TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0855	TPA CHANGE NOTICE FORM	Date: May 15, 2019
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*, Rev. 0		Date Document Last Issued: 5/4/2018
Approved Change Notices Against this Document: TPA-CN-0824, TPA-CN-0838		
Originator Randal Fox		Phone: 509-373-6024

Description of Change:
DOE/RL-2018-28 is amended to change the date of pilot test plan to end on June 30, 2019.

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 are made:

- Lengthening the time allowed to complete the Optimization Test Plan from May 31, 2019 to June 30, 2019.

Additions are shown using double underline. Deletions are shown using ~~strikeout~~.

Note: Include affected page number(s): iii, 1, 17, 24

Justification and Impacts of Change:

Reasoning for the end date extension
The spring 2019 transfer campaign began later than planned due to the cold weather. On initiation of the transfer of MSU water to the 200W P&T this spring, unexpected difficulty was experienced. On start-up, the pump rate rapidly decreased from about 40 gpm to 10 gpm or less. The transfer was paused to determine what was causing the limited flow. Troubleshooting involved taking the pipe apart at a flange near the highest point in the line to 200W P&T. MSU water was then pumped through the line to a purgewater truck. It was observed that air and water vented into the purgewater truck, in addition air vented back to the MSUs. This showed that the pipeline was air locked. After the air was vented from the pipeline, it was reconnected at the flange, the pump was restarted and there is no problem with a reliable consistent average flow of 22 gpm to 200W P&T. The lesson learned about the effects of air blowing this line will be incorporated next winter.

In addition, one pump was not operational. It appears that icing of the pump is causing the inability to flow 35gpm. We have installed an air separator between the air supply and the pneumatic pumps to improve the performance of the pumps. A rebuilt backup pump is in place should there be any problems with the existing pump. The project is evaluating a recommendation to purchase diesel-powered centrifugal pumps in place of the air diaphragm pumps.
It is anticipated that we will complete the transfer of all available water from MSU #3 at the beginning of June 2019. In order to provide some float for unanticipated delays, we are proposing to extend the pilot test end date to June 30, 2019.

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Approvals:

Michael W. Cline DOE Project Manager	5/16/2019 Date	[X] Approved [ ] Disapproved	Page 1 of 2
Emil Laija EPA Project Manager	5/20/2019 Date	[X] Approved [ ] Disapproved	
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved	

Summation of total water transferred under the pilot test

During the campaign in the summer of 2019 approximately 154,000 gallons were transferred by truck (DOE/RL-2018-70). During the campaign in the fall of 2018 approximately 40,000 gallons were transferred by pipeline. It is anticipated that approximately 330,000 gallons of MSU water will be transferred to the 200W P&T. On completion of the spring 2019 transfer campaign, a total of approximately 524,000 gallons will be transferred to the 200W P&T for the pilot test. The next step will be to review the sampling results of the 200W P&T streams and proceed with approval to adopt this treatment method for MSU water for long-term use.

Water levels of MSUs through FY2019

At the end of the transfer campaign, there will be sufficient capacity in the MSUs to support future groundwater activities including drilling, sampling, and well maintenance activities. At the end of the current campaign, MSU #3 will be pumped down to about 4.5 feet freeboard and then water from MSU #2 will be transferred to MSU #3 to result in equal freeboard of approximately 3 feet in each MSU. Based on current projections, it is anticipated that MSU levels will rise by the end of FY2019 to 2.5 feet freeboard level. The forecast also estimates that by the end of FY2020 MSU levels will be nearing the freeboard limit if no transfers occur between this campaign and the end of FY2020.

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) by ~~May 31, 2019~~ June 30, 2019. 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 treatment of 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 by June 30, 2019~~May 31, 2019~~. 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.

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 by June 30, 2019~~May 31, 2019~~. 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.

8.2 Test Data

Samples will be collected when the MSU water is being pumped for the following evaluations:

- Compare baseline data collected before and after treating MSU water.
- Compare COC concentrations expected in the plant effluent to that measured.
- Profile the COCs through the facility to verify removal and unit process method.
- Assure that the effluent quality meets the cleanup criteria.
- Determine whether the MSU water impacted plant operations.

The number of samples of test data will be at least one and up to three.

9 Schedule

Once this optimization pilot test is approved and both operational and sampling staff are available, the test will be completed in approximately 6 months. The pilot test is expected to start in May 2018 and operate through June 30, 2019~~May 31, 2019~~. The draft Optimization Review and Recommendations Document (draft pilot test results and recommendation[s] report) is expected to be available 2 months after the test concludes.

10 References

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: https://www.csu.edu/cerc/researchreports/documents/CERCLASummary1980.pdf..

DOE/RL-2003-04, 2005, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=DA01974685.

DOE/RL-2003-38, 2015, *100-BC-5 Operable Unit Sampling and Analysis Plan*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: https://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0078750H.

DOE/RL-2009-80, 2009, *Investigation Derived Waste Purgewater Management Work Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0094946.

Modified by:