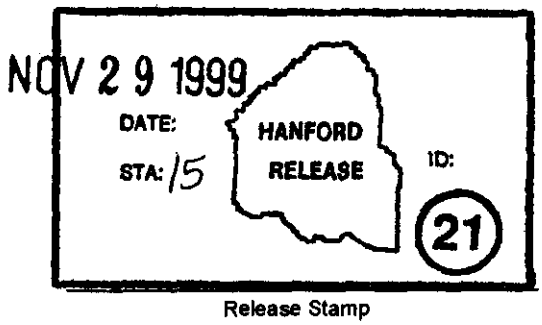
Preliminary Site-Specific SST Phase 1 RFI/CMS Work Plan Addendum for WMA S-SX

J.C. Henderson
Lockheed Martin Hanford Corporation
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 648337 UC: 2010
Org Code: 73500 Charge Code: 106497AJ60 HMLM0351
B&R Code: EW3130010 Total Pages: ~~122~~ 275 KN

Key Words: Vadose Zone, RFI/CMS Work Plan, WMA S-SX

Abstract: This Preliminary Site-Specific Waste Management Area S-SX Phase 1 RFI/CMS Work Plan Addendum addresses vadose zone and groundwater characterization activities in and near the WMA S-SX. Vadose zone characterization activities associated with decommissioning borehole 41-09-39, installation of a new borehole in the SX Tank Farm near SX-115, and installation of three RCRA groundwater monitoring wells are described.



