START

# SUPPORTING DOCUMENT

0014685

1. Total Pages 14

| 2. Title | 3 Number | 4 Rev No |
|---|---|---|
| 316-5 Process Trenches: Expedited Response Action Sampling Plan | WHC-SD-EN-AP-055 | 0 |

5 Key Words

process trenches

sampling

expedited response action

6 Author

R. C. Roos
Name (Type or Print)

W J Johnson for RC Roos
Signature

81223/EN31A
Organization/Charge Code

7 Abstract

This document specifies the soil sampling to support the expedited response action (ERA) at the 316-5 process trenches. Before excavation begins for the ERA, soil will be sampled to 6-ft depths at four locations in one trench. Confirmation samples will be collected at a single location in the second trench. After excavation, surface samples will be collected to assist in evaluating the success of the ERA.



APPROVED FOR PUBLIC RELEASE J. Birkland 6/7/91

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.

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 This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon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 U.S. Department of Energy, Patent Attorney, Richland Operations Office, Richland, WA.



9 Impact Level

3

10 for R. P. Henckel /W. L. Johnson
Authorized Manager's Name (Type or Print)

W S Johnson W.S. Johnson
Authorized Manager's Signature

Specify Distribution Limit External

11 RELEASE STAMP

RELEASED
DISTRIBUTION LIMITS

☐ INTERNAL ONLY

☐ SPONSOR LIMITED

☒ 20 EXTERNAL

DATE: JUN 07 1991

Sta. 21

## CONTENTS



**TABLE:**

## 1.0 INTRODUCTION

The 316-5 process trenches have been selected as the site of an expedited response action (ERA). The proposed action will include excavation of sediments from the trenches to remove the accumulation of contaminants deposited from past discharges. Current and future discharges to the trenches are monitored and are within regulatory guidelines.

This sampling and analysis plan is a supplement to the *Expedited Response Action Proposal for 316-5 Process Trenches* (DOE 1991). This document concentrates on information relevant to sampling that is not contained in the proposal. Site background information and a site description are included in the ERA proposal.

## 2.0 SAMPLING OBJECTIVES

A letter prepared by the U.S. Environmental Protection Agency (EPA) to the U.S. Department of Energy-Richland Operations Office (DOE-RL) (Attachment A) specified that sampling will be conducted before and after excavation of the trenches. Sampling will be conducted in compliance with the regulatory request. Samples collected before excavation will yield information on current contamination in the trenches. This information may be useful in the designation of removed soil for eventual final disposal during remediation activities in operable units 300-FF-1 and 300-FF-5. Samples collected after excavation will assist in evaluation of the effectiveness of the response action and provide input for planning final closure of the facility as part of the 300 Area operable units.

## 3.0 ANALYSIS AND DATA

The 316-5 process trenches receive process effluent from laboratories and facilities throughout the 300 Area. The 300 Area operations are critical in supporting cleanup of the Hanford Site in compliance with the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989). The process trenches will be critical to operations in the 300 Area until an effluent treatment facility can be constructed. Successful accomplishment of the proposed ERA will allow continued discharge of clean liquid to the trenches until alternate facilities can be constructed. Sampling of the trenches will provide data for evaluation of the effectiveness of the ERA.

Field screening techniques for volatile organics and radiological constituents will be available during this sampling for health and safety assessment. The measured types, concentrations, and locations of contaminants will be important in assessing onsite health and safety requirements for worker protection.

Data from quantitative and semiquantitative field instruments will be correlated with laboratory derived data. Correlation will allow field instruments to be increasingly relied on during future activities at this and other facilities. Establishment of constituents of concern (i.e., parameters that are pervasive and present in relatively high concentrations) will be used to focus on analytes of concern in subsequent sampling and closure efforts at the facility, thus reducing the number of analytes required to assess contamination limits.

Data from field screening will be used to assist both sampling and the ERA in several ways, including the following:

- Determination of onsite health and safety requirements
- Development of correlations between qualitative onsite screening measurements and quantitative offsite laboratory analyses
- Establishment of indicator parameters to assist in defining closure excavation limits
- Assessment of the extent of remedial action (i.e., soil removal).

Samples will be analyzed for the Contract Laboratory Program (CLP) target compound list and the target analyte list for organic and inorganic constituents. Radiological contamination will be analyzed by gamma spectroscopic analysis, alpha spectroscopic analysis, $^{90}Sr$, and $^{99}Tc$ analysis (Table 1).

