SURVEY OF
WESTINGHOUSE HANFORD COMPANY
RCRA GROUNDWATER WELL CONSTRUCTION AND MONITORING
AT THE LOW-LEVEL BURIAL GROUNDS, 300 AREA TRENCHES,
THE NON-RADIOACTIVE DANGEROUS WASTE LANDFILL

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Department of Energy - Richland Operations Office

SURVEY TEAM

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INTRODUCTION

The operation of hazardous waste treatment, storage, and disposal (TSD) facilities is regulated by the Resource Conservation and Recovery Act (RCRA) (P.L. 95-580). Regulations issued November 19, 1980 (40 CFR 260 through 265 as amended) include requirements for monitoring of groundwater to ensure that hazardous waste constituents are not released to the environment. These RCRA regulations are implemented in the state of Washington through the Washington Administrative Code (WAC) under the Dangerous Waste Regulations section (WAC 173-303).

The Department of Energy Richland Operations (DOE-RL) and its contractors are responsible for conducting hazardous waste TSD activities at Hanford in compliance with the existing regulations. Groundwater monitoring is a required part of these operations. Well construction and monitoring activities were surveyed by DOE-RL to characterize and evaluate RCRA groundwater programs at three Hanford facilities. This report documents the survey activities and summarizes the results.

PURPOSE AND OBJECTIVES

The purpose of this DOE-RL survey was to identify any problems or potential problems in pursuing environmental compliance and evaluate the status of compliance with regards to RCRA and WAC requirements for groundwater well construction and monitoring.

The specific objectives were to:

1. Identify and characterize problems related to compliance with groundwater monitoring requirements,

2. Assure DOE-RL program management that groundwater well construction and installation have been completed in compliance with RCRA and WAC requirements,

3. Determine if designated RCRA monitoring wells are properly located and equipped to satisfy 40 CFR 264 Subpart F and WAC 173-303 requirements,

4. Determine if adequate sampling and analysis plans and procedures have been implemented and are being followed,

5. Determine if required analyses have been properly carried out on samples from the monitoring/detection system,

6. Assure that record keeping and reporting procedures for RCRA groundwater monitoring are adequate, and

7. Assess management controls and quality programs for these RCRA groundwater monitoring activities.

This survey has provided DOE-RL and its contractors an opportunity to review jointly and to evaluate the RCRA groundwater monitoring program. It is hoped that followup activities will result in enhancing the ongoing RCRA groundwater monitoring program at Hanford.

STANDARDS AND SCOPE

This survey is based on requirements found in 40 CFR 264 Subpart F dealing with groundwater monitoring, WAC 173-303-645 Ground Water Protection, and WAC 173-160 Minimum Standards for Construction and Maintenance of Water Wells.

The survey focused on the evaluation of RCRA groundwater well construction and monitoring programs at three Hanford facilities:

Low Level Burial Grounds (LLBG)
300 Area Process trenches
Non-Radioactive Dangerous Waste Landfill (NRDWL)

Activity areas surveyed included: planning, design, construction, installation, sampling, analysis, data handling, reporting, management responsibilities, personnel qualifications and training, quality control and assurance, and record keeping.

SURVEY APPROACH AND METHODS

The survey approach involved (1) assessing the groundwater monitoring system design, well construction, and installation; (2) evaluating fielding sampling, analysis, data handling, and reporting; and (3) assuring that management controls are in place to ensure program compliance with RCRA requirements.

To accomplish the objectives, the survey team reviewed program plans and background documents; reviewed procedures, data, records, and reports; and conducted a field inspection. This survey report describes the survey activities and summarizes the results. The survey will be closed on the completion of followup activities including a written contractor response to DOE-RL survey results, DOE-RL evaluation of the response, and followup activities to close out the findings and observations.

SURVEY TEAM

The survey team included DOE-RL personnel and personnel from DOE-RL's General Support Services Contractor, Stone and Webster Engineering Corporation (SWEC).

The team included:

Survey Team Leader: R. J. Eastmond (SWEC/IT)

Three working teams:

Team 1: Management: (Management Controls, Personnel, Quality, Records)
Environmental Engineer - R. J. Eastmond (SWEC/IT)*
Program Engineer - J. J. Broderick (DOE-RL)
Program Engineer - M. J. Anthony (DOE-RL)

Team 2: Technical: (Plan, Design, Construction, Install.)
Environmental Scientist - P. F. X. Dunigan (DOE-RL)*
Program Engineer - K. L. Thomas (DOE-RL)
Hydrogeologist - P. A. Skiba (SWEC/IT)

Team 3: Technical: (Sampling, Analysis, Data, Reporting)
Environmental Engineer - R. G. Carnes (SWEC/IT)*
Environmental Engineer -M. Vargas (DOE-RL)
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SUMMARY

DOE-RL conducted a field visit of well construction and installation in the vicinity of the Low Level Burial Grounds on November 6, 1987. The intent of this visit was to familiarize the survey team with the program and to observe well construction and installation activities in the field.