Karen L. Noland 11/29/99
Release Approval Date Release Stamp

Approved For Public Release

RECORD OF REVISION

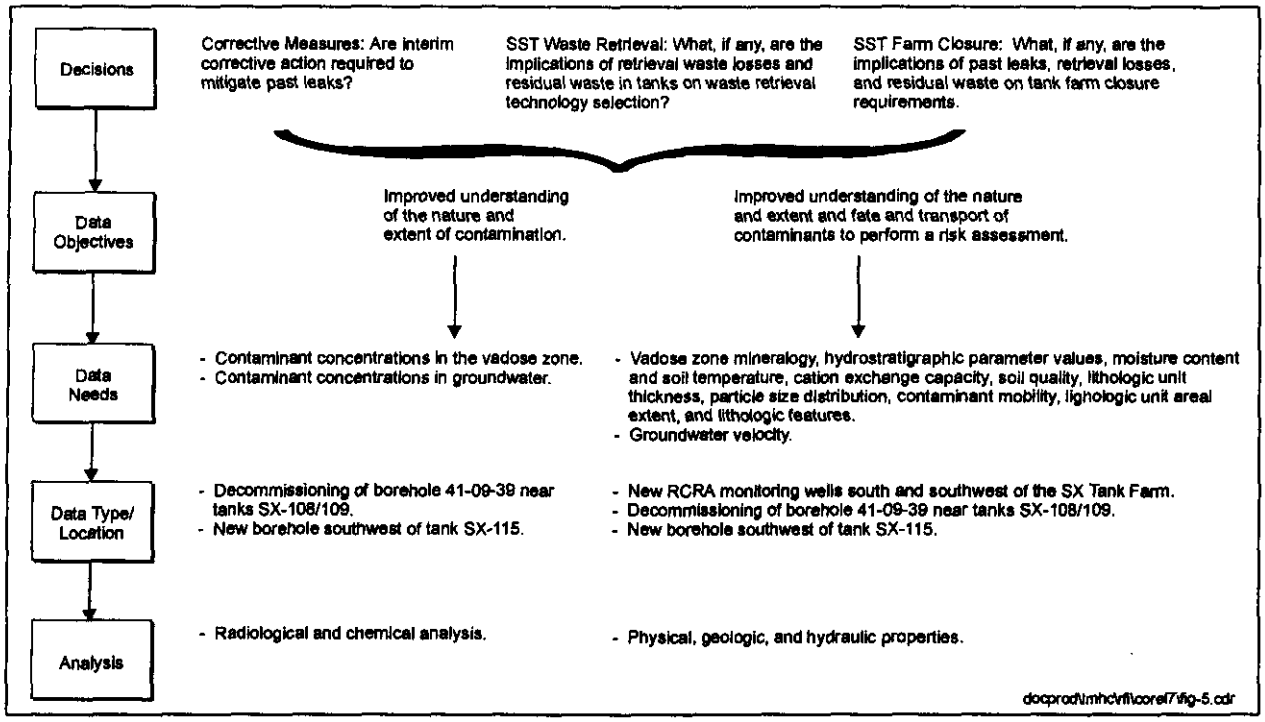
(1) Document Number: HNF-4380

(2) Title: Preliminary Site-Specific SST Phase 1 RFI/CMS Work Plan Addendum for WMA S-SX

Change Control Record

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog. Engr.	(6) Cog. Mgr.	Date
0	(7) Initially released 4/26/99 on EDT 621750	JCH	C.C. Haass	
0A	Incorporated per ECN-648339 - Replaced page C-5	JCH	C.C. Haass	
1	Complete revision per ECN-648340	JCH	A.J. Knepp	
1A	Incorporated per ECN-648341 - Replaced pageA-14, A-16, and C-5	JCH	A.J. Knepp	
1B RS	Incorporated per ECN-648337- Replaced page 1-11, 6-3, A-5, and A-6	JC Hall	AJ Knepp	

Figure 1.5. DQO Objectives and Data Needs



(telescoping) casings to reduce the likelihood of cross contamination from penetrating through highly contaminated zones. Collection of split-spoon driven samples and drill cutting samples will be attempted from about 3 m (10 ft) bgs to just below the water table. The water table is expected to be encountered at a depth of 64 m (210 ft) bgs. Selected portions of the samples will be analyzed for chemical, radiological, and physical characteristics. A suite of geophysical surveys will be performed, and groundwater samples will be collected for chemical and radiological analysis. The new borehole is being completed as a RCRA-compliant groundwater monitoring well. The new well will be included in the RCRA groundwater monitoring network for routine groundwater sampling and analysis.

- Collection of vadose zone characterization data from three proposed RCRA groundwater monitoring wells – Vadose zone samples will be collected during the installation of three proposed RCRA groundwater monitoring wells planned in support of the ongoing RCRA groundwater monitoring effort. The three RCRA groundwater monitoring wells are to replace existing RCRA groundwater monitoring wells because groundwater levels in the WMA S-SX area are declining by up to 0.6 m (2 ft) per year, and some of the existing monitoring wells are going dry. The southern-most proposed monitoring well is tentatively located about 50 m (164 ft) southeast of tank SX-113. From this well, the collection of continuous driven samples from about 6 m (20 ft) bgs to refusal (anticipated to be near the top of the Ringold Formation) will be attempted. Continuous drill cuttings will be collected from refusal to the water table. The other two RCRA groundwater monitoring wells are located east of WMA S-SX. Continuous drill cuttings will be collected and described from these two wells. Selected portions of the split-spoon driven

samples and cuttings will be analyzed for physical, hydraulic, and chemical properties. A detailed description of the work associated with the installation of these monitoring wells is being developed by the Hanford Groundwater Program. Only details associated with the collection and analysis of driven samples and cuttings are provided in this work plan addendum.

1.5 ORGANIZATION OF THE PRELIMINARY ADDENDUM

Eight chapters and six appendices are included in this Preliminary Addendum. The addendum is structured to provide information necessary to initiate the field investigation in fiscal year 1999. The chapters include the following:

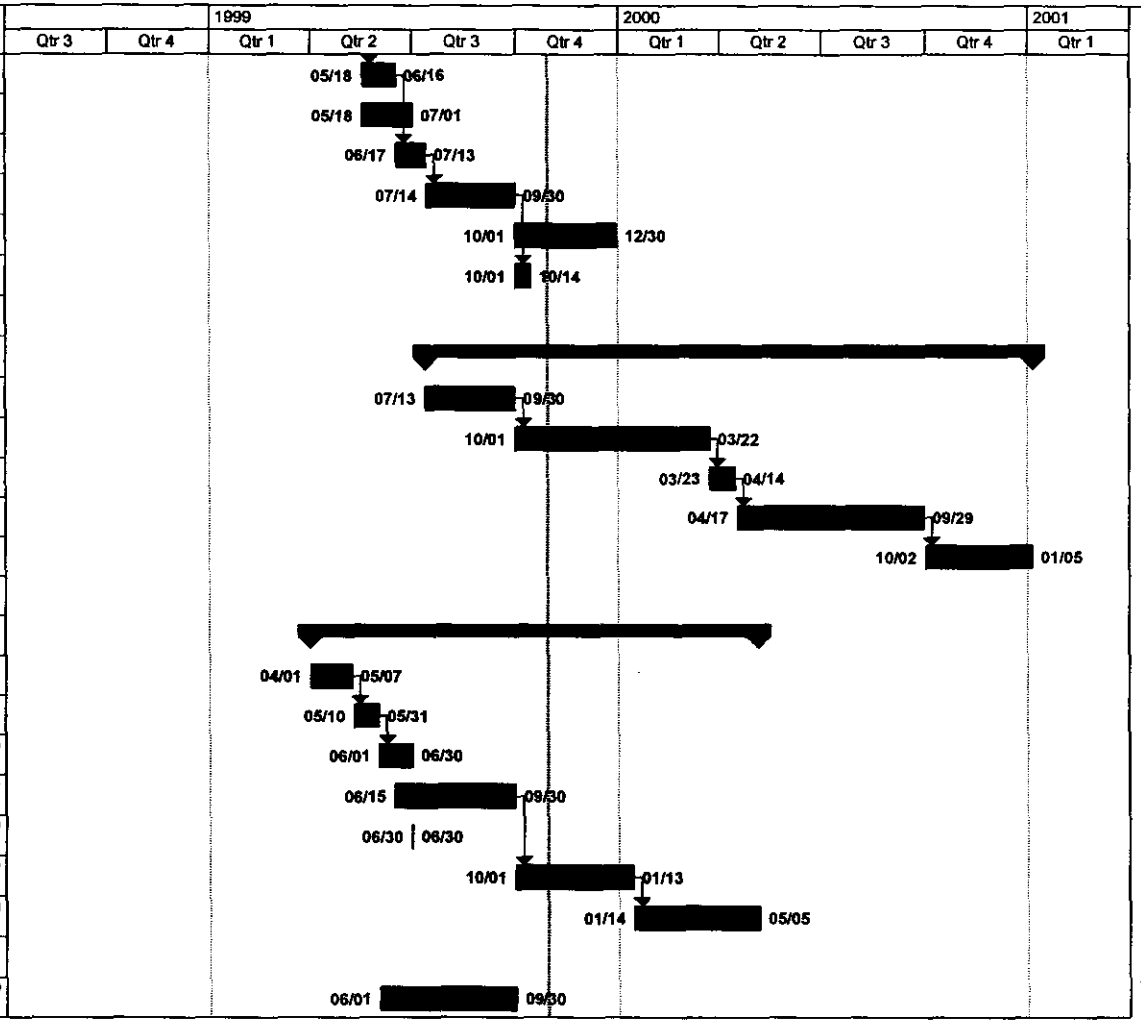
- Chapter 1.0: Introduction to the Preliminary Addendum that provides an overview of the issues and technical approach detailed in the remainder of the addendum
- Chapter 2.0: Overview of the physical and environmental setting of WMA S-SX
- Chapter 3.0: Summary of the available data on potential contaminant exposure pathways that will be used to develop a conceptual exposure pathway model for WMA S-SX needed to assess compliance with Federal and state environmental standards, requirements, criteria, or limitations that may be considered potential corrective action requirements (CAR), and potential impacts to human health and the environment
- Chapter 4.0: Presentation of the rationale and approach for the initial field investigations
- Chapter 5.0: Presentation of the tasks and activities necessary to conduct initial field investigations
- Chapter 6.0: The schedule for the initial site-specific investigations focused on vadose zone-related aspects of WMA S-SX in accordance with the tasks and activities discussed in Chapter 5.0
- Chapter 7.0: Description of the project management tasks necessary to implement the initial field investigation activities, including responsibilities, organizational structure, and project tracking and reporting procedures
- Chapter 8.0: References used to develop the Preliminary Addendum.

