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TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0824	TPA CHANGE NOTICE FORM	Date: August 22, 2018
Document Number, Title, and Revision: DOE/RL-2018-28, Optimization Test Plan for Treating Water from Modular Storage Units at 200 West Pump & Treat Facility		Date Document Last Issued: 5/4/2018
Approved Change Notices Against this Document: None		
Originator: Randal Fox		Phone: 509-373-6024

Description of Change:
This TPA Change Notice changes the date of pilot test plan, and adds the ability to pipe MSU water.

M.W. Cline (DOE) and E. Laija (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

The following changes to be made:

- Lengthening the time allowed to complete the Optimization Test Plan from the end of the fiscal year 2018 to the end of the calendar year 2018.
- Add the ability to ship the Modular Storage Tank (MSU) water via truck or pipeline.

Added text is denoted with a double underline. The deleted text is denoted with a ~~strikethrough~~.

Note: Include affected page number(s): iii, 1, 12, 16, 17

Justification and Impacts of Change:

1) It was anticipated that removal of the MSU water would be completed by the end of this fiscal year (FY2018). Due to the late date in the fiscal year of approval of this document and a longer than anticipated time to remove and ship the MSU water, it is proposed that the duration of MSU water shipment and treatment be extended to the end of calendar year 2018.
2) Shipment of MSU water by pipeline is needed in order to allow increased flexibility to ship the MSU water to the 200W Pump & Treat. This increased flexibility also will be more cost effective in the long term.

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Approvals:

DOE Project Manager	8/27/2018 Date	[X] Approved [ ] Disapproved
EPA Project Manager	8/28/2018 Date	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

A-6005-413 (REV 1)

Executive Summary

Using U.S. Environmental Protection Agency guidance, *Remediation Optimization: Definition, Scope and Approach*,[1] a pilot test is being performed to confirm the treatability of up to 2 million gallons of water from the modular storage units (MSUs) by the 200 West Pump and Treat Facility (hereinafter referred to as 200 West P&T) during ~~fiscal~~ calendar year 2018. The optimization of purgewater management associated with the MSUs is important to supporting Hanford Site groundwater remedial actions. The optimization activity described in this document is expected to reduce the environmental footprint by proving a reliable, cost-effective means to remove well foulants that are currently recycled when spent cleaning solution is brought directly back to 200 West P&T.

The water in the MSUs has been well characterized and reviewed by 200 West Engineering and, with the exception of manganese, is believed to be treatable by the 200 West P&T. Two filtration tests were performed to assess the ability of filtration of the MSU water to remove manganese that can pass the 200 West P&T. The sediment in the MSUs has been tested and found free of most contaminants with the exception of known metals, which was expected. These metals are removed from the water by precipitation reactions that result in accumulation of the metals in the sediments.

This pilot test plan covers several verification and monitoring objectives for the treatability test and associated data quality objectives that are necessary to meet performance objectives. Similarly, the conceptual design of the pilot test encompasses several design features, related information, and testing procedures that will be refined based on feedback. These data derived from the test will be evaluated to verify that the contaminants of concern meet the cleanup criteria, document removals through the facility, and determine whether treatment performance has been impacted in any meaningful way.

[1] EPA 542-R-13-008, 2013, *Remediation Optimization: Definition, Scope and Approach*, Office of Solid Waste and Emergency Response and Office of Superfund Remediation and Technology Innovation, U.S. Environmental Protection Agency, Washington, D.C. Available at: https://www.epa.gov/sites/production/files/2015-08/documents/optimizationprimer_final_june2013.pdf.

1 Introduction

The recommendation to optimize modular storage unit (MSU) water at the 200 West Pump and Treat Facility (hereinafter referred to as 200 West P&T) has been reviewed and accepted by the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Washington State Department of Ecology (Ecology) providing that the optimization pilot test demonstrates that MSU water can successfully be treated to required and appropriate cleanup levels. The testing will focus on identifying all contaminants and reducing cleanup levels to below drinking water standards.