A final survey checklist was prepared and provided the program contractors. A survey entry meeting was held on January 21, 1988. The survey was performed between January 26 and February 2, 1988. An exit briefing was conducted February 4, 1988. This survey report is provided to the contractors to document the survey and provide the basis for response and followup.

A written response must be submitted to DOE-RL within 30 days of receipt of this report. The contents of the response are stated in the section on followup actions and close out.

The overall well construction and monitoring effort at the three facilities is being managed and conducted in a manner which should result in compliance with RCRA requirements. The survey did identify some program areas needing improvement and for which corrective action is necessary. Corrective action will help ensure RCRA compliance in the groundwater monitoring activities at these three facilities.

FINDINGS, OBSERVATIONS, AND PRACTICES

The survey resulted in a number of findings and observations. Findings, as identified in this report, are based on noncompliance with either regulatory requirements or program procedures. Observations are based primarily on deviations from the EPA RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD). The survey team believes that, where deviations exist, adequate justification and documentation should be provided.

Also included in this report are a number of comments on practices observed or reviewed during the course of the survey and comments resulting from the survey. Such practices and comments are identified as (1) items which should be reviewed and modifications considered to enhance the monitoring program or (2) items considered noteworthy by the survey team.

A. Findings

1. Locks have not been installed on well caps at wells located at the three surveyed facilities. It was stated in interviews with the project personnel that locks have not been installed on the monitoring wells. This fact was observed in the field at the 300 Area process trenches during field observation.

   The requirement for locked well caps comes from WAC 173-303-400, and WAC 173-303-645 which state that wells shall be designed, constructed, and operated so as to prevent contamination. WAC 173-303-400 cross-references WAC 173-160 for guidance. WAC 173-160 states that capping shall be affixed by tack welds or equal seal to prevent unauthorized entrance. The EPA Technical Enforcement Guidance Document (TEGD) indicates that locking caps must be installed on monitoring system wells.

2. Chain-of-custody procedures were not always followed in completing chain-of-custody forms. Although spaces are provided on the chain-of-custody forms for sample handling personnel, some forms were observed to be incomplete with respect to field sampling personnel possession of the sample and the total time of possession. Field sampling personnel had not signed the chain-of-custody record.

   The TEGD indicates that the individual collecting the sample in the field must sign the chain-of-custody record. Furthermore, PNL Environmental Monitoring Procedures (PNL-MA-580) requires each person who handles the sample to sign the chain-of-custody form (Section 13.3). Documented procedures must be followed.

3. Site topographic maps at each of the LLBG and NRDWL facilities have a contour interval of 20 feet. The contour interval of the site map for the 300 Area trenches is 1 foot. The contour interval is not the same as the required interval.

   The WAC [173-303-806(4)(a)(xviii)] specifies a topographic site-map contour interval of 2 feet.

4. During the observed field sampling, the field vehicle was not parked downwind of the monitoring well creating the potential for contaminating sample with exhaust fumes.

   The Environmental Monitoring Procedures (PNL-MA-580 Section 13.2) identifies this concern under "Sampling Precautions".

B. Observations

1. Mineralogy for the LLBG and for the NRDWL area was not determined by analytical tests.

   Appendix A of the LLBG compliance plan specifies mineralogical tests on vadose zone samples. The compliance plan for the NRDWL does not specify mineralogical tests. The TEGD checklist calls for the description of the mineralogy as part of site characterization.

2. It was noted that a number of old wells, not built to RCRA standards, have been included in the monitoring program at the 300 Area process trenches.

   RCRA requirements [40 CFR 264.97(c); WAC 173-303-645(8)(c)] specify casing, screening, and sealing of the monitoring wells. In the case of the older wells, some of these conditions may be called into question. No documentation was identified that would support the "RCRA quality" of the data from these older wells. The inclusion of data from these wells in statistical computations for RCRA may call into question observations of groundwater quality in the monitored area.

3. Completed State Well Forms were not provided to the State for the RCRA monitoring wells at the NRDWL facility,

   WAC 173-160-050 requires a complete record of construction or alteration of water wells be provided to the state. The record should be made on the State Well Form.

4. Bumper guards have not been installed at the NRDWL network wells.

   NRDWL network design calls for the use of bumper guards to protect the well at the surface.

5. The pumping rate during the observed sampling was approximately 3000 ml/minute.

   This rate may be excessive for sampling volatile compounds. Such high pumping rates may result in the loss of volatile constituents and can cause fluctuation in pH and pH sensitive analytes. The TEGD Section 4.2.4 recommends a 100 ml/min sampling rate limit for sampling when volatile constituents may be present.