Appendices to this Preliminary Addendum include supporting plans and information necessary to define, conduct, and control the initial field characterization activities. The appendices include the following:

- A – Sampling and Analysis Plan
- B – Health and Safety Plan
- C – Quality Assurance Project Plan

Figure 6.1 Preliminary Characterization Schedule

ID	Task Name	Start
30	Place Contracts (field/lab)	Tue 05/18/99
31	Readiness Assessment	Tue 05/18/99
32	Drilling Mobilization & Training	Thu 06/17/99
33	Drill and Sample	Wed 07/14/99
34	Complete Monitoring Well/Waste Disposal	Fri 10/01/99
35	Demobilization	Fri 10/01/99
36		
37	**Laboratory Analysis (1.01.04.01.03.03.19.05)**	**Tue 07/13/99**
38	Initial Lab Analysis (FY99)	Tue 07/13/99
39	Initial Lab Analysis (FY00)	Fri 10/01/99
40	Select Samples for Detailed Analysis	Thu 03/23/00
41	Conduct Detail Analysis (FY00)	Mon 04/17/00
42	Conduct Detail Analysis (FY01)	Mon 10/02/00
43		
44	**Decommissioning and Sampling 41-09-39 (1.01.04.01.03.03.19.08)**	**Thu 04/01/99**
45	Readiness Review/Assessment	Thu 04/01/99
46	Initiate Decommissioning and Soil Sampling Training and Preparation	Mon 05/10/99
47	Decommissioning and Soil Sampling	Tue 06/01/99
48	Sample Analysis (FY99)	Tue 06/15/99
49	Complete Decommissioning	Wed 06/30/99
50	Sample Analysis (FY00)	Fri 10/01/99
51	Prepare Field/Lab Report	Fri 01/14/00
52		
53	Install RCRA Groundwater Wells Outside S-SX WMA	Tue 06/01/99



Project: fig6_1
Date: Fri 10/29/99

Task | Summary | Rolled Up Progress | Project Summary
Progress | Rolled Up Task | Split
Milestone | Rolled Up Milestone | External Tasks

FIG6_1.MPP

2

This page intentionally left blank

Split-spoon samplers will be 0.6 to 1.5 m (2 to 5 ft) in length, with a nominal 10-cm (4-in.) inside diameter. All split-spoon samples will be collected in advance of the casing being driven. The drill casing will be a nominal 25-cm (10-in.) outside diameter. For driven split-spoon samples attempted from 3 m (10 ft) to 12.2 m (40 ft) bgs, the drill pipe and conductor casing are to be advanced in 1.5-m (5-ft) intervals. For driven split-spoon samples attempted from 12.2 m (40 ft) to 50.3 m (165 ft) bgs (top portion of the Ringold Formation), the drill pipe and conductor casing will be advanced only as far as split-spoon samples have been collected or attempted. Standard techniques will be used to remove that portion of the sediment column that remains in the drill casing once it is driven to the sample depth. If refusal of the split-spoon sampler occurs, the hole will be drilled ahead 0.3 m (1 ft), and continuous split-spoon sampling will resume. From the depth of 50.3 m (165 ft) to total depth of the borehole, the drill pipe and conductor casing will be advanced while collecting drill cuttings, except at the historic high water level (approximately 56.4 m [185 ft] bgs) and at the capillary fringe zone (approximately 64 m [208 ft] bgs). The casing is to be driven to total sample depth and the hole is to be cleaned at the end of each day's drilling effort. All drilling tools are to be removed. All split-spoon samplers are to be used with new Lexan liners. Split-spoon samplers will be new or decontaminated before reuse. Procedures for decontamination of sampling equipment are contained in WP 2-2, "Field Cleaning and/or Decontamination of Equipment" (WMFS 1998b). One new, unused sampler will be retained in reserve and used for the last sampling episode where the water table may be penetrated.

