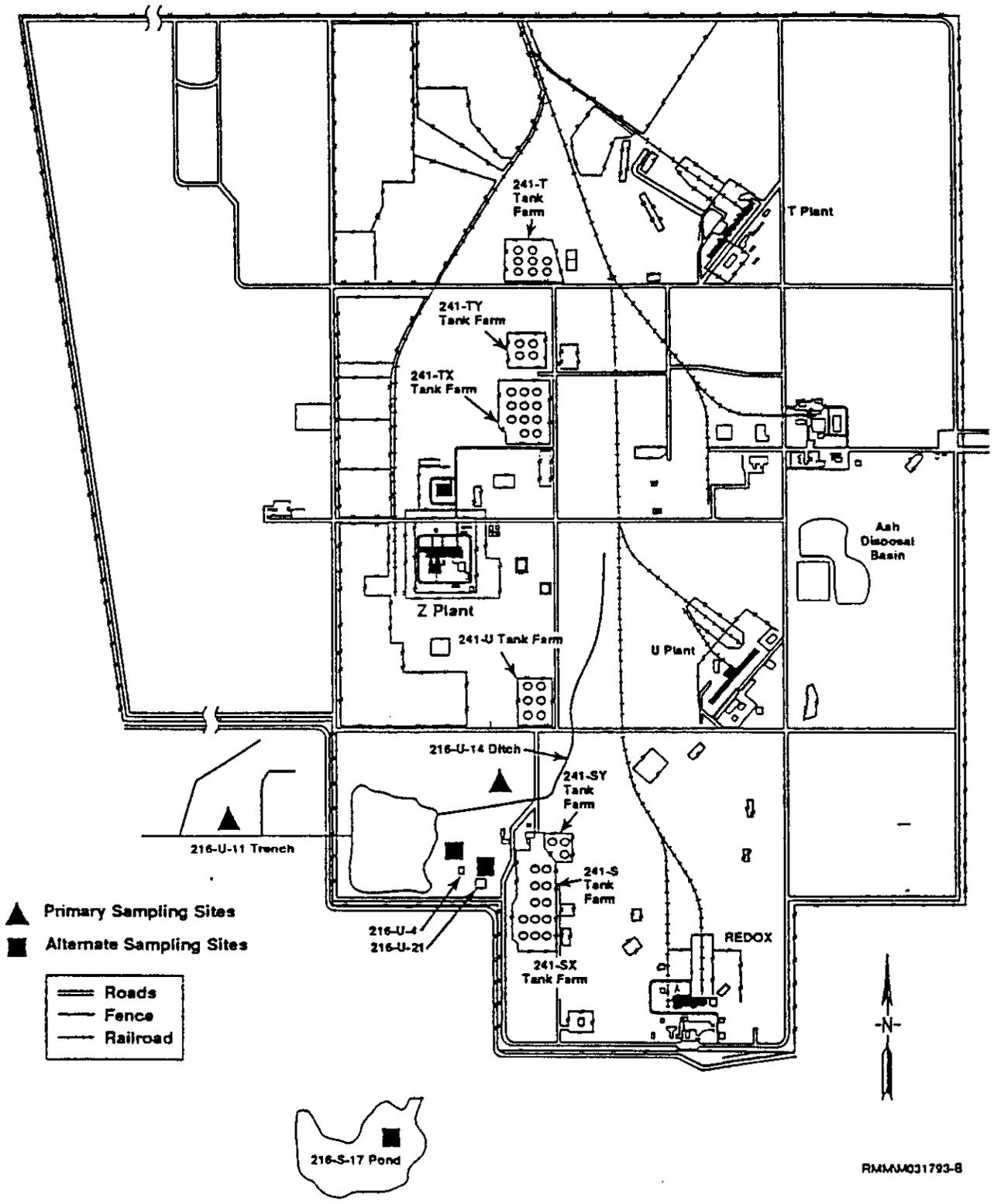


Figure 1. 200 East Area Map Showing Sample Locations.

MHC-SD-EN-AP-127, Rev. 0

Figure 2. 200 West Area Map Showing Sample Locations.



4.0 HEIS SAMPLE LABELING

The Hanford Environmental Information System (HEIS) is used to track the sample and laboratory data obtained during environmental investigations conducted as part of this description of work. Each sample will be identified and labeled with a unique HEIS sample number. The HEIS numbers will be assigned in the field according to EII 1.11, "Technical Data Management" (WHC 1988a). The sample location and corresponding HEIS numbers will be documented in the field logbook.

Methods, holding times, and estimated container requirements (actual quantity of material needed may vary depending on the laboratory doing the analyses) are shown in Table 3. Sample custody will be in accordance with EII 5.1, "Chain of Custody" (WHC 1988a).

5.0 ANALYSES

All samples will be analyzed for the CERCLA CLP target analyte list (TAL) metals, gamma spectroscopy, strontium-90, and uranium. Soil and vegetation will also be analyzed for technetium-99. This information is summarized in Table 3. These analytes have been identified in the past as the most significant contaminants in biota, and are the most ecologically relevant of the contaminants of concern identified in the 200 aggregate area management studies (e.g., DOE-RL 1992a).

6.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Field characterization and surveys will be performed as part of this work. To help ensure that data collected are of sufficient quality to support decisions, all work on the Hanford Site is subject to the requirements of DOE Order 5700.6C, *Quality Assurance* (DOE 1991), which establishes quality assurance (QA) program requirements. Quality assurance program requirements so defined apply to all types of projects conducted on the Hanford Site.