Samples will be screened onsite with portable instruments for radiological contamination and inorganic constituents. Additional screening for radiological constituents will be done before shipment of samples to an offsite laboratory. Laboratory instruments or semiportable field instruments will be used for this screening.

Table 1. Data Quality Objectives.

| Parameter | Standard or reference method | Target detection limit | Precision percent RPD[a] | Accuracy percent recovery |
|---|---|---|---|---|
| CLP Analysis | | | | |
| Target compound list | CLP[b] | b | b | b |
| Target analyte list | CLP[b] | b | b | b |
| Gamma Spectroscopic Analysis[c] (pCi/g) | | | | |
| Gamma energy analysis | d/e | 0.1 | ±30 | ±25 |
| Gross Beta Analysis | | | | |
| Gross beta analysis | f | 10 | ±30 | ±25 |
| Alpha Spectroscopic Analysis[c] (pCi/m) | | | | |
| $^{238}Pu$ | g | 0.1 | ±30 | ±25 |
| $^{239}Pu$ | g | 0.1 | ±30 | ±25 |
| $^{240}Pu$ | g | 0.1 | ±30 | ±25 |
| $^{235}U$ | g | 1 | ±30 | ±25 |
| $^{238}U$ | g | 1 | ±30 | ±25 |
| Total Uranium | g | 1 | ±30 | ±25 |
| Gross Alpha Analysis | | | | |
| Gross alpha analysis | f | 4 | ±30 | ±25 |
| Specific Radiological Analytes[c] (pCi/g) | | | | |
| $^{90}Sr$ | Sr-01 | 1 | ±30 | ±25 |
| $^{99}Tc$ | Tc-01 | 10 | ±30 | ±25 |

[a]RPD refers to relative percent difference.
[b]CLP methods, target detection limits, and minimum values for precision and accuracy shall be as specified in the statement of work (SOW) for CLP services (EPA 1988, 1989a).
[c]Analyses are from *EML Procedure Manual* (DOE 1982).
[d]Laboratory will report all measurable and identifiable nuclides.
[e]Procedure based on general gamma energy analysis technique (procedures covered in general section of DOE 1982 and EPA 1984).
[f]No nationally recognized procedure available. Procedures for these analyses will be evaluated and may result in modification of parameter list.
[g]Procedure based on general alpha energy analysis technique (procedures covered in general section of DOE 1982 and EPA 1989b).

# 4.0 CHEMICAL HAZARDS SUMMARY

The 316-5 process trenches previously were sampled and shown to contain moderately elevated levels of radionuclides and metals (Zimmerman and Kossick 1987). A hazardous waste operations permit will be prepared before work begins at the process trenches. Specific hazards and safety controls will be specified in that document. Specific radiological hazards and controls will be specified in a radiation work permit that will be prepared before work begins.

# 5.0 FIELD SAMPLING INFORMATION

## 5.1 SAMPLING PLAN

### 5.1.1 Phase I: Sampling of Trenches Before Excavation

**5.1.1.1 Sampling Location.** The 316-5 process trenches are approximately 458 m (1,500 ft) long, 10 m (30 ft) wide at the top, and 3 m (10 ft) wide at the bottom. Four locations will be sampled in the first trench and one location in the second trench. An EPA letter to DOE-RL (attachment A) has specified sampling (in feet) at three depths: 0 to 2 ft, 2 to 4 ft, and 4 to 6 ft. To meet these requirements, samples will be collected at each sampling location from the following intervals: 0 to 6 in., 33 to 39 in., and 66 to 72 in.

The two trenches receive effluent alternately; one trench is dry for a period (generally 2 to 6 weeks) while effluent is routed to the other. It is expected that the east trench will be dry when field work begins on sampling and the ERA. However, work will begin on whichever trench is dry at the time work is initiated. After sampling and excavation of the first trench, the effluent stream will be switched. Effluent will flow to the newly cleaned trench, and the remaining trench will dry in preparation for sampling and excavation.

Past sampling data (Zimmerman and Kossick 1987) suggest that most constituents decrease in concentration with increasing distance from the outfall point. Because of expected higher contamination levels near the outfall to the trenches, sampling will concentrate in this area. Samples will be collected at 0, 20, 100, and 400 m (0, 66, 330, and 1,320 ft) from the outfall in the first trench and the single sampling point will be at 0 m in the second trench. Samples will be collected from near the centerline of each trench.