The optimization pilot test is being performed to confirm the treatability of up to 2 million gallons of water from the MSUs by 200 West P&T in ~~fiscal~~ calendar year 2018. This activity is expected to reduce the environmental footprint of the remedy by proving a reliable means to remove well foulants that are currently recycled when spent cleaning solution is brought directly back to 200 West P&T. Sampling has shown that well foulant is a biofilm that includes mineralized metals, especially iron, manganese, and aluminum. These metals have been measured in the spent cleaning solution at concentrations that are 100 fold greater than that dosed in the micronutrient. When this spent cleaning solution is brought back to 200 West P&T, the concentration of the contaminants have increased presumably because there are inadequate opportunities to remove them from the system.

1.1 Purpose and Scope

The purpose of this test plan is to support the 200 West P&T proposed MSU sampling and treatment of purgewater at the 200 West P&T on a campaign basis. The proposed pilot test will treat water collected at the MSUs.

The focus of the pilot test is to characterize the untreated water stream collected in the MSUs and to treat this water at the 200 West P&T. Of particular interest is whether all contaminants of concern (COCs) can be reduced to below the cleanup level, and reduce the concentration of well foulants. Well foulants are removed from the well during the cleaning process and the spent cleaning solution is transferred to the MSUs. The concentrations of these foulants is reduced at the MSUs in part, because the chemical condition in the MSUs (high pH and eH) transforms foulants such as iron to compounds that precipitate. For example, iron is believed to be transformed to iron hydroxide ($Fe(OH)_3$).

1.2 Site Description

The MSUs consist of two aboveground modular containment units that are square tanks about 56 m (184 ft) on each side. They are designed to store around 3,785,412 L (1,000,000 gal; MSU #2) and 4,807,473 L (1,270,000 gal; MSU #3) of purgewater for treatment via solar evaporation. Purgewater is defined as water extracted or otherwise derived from the ground in connection with well development, well remediation/construction, well sampling, well decommissioning, well maintenance, aquifer testing, and decontamination water (DOE/RL-2011-41, *Hanford Site Strategy for Management of Investigation Derived Waste*). The storage units are located in the 600 Area near the Effluent Treatment Facility (ETF).

The MSUs are east of the 200 West area (Figure 1). They are adjacent to each other with MSU #3 on the northwest side of MSU #2.

The following radiological contaminants were not detected:

Americium-241	Plutonium-238
Plutonium-239/240	Uranium-235/236
Total strontium (strontium-90)	Cesium-137
Cobalt-60	Europium-152
Europium-154	Europium-155
Iodine-129	Tritium

In summary, it is not anticipated that the sediment/soil will add contaminants to the water when it is disturbed and steps will be taken to ensure that the sediment/soil does not become windborne. The sediment did not contain any unexpected COCs, including strontium-90, a COC that is not readily removed. The minerals and metals associated with the sediments were expected, many of which are either naturally occurring in the groundwater (calcium and magnesium) or are introduced in the micronutrient (aluminum, cobalt, copper, iron, manganese, molybdenum, nickel, and zinc). The presence of many of these micronutrients in the sediment is a positive sign that the chemical conditions in the MSUs favor insoluble species that will either settle or be filtered from the water.

3 Performance and Data Quality Objectives

This section identifies the test objectives and associated data quality objectives necessary to meet the performance objectives.

3.1 Test Objectives

The overall objectives of the treatability test are as follows:

- Verify the adequacy of the equipment and techniques used to pump the water from the MSUs and truck, or pipe, the water to the 200 West P&T.
- Verify lowered concentrations of soluble well foulants in the water in the MSUs.
- Verify manageable levels of the COCs in the MSUs.
- Monitor the treatment processes at the 200 West P&T to verify the COCs are removed to concentrations below the cleanup level before being released to the environment.
- Monitor the treatment processes at 200 West P&T to determine whether there are any unintended side effects from treatment of the water from the MSU.