6. The sampling pump hose was purged but was not decontaminated prior to use on subsequent wells.

   All non-dedicated equipment used for sampling or well evacuation should be thoroughly cleaned before each use. Furthermore, care should be exercised to ensure that residual cleaning agents are not carried over to the sample. Samples should be taken at background (upgradient) wells first. (TEGD 4.2.4)

7. Sampling personnel did not complete the calibration of monitoring equipment at the beginning of each use.

   Monitoring equipment is calibrated each morning and checks are made at mid-day. Calibration should occur before sampling each well. (TEGD 4.2.5)

8. Sampling procedures are not adequate for sampling immiscible contaminants.

   The Environmental Monitoring Procedures (PNL-MA-580) do not include provision for sampling or detecting immiscible contaminants (i.e. "floaters" and "sinkers"). The sampling plan should allow for the detection and measurement of compounds (light and dense phases). (TEGD 4.2.2).

9. Field sampling records do not include:
   - Purpose of sampling
   - Parameters Requested
   - Sample I.D. Number
   - Total Depth of Well
   - Preservatives Used
   - Units of Measurement

   The EPA TEGD indicates the field record should include specific data elements (including above elements). It also calls for specific observations on weather conditions, equipment malfunctions, possible sample contamination, and other unusual events. (TEGD)

10. Not all sampling and field personnel have completed the 40-hour RCRA Hazardous Waste Training.

   Interviews indicated that some field personnel may not have completed the required RCRA training. However, training records were not examined by the survey team. 40 CFR 264.16 and WAC 173-303-330 specify personnel training requirements. According to responses provided during the interviews, a RCRA training program is in place at PNL and training of personnel is being conducted. All personnel who participate in the sampling and analytical work in this program must receive this RCRA training. Furthermore, the survey team understands that WHC has directed that well drilling personnel are required to have this RCRA training.

11. Use of disposable gloves: Clean gloves were not used by the sampling personnel before sampling each well to prevent cross-contamination between wells.

    Section 4.2.3 of the TEGD describes this precaution.

C. Practices

The following practices and comments are noted by the survey team. These items need to be reviewed and program modifications considered for possible enhancement of the RCRA groundwater monitoring program:

1. WHC verification of PNL support services:
   It is the survey team's understanding that WHC is responsible for RCRA groundwater compliance at the three facilities surveyed while PNL provides groundwater monitoring support. However, it was stated during interviews that there is no WHC verification of the adequacy or accuracy of data provided by the PNL support services activities.

2. Clarification of the WHC operations versus PNL support activities:
   The team was unable to determine that there is a clear understanding of the roles and responsibilities of WHC in operations related to RCRA groundwater monitoring and the PNL groundwater monitoring support activities. The survey team did examine one MOU implementation document which is being developed to clarify some of these relationships between WHC and PNL.

3. General knowledge of compliance responsibilities:
   The survey team learned that the responsibility for environmental regulatory compliance is defined in WHC documentation. The team gained an understanding of that responsibility as it is related to RCRA groundwater compliance from interviews with WHC management personnel. It was observed that program staff did not have a clear understanding of those RCRA groundwater compliance responsibilities within the program framework.

4. Training in field procedures:
   The results of survey interviews indicated that there is no formal, documented training for field personnel in the application of field procedures and record keeping. Formal training in sampling and sample handling procedures and record keeping along with documented on-the-job training is one way of ensuring adequate implementation of the field sampling program.

5. Handling of potentially contaminated extraction materials:
   No procedure was identified for handling potentially contaminated well extraction materials (e.g. cuttings, purge and development water). There is a potential for contaminating land surface at the well site, construction equipment, and increasing personnel exposure risks.

6. Mechanism for keeping Washington Department of Ecology (WDOE) informed and current:
A mechanism, in addition to quarterly reports and characterization reports, should be considered to keep the WDOE fully informed and current of the RCRA groundwater monitoring activities and decisions.

The following practices are identified as being notable:

- o There is a cooperative, working relationship between WHC and PNL at the groundwater programs manager and technical levels.
- o PNL project managers for each of the surveyed projects were knowledgeable of RCRA requirements, technical management responsibilities, and project activities.
- o During the interviews with project managers and staff, a notable, professional interest in environmental compliance and informed interaction with the regulators was evident.
- o The field sampling crew was adequately equipped with precleaned sample containers. Field vehicles were adequately equipped to support the sampling effort and crew had with them copies of groundwater monitoring procedures, well depth log, and pertinent forms and records.
- o All sample labels inspected contained the required data.

FOLLOWUP ACTIONS AND CLOSE OUT

Responses to the findings, observations, and practices listed and described in this report are to be prepared and submitted to DOE-RL within thirty days of receipt of the report. The following information shall be included in the formal response for each finding, observation, and practice:

- o Clarification, discussion, and recommendation as needed
- o Actions which have been or will be taken to identify all similar situations or conditions
- o Assessment of underlying causes
- o Actions which have been or will be taken to correct underlying causes
- o Actions which have been or will be taken to verify the effectiveness of corrective actions.

Following DOE review of the responses and DOE / WHC review and discussion of those responses, close out actions will be identified and close out will be documented as corrective actions and changes are implemented.

SURVEY PARTICIPANTS

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