Sample locations will be identified using standard measuring equipment such as distance-measuring wheel and steel or fiberglass tape. Distance will be measured from the north edge of the concrete weir box at the outfall of the trenches. Field conditions will dictate precise sampling locations. For instance, the initial sample designated in this plan as 0 m, will actually be somewhat north of the weir box to avoid damaging the concrete apron at the outfall. Precise locations will be recorded in the field logbook.

Sample depths will be estimated using measured dimensions of the backhoe bucket and arm (i.e., if bucket is 4 ft tall, the 33- to 39-in. sample would be collected by scooping a 6-in. lift of soil at approximately three-fourths the depth of the bucket). Measurements may be marked on the bucket using soapstone or other noncontaminating marker. If a more precise method of measuring sample depth is used, this will be identified in the field logbook.

**5.1.1.2 Background Samples.** As discussed in the *Expedited Response Action Proposal for 316-5 Process Trenches* (DOE 1991), background data will not be collected during this effort. Background data will be collected to support remedial investigation for the 300-FF-1 and 300-FF-5 operable units. The 316-5 process trenches are included within these operable units.

**5.1.1.3 Sample Collection.** Samples will be collected directly from the backhoe bucket. The bucket will be cleaned of visible dirt before sampling and between sample locations. A bucket of soil will be removed from the desired sampling interval and brought to the side of the trench for sampling. Samples will be collected from soil in the middle of the bucket away from the bucket sides.

Samples will be collected from the backhoe bucket using hand tools and standard soil sampling techniques identified in *Environmental Investigations and Site Characterization Manual*, WHC 1988a. At the direction of the field team leader, plastic or other covering may be placed beneath the bucket during sampling to prevent spilling of contaminated soil on the side of the trench.

### 5.1.2 Phase II: Sampling After Excavation

After excavation for the ERA, a single-surface sample will be collected at each location sampled before excavation. The same equipment and methods will be used as in Phase I. Sampling locations will be the same, unless excavation for the ERA is <6 ft below the original trench bottom. Sampling in Phase I will disturb soil to 6 ft depth. If ERA excavation were, for example, to a depth of 4 ft, then 2 ft of disturbed soil would remain at the original sampling locations. In such an instance, sampling locations in Phase II will be offset slightly from previous locations so that undisturbed soil is sampled.

A total of 16 samples is anticipated in the east trench, and four samples in the west trench. Generally, quality assurance (QA) samples comprise approximately 5% of the total samples. To meet this goal, one set of QA samples will be collected during work on the east trench, and one set will be collected during work on the west trench. At the field team leader's discretion, additional QA samples may be collected in response to specific field conditions. Samples to be collected for QA include the following:

- Duplicate samples--Two separate samples are taken from the same sampling point in the field and placed into separate containers to undergo separate analyses at the primary laboratory.
- Split samples--Sample splits are technically the same as duplicates, except that the two samples go to different laboratories.

- Trip blanks--Trip blanks are prepared to detect contamination of volatile organic samples during transport to the laboratory. Trip blanks for soil samples are prepared from clean silica sand, packaged as volatile organic analysis samples, and sent to the laboratory along with other samples. Trip blanks are prepared before entering the field, and are not opened in the field.

## 5.2 SAMPLING PLAN MODIFICATIONS

Under field conditions, the optimal aspects of preliminary sample design often are not achievable. Factors influencing these efforts can be equipment malfunction or breakdown, weather conditions, improper equipment, soil conditions, physical barriers to sampling equipment, and overly optimistic evaluation of capabilities. Because of unforeseen field conditions, modifications to the planned activity may be necessary as decided by the field team leader. When conditions are encountered that require modifications in the field, the steps below will be followed.

1. Where routine field decisions are made by the field team leader, necessary actions will be recorded in the field logbook along with circumstances requiring the action.

2. Where modifications require deviation from the *Environmental Investigations and Site Characterization Manual* (WHC 1988a), environmental investigation instruction (EII) 1.4, Deviation from Environmental Investigations Instructions, will be followed.

3. Circumstances may be encountered, or objectives changed such that the basic sampling plan is modified. The field team leader will submit the following information to the project file stating that deviation from the sampling plan is approved by Westinghouse Hanford Company (Westinghouse Hanford):

    - sampling plan title
    - section or subsection to be modified (chapter title, page number) (quote section as given in sampling plan)
    - modifications or deviations (quote modified, deleted, or added statement)
    - technical summary of change
    - impact of changes (cost, schedule)
    - approvals (field team leader, field coordinator, ERA coordinator, Level 4 manager.