3.2 Data Quality Objectives

The data quality objective of this sampling instruction is to ensure the generation of analytical data of known and appropriate quality are acceptable and useful for decision making. In support of this objective, statistics and data descriptors known as data quality indicators help determine the acceptability and utility of data to the user. The principal indicators are precision, accuracy, representativeness, comparability, completeness, bias, and sensitivity. These are defined in Appendix D, Section D2, Table D5 of the O&M Plan (DOE/RL-2009-124) and are to be followed and implemented for the sampling and analysis of MSU water.

5.2.3 Water Sampling

The sampling group will perform sampling. This includes identifying the laboratory to use, preparing the paperwork, preparing the sample bottles (including preservative addition), sampling, packaging and mailing the samples to the laboratory.

5.2.4 Water Transport

The teamsters will drive the tanker trucks and transport water to 200 West P&T when required. The water will be offloaded under the supervision of 200 West P&T Operations staff using existing procedures. MSU water can also be transported to the 200 West P&T by pipeline.

5.2.5 Sediment/Soil Removal During Pilot Testing

The Operations staff will remove sediment/soil from the MSUs. Sediment/soil removed is not part of the pilot test. Sediment/soil is an approved waste stream classified as miscellaneous waste in the purgewater management work plan (DOE/RL-2009-80). Currently, sediment/soil removal is scheduled for MSU #3. This activity may start before the optimization pilot test and last for 2 to 4 weeks. It is likely that the sediment/soil removal occurs simultaneously with the optimization pilot test. To avoid a potential conflict, the optimization pilot test will start in MSU #2. Should sediment/soil transfer begin on MSU #2 then water would be removed from MSU #3.

During the sediment/soil removal activities, it may be advantageous to transfer water from MSU #3 (sediment/soil removal) to MSU #2. Sediment/soil removal is thought to be more effective with less water on top of the sediment/soil pile. As the sediment/soil pile is drawn down, it may be helpful to decrease the water level. In MSU #3, the sediment/soil pile may be exposed as water is removed. It is desirable to maintain some water over the sediment/soil to avoid dried sediment/soil from becoming windborne. Water transfer will require a pause in activities and a sampling event as described in Section 5.1. At some point, the sediment/soil and water removal activities will switch from one MSU to the other.

This coordination of the two activities will be the responsibility of the Engineering group at the 200 West P&T as described in Section 5.2.1.

5.2.6 Data Analysis and Reporting

CH2M HILL Plateau Remediation Company chemists will review the laboratory data to confirm that they meet the quality objectives. The 200 West P&T Engineering staff will analyze and interpret the data and prepare a draft report covering activities ranging from basic laboratory work to 200 West P&T performance. Findings in this report will form the basis of ongoing treatment of the MSU water at 200 West P&T.

5.3 Facility Installation

Many of the required facilities are in place. Figure 4 shows the filtration facilities in place at the MSU site. These facilities include hosing and connections to fill transfer trucks. These facilities will remain at the site and be available for this test.

Facilities for chlorine addition may be needed. The work package for sodium hypochlorite addition is in development and calls for the sodium hypochlorite to be added from totes on trucks that would be driven to the appropriate location. Connections and tubing will be purchased for chlorine addition.

The pump and transfer lines used to transfer water from one MSU to the other are existing and staged.