To ensure that the objectives of the past practice activities are met in a manner consistent with DOE Order 5700.6C, all work will be performed in compliance with the Quality Assurance Project Plans (e.g., Appendix A in DOE 1990), Westinghouse Hanford's existing QA manual, WHC-CM-4-2 (WHC 1988b) and with procedures outlined in the QA program plan, WHC-EP-0383 (WHC 1990), which is specific to CERCLA Remedial Investigation/Feasibility Study activities. This QA program plan describes the various plans, procedures, and instructions that will be used by Westinghouse Hanford to implement the requirements of DOE 5700.6C.

6910-600126
933009.0169

Table 3. Sample Analyses Summary.

Media	Analyte	Method	Holding time	Container/volume
Vegetation	TAL (including mercury)	CLP	6 Months	P 300 mL
	Gamma Spec. ⁹⁰ Sr Uranium, ⁹⁹ Tc	Lab SOP	28 Days 6 Months	P 300 mL
	Total Activity	N/A	6 Months	G or P, >1 mL
Insects	TAL (including mercury)	CLP	6 Months	P 300 mL
	Gamma Spec. ⁹⁰ Sr Uranium	Lab SOP	28 Days 6 Months	P 300 mL
	Total Activity	N/A	6 Months	G or P, >1 mL
Small mammals	TAL (including mercury)	CLP	6 Months	Will be submitted as whole organisms
	Gamma Spec. ⁹⁰ Sr Uranium	Lab SOP	28 Days 6 Months	
	Total Activity	N/A	6 Months	
Soil	TAL (including mercury)	CLP	6 Months	P 300 mL
	Gamma Spec. ⁹⁰ Sr Uranium, ⁹⁹ Tc	Lab SOP	28 Days 6 Months	P 300 mL
	Total Activity	N/A	6 Months	G or P, >1 mL

CLP = Contract Laboratory Procedure.
 G = Glass.
 P = Plastic.
 SOP = Standard Operating Procedures.
 TAL = Target Analyte List.

A field duplicate will be collected for each of the media, including insects, provided enough material can be collected. Control samples will be collected for each of the sampling media as indicated in Table 1. Volatile organic analysis trip blanks are not required because volatile organic analysis samples are not being collected. Split samples, equipment blanks, and field blanks are not being collected due to the nature of the sample media.

9312089.0165

7.0 SCHEDULE

Sampling for the multiplicity of media identified will require a coordination of the efforts in the summer seasons (June - August) depending on growth patterns of vegetation, animal activity, and abundance of insects. If field conditions permit, it would be preferable to sample all the required media at each site over a two to three day period. That synchronization of effort will be the goal of the sample scheduling for this project. However, if environmental conditions are not favorable, sampling may take place over several days. The requirements to collect deep-rooted vegetation and 10 to 20 g of insects may require sampling be extended into the later portions of the summer season. Under any existing conditions all samples will be collected and submitted for analysis no later than September 24, 1993. A final report describing the results of this sampling will be prepared approximately 7 months after the completion of sampling.

8.0 CHANGES TO DESCRIPTION OF WORK

Major changes to this DOW will be submitted on a Project Change Form. The change will require at least the verbal approval of the Field Team Leader and the project coordinator. The change will be filed as an Engineering Change Notice, and a copy will be kept with the project file. Copies will be submitted to the regulatory agencies and the appropriate field personnel within 10 working days of the change.

9.0 REFERENCES

- DOE, 1990, *Remedial Investigation/Feasibility Study Work Plan for the 100-BC-5 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL-90-08, Draft B, U.S. Department of Energy, Richland, Washington.
- DOE-RL, 1992a, Order 5700.6C, *Quality Assurance*, U.S. Department of Energy, Washington, D.C.
- DOE-RL, 1992b, *U Plant Source Aggregate Area Management Study Report*, DOE/RL 91052, U.S. Department of Energy, Richland, Washington
- DOE-RL, 1993, *Facility Investigation/Corrective Measures Study Work Plan for the 200-UP-2 Operable Unit*, DOE/RL-91-19, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA/540/G-89/004, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

- EPA, 1989a, *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference*, EPA/600/3-89/013, U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon.
- EPA, 1989b, *Risk Assessment Guidance for Superfund*, Volume II, "Environmental Evaluation Manual," EPA/540/1-89/001, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.
- EPA, 1992, *Framework for Ecological Risk Assessment*, EPA/630/R-92/001, Risk Assessment Forum, U.S. Environmental Protection Agency, Washington, D.C.
- Huckfeldt, C.R., 1991, *Quarterly Environmental Radiological Survey Summary - First Quarter 1991*, WHC-SD-0665-0, Westinghouse Hanford Company, Richland, Washington
- Stenner, R.D. et al., 1988, *Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford*, PNL-6456, Pacific Northwest Laboratory, Richland, Washington
- WHC, 1987, *Industrial Safety Manual*, Vols. 1-3, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988a, *Environmental Investigations and Site Characterizations Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988b, *Quality Assurance Manual*, WHC-CM-4-2, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988c, *ALARA Protection Manual*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988d, *Radiation Protection*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988e, *Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0383, Westinghouse Hanford Company, Richland, Washington.
- Winship, R. A. and M. C. Hughes, 1992, *Hanford Site Surface Soil Radioactive Contamination Control Plan for Fiscal Year 1993*, WHC-EP-0489-1, Westinghouse Hanford Company, Richland, Washington
- Woodruff, R. K., R. W. Hanf, M. G. Hefty, and R. E. Lundgren, 1991, *Hanford Site Environmental Report for Calendar Year 1990*, PNL-7930, Pacific Northwest Laboratory, Richland, Washington.
- Woodruff, R. K., R. W. Hanf, and R. E. Lundgren, 1992, *Hanford Site Environmental Report for Calendar Year 1991*, PNL-8148, Pacific Northwest Laboratory, Richland, Washington.

9313089.0167