These procedures will provide an accurate record of modifications and Westinghouse Hanford approval, while allowing sampling to proceed safely and maintaining efficient manpower and equipment usage.

## 5.3 PROTOCOL FOR SOIL AND SEDIMENT CHARACTERIZATION

Westinghouse Hanford and Environmental Engineering and Geotechnology (EE&G) procedures will be followed throughout the sampling effort. The EE&G procedures are listed as follows:

| Subject | Environmental Investigation Instruction (EII) WHC 1988a |
|---|---|
| Sampling procedures | 5.2, 5.3, 5.8, 5.9, 5.12, 5.13 |
| Sample handling | 5.2, 5.11 |
| Field documentation | 1.5, 5.1, 5.10 |
| Equipment decontamination | 5.4, 5.5 |
| Waste handling and disposal | 4.2, 5.14 |
| Site entry requirements | 1.1 |
| Deviation from procedures (EII's) | 1.4 |
| Personnel requirements | 1.1, 1.7, 3.1 |
| Health and safety requirements | 1.1, 1.7, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3 |

Additional procedures are contained in EII manual (WHC 1988a) that may be applicable to specific field situations. However, procedures listed here should cover the majority of work.

# 6.0 LABORATORY PROCEDURES AND INFORMATION

## 6.1 ANALYTICAL SERVICES

Two laboratories will be prepared to receive samples. A primary laboratory will receive the bulk of samples. A secondary laboratory will be prepared to receive QA samples (split samples) and routine samples in case the primary laboratory cannot accommodate the samples in their schedule. Each laboratory will be capable of receiving and analyzing samples that may contain radioactive constituents.

### 6.2 ANALYTICAL PROCEDURES APPROVAL

Analytical services for the Environmental Engineering Group are managed by Westinghouse Hanford's Office of Sample Management (OSM). Westinghouse Hanford SOW will initiate the analytical activity and will be prepared by OSM in compliance with specific procurement control procedures referenced in Westinghouse Hanford QA program plan for Comprehensive Environmental Response, Compensation, and Liability Act of 1980 remedial investigation/feasibility study activities and the Westinghouse Hanford *Quality Assurance Manual* (WHC 1988b).

Analytical services for hazardous waste constituents in environmental media and other laboratory work aspects are covered by procedures specific to the laboratory and by QA and quality control (QC) manuals. All applicable analytical procedures and associated internal laboratory QA/QC manuals shall be reviewed for acceptance by the Westinghouse Hanford OSM and QA before their application to this investigation.

All approved procedures will require the use of standard reporting techniques and units to the extent possible to facilitate the comparability of data sets in terms of precision and accuracy. All accepted analytical procedures and laboratory QA/QC plans shall be retained as permanent records by OSM, and shall be available for regulatory review on request at the direction of the technical lead.

### 6.3 LABORATORY RECEIPTS AND LOGGING OF SAMPLES

In the laboratory, a sample custodian will receive the samples. On receipt of samples, the custodian will inspect samples, document receipt, and notify Westinghouse Hanford in accordance with the SOW from Westinghouse Hanford OSM.

## 7.0 REPORTING

### 7.1 STATISTICAL TREATMENT OF DATA

All data collected will be analyzed and tabulated for evaluation using the methods described in the EPA (EPA 1986) and other guidance documents (Snedecor and Cochran 1980; EPA 1989b). Data for individual hazardous constituents will be summarized and will include the following information:

- Number of less-than-detection-limit values
- Total number of values
- Mean
- Median

- Standard deviation
- Coefficient of variation
- Minimum value
- Maximum value.

Sample results will be compared to regulatory standards to determine if samples are contaminated at levels above regulatory concern.

Actual precision and accuracy values for individual analytical methods will be highly matrix-dependent. A generic error, combining the bias and the standard deviation, shall be calculated and reported as required by the CLP procedure manual for the target compound list constituents, or the approved SOW for the analytical laboratory for non-CLP analyses. Additional matrix-spike data may be requested at the technical lead's option.

Goals for data representativeness are addressed qualitatively by the specified sampling locations and intervals within the sampling plan. Objectives for completeness for this investigation shall require that valid measurements be obtained for at least 80% of the total number of requested determinations. Representativeness and completeness of analytical data shall be assessed by the technical lead on completion of analysis. Approved analytical procedures shall require the use of standard reporting techniques and units wherever possible to facilitate the comparability of data sets in terms of their precision and accuracy.