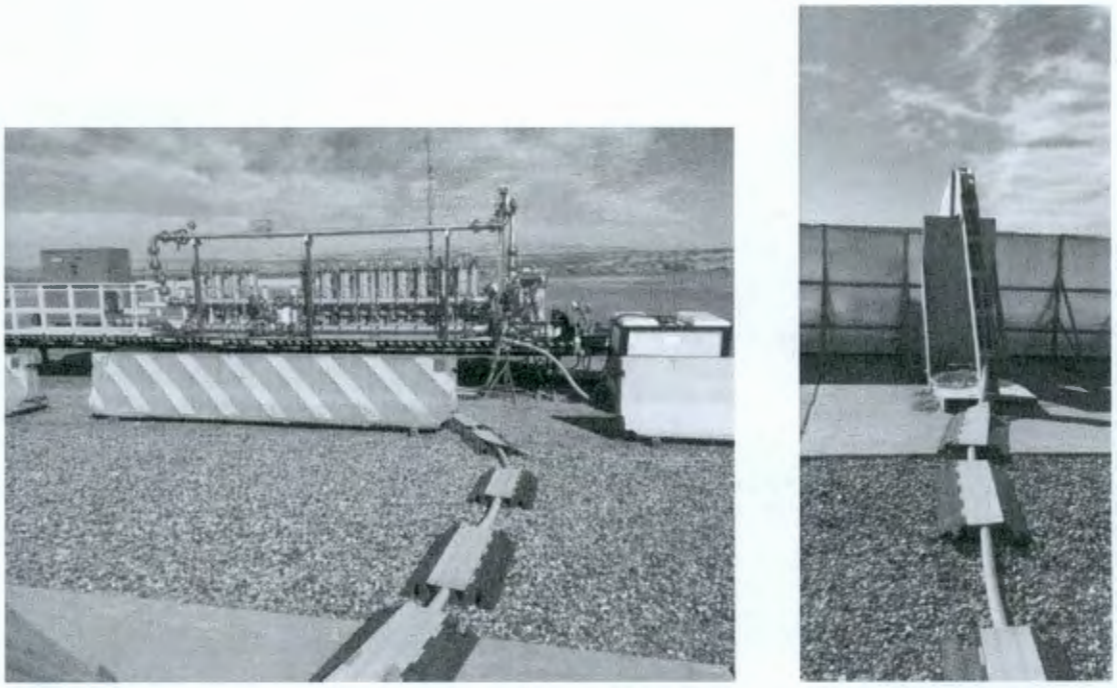

Figure 4. Filter Skid at the MSU Site (left) and the Pipeline Connecting the MSU to the Filter Skid (right)

6 Sampling and Characterization Activities

This sampling instruction has been prepared as part of the pilot test to support sampling and treatment of purgewater at the 200 West P&T on a campaign basis. The test will treat up to 2 million gallons of purgewater collected at the MSUs during ~~fiscal~~ calendar year 2018. The 200 West P&T is a principal component of the selected remedy presented in the following:

- EPA et al., 2008, *Record of Decision, Hanford 200 Area, 200-ZP-1 Superfund Site Benton County, Washington*
- EPA et al., 2012, *Record of Decision for Interim Remedial Action Hanford 200 Area Superfund Site, 200-UP-1 Operable Unit*
- DOE/RL-2014-34, *Action Memorandum for the 200-DV-1 Operable Unit Perched Water Pumping/Pore Water Extraction*
- DOE/RL-2010-74, *Treatability Test Plan for the 200-BP-5 Groundwater Operable Unit*
- EPA et al., 2015, *Explanation of Significant Differences for the U.S. Department of Energy Environmental Restoration Disposal Facility, Hanford Site – 200 Area Benton County, Washington*

The 200 West P&T is designed to treat contaminated water from the 200-ZP-1, 200-UP-1, 200-DV-1 Perched Water, and 200-BP-5 OUs. The contaminated water is treated to reduce concentrations of carbon tetrachloride, trichloroethene, total chromium and hexavalent chromium, nitrate, iodine-129, technetium-99, uranium, and other constituents such as cyanide (from the 200-BP-5 OU) and strontium (from Environmental Restoration Disposal Facility leachate) and process byproducts. Extracted water treated to the levels identified in each of the RODs or action memorandum(s) is then injected back into the aquifer.