The depth of the vadose zone boring will be to just below groundwater, unless perched water is encountered while drilling. Drilling will cease if saturated, contaminated water is encountered before reaching the unconfined aquifer, and a water sample will be collected for analysis. The borehole could be decommissioned at that depth. A waiver from Ecology would be required to continue the borehole past this level. If saturated sediments are encountered above the anticipated depth of the capillary zone (approximately 64 m [208 ft] bgs), drilling will be terminated and the borehole decommissioned with approved material, unless a waiver is granted by Ecology. In this case, decommissioning will commence immediately following final geophysical logging of the borehole. Based on a waiver from Ecology, the borehole will apply telescoping techniques (i.e., smaller drill pipe and conductor casing diameter inside existing drill pipe and conductor casing) at either the maximum gamma-emitting location or the bottom of the Plio-Pleistocene Unit.

The use of field screening instruments will be used for evaluating alpha-, beta-, and gamma-emitting radionuclides. Radiological screening is expected to be effective in determining the initial extent of contamination. Organic vapor monitors, hexavalent chromium test kits or other appropriate methods, including visual screening, also may be used for field screening.

In addition to the borehole geologic logging, radiation measurements will be made using hand-held instruments on each segment of sample recovered during sampling and on the drill cuttings during cleaning out the borehole. Blow count measurements will be collected during all drive samples collected while advancing the split-spoon sampler. General observation will be noted as to drilling progress and problems. All of this information will be included in each borehole geologic log. Borehole geologic logs and well summary sheets will be prepared in accordance with approved WMFS procedures.

If contamination is determined through daily geophysical surveying to be actively migrating along the bore, drilling will be stopped, and the data will be analyzed to determine if the migration is caused by drag down of the sediments or by the migration of contaminated water. If contaminated water is the cause of the migration, drilling will cease and the borehole will be sealed. If contamination is determined to be caused by dragdown, telescoping techniques of the drill pipe and conductor casing will be performed to stop dragdown and drilling will resume.

As a result of the first time use of the drill and drive drilling method in the tank farms, this endeavor may need modification based on permitting compliance with the Washington State Department of Health. Air used in the drilling process will need to be contained per Washington State Department of Health. Appropriate permits and Notice of Construction (NOC) permits will be acquired prior to drilling operations for inside the tank farm. The proposed drilling method will comply with the requirements of the Washington State Department of Health for the notice of construction permit and other pertinent requirements. The proposed drilling method will utilize double containment, negative pressure, and appropriate engineered systems to prevent possible contaminated air from being released to the environment.

An on-site geologist will geologically log the new borehole, based on drill cuttings and the split-spoon samples. Borehole geologic logs will be prepared in accordance with approved procedures. The geologic log will include lithologic descriptions, sampling intervals, Health Physics Technician (HPT) hand-held instrument readings, screening results, evidence of any alteration of sediments, and any general information the geologist thinks is pertinent to the characterization of subsurface conditions. Drill cuttings and split-spoon driven samples will be continually screened with hand-held instruments for radiation, volatile organic compounds and other compounds as appropriate using techniques and procedures defined in the work package. Screening results and general observations as to drilling progress and problems will be included in each borehole log.

Sediment cuttings containing unknown, low-level mixed radioactive waste and/or hazardous waste will be contained, stored, and disposed of according to WMFS procedure WP 2-1 "Waste Management" and specified in the QAPjP and will be documented in the field activity reports. Sediment drill cuttings not used as samples will be disposed of in the Mixed Waste Burial Grounds. All important information will be recorded on a field activity report forms per approved procedures. Field activity report form includes borehole number, site location drawings, drawing of the downhole tool strings, site personnel, sampling types and intervals, zones noted by the HPT as elevated in radiological contaminants, instrument readings will be noted and the depth represented by those readings, and specific information concerning borehole completion.

The new borehole will be completed as a RCRA-compliant groundwater monitoring well after completion of the geophysical surveying. All temporary steel casing removed from the boring will be surveyed and either decontaminated and released or transferred to an appropriate disposal facility. A 4-in. stainless steel casing and screen will be permanently installed, and a flush mount surface protection/well seal will be constructed. The well will be completed in accordance with WAC 173-160 requirements to meet groundwater protection goals. Specific work steps for well completion will be documented in the tank farm work package.