## 7.2 DATA REDUCTION, VALIDATION, AND REPORTING

Analytical data from sampling activities will be used primarily to determine the presence and amounts of analytes of interest in the sampled locations. All CLP analytical data shall be validated as specified in the CLP SOW (EPA 1988). Data not analyzed and reported according to CLP protocol will be validated by the Westinghouse Hanford OSM, or an independent third party. The QC reports shall be submitted to the technical lead, and shall be retained as permanent project QA records in compliance with EII 1.6, Records Management (WHC 1988a). The reports shall compare actual analytical results with the objectives stated in Section 5. Laboratory QA/QC manuals used for this report will be available in the project files, and reviewed for acceptance by Westinghouse Hanford OSM. If the stated objectives for a particular parameter are not met, the situation shall be evaluated, and limitations or restrictions on the uses of such data shall be established. The QC report shall be routed to permanent project records in compliance with EII 1.6, Records Management (WHC 1988a).

## 8.0 REFERENCES

DOE, 1982, *EML Procedures Manual*, HASL-300, 25th Edition, Environmental Measurements Laboratory, U.S. Department of Energy, New York, New York.

DOE, 1991, *Expedited Response Action Proposal for 316-5 Process Trenches*, DOE/RL-91-11, U.S. Department of Energy-Richland Operations, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, Washington Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA, 1984, *Radiochemistry Procedures Manual*, EPA 520/5-84-006, Eastern Environmental Radiation Facility, Montgomery, Alabama.

EPA, 1988, *USEPA Contract Laboratory Program Statement of Work for Organic Analysis*, Sample Management Office, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989a, *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis*, Sample Management Office, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989b, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance*, 530-SW-89-026, U.S. Environmental Protection Agency, Washington, D.C.

Snedecor, G. W. and W. G. Cochran, 1980, *Statistical Methods*, 7th ed., University of Iowa Press, Ames, Iowa.

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.

Zimmerman, M. G., and C. D. Kossick, 1987, *300 Area Process Trench Sediment Analysis Report*, WHC-SP-0193, Westinghouse Hanford Company, Richland, Washington.

United States
Environmental Protection
Agency

Region 10
Hanford Project Office
712 Swift Boulevard, Suite 5
Richland WA 99352

EPA

May 7, 1991

Steven H. Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550, A6-95
Richland, Washington 99352

Re: 316-5 Process Trench - Expedited Response Action, Sampling and Cover Installation

Dear Mr. Wisness:

In response to discussions with Mr. George Henckel and Mr. Wayne Johnson, the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) are submitting clarification of requirements for two comments on the 316-5 Process Trench Expedited Response Action (ERA).

1. Sampling Plan: As part of the ERA, EPA and Ecology have requested sampling of the process trenches prior to and after excavation. It is our desire to have four sampling locations in the east trench and one confirmative sampling location near the outfall of the west trench. It is understood that the sampling intervals for each location are 0-2 feet, 2-4 feet, and 4-6 feet, and that each of the composite samples will be subject to CLP analysis, plus field screening to establish a correlation. EPA and Ecology will be involved in the preparation of the sampling and analysis plan.

2. Cover Installation: EPA and Ecology have requested that a less permeable layer be placed over the excavated material located in the north end of each trench and in the north lobe in order to reduce contaminant migration to the maximum extent practicable in this ERA. Through conversations with Mr. George Henckel, Mr. Richard Hibbard, and Ms. Pamela Innis (EPA), it was agreed that a temporary synthetic liner, with a thickness of 10 mil or greater, will be placed over the spoils pile as it reaches the desired grade. Gravel will then be placed on top of the liner to secure it in place. The purpose of the liner is to reduce, not eliminate, the infiltration of liquids through the excavated media. It will not be necessary to weld the seams. However, the liner edges will be overlapped a minimum of one (1) foot. Additionally, a Quality Assurance Project, or other procedural requirements will not be required for this cover system.

S.H. Wisness -2- May 7, 1991

We hope this letter resolves any outstanding issues on this ERA. If you have any questions, please contact Ms. Innis of my staff at (509) 376-4919.

Sincerely,

Paul T. Day
Hanford Project Manager

cc: Larry Goldstein/Rich Hibbard, Ecology
Dave Nylander, Ecology
Linda Powers, WHC
Bob Stewart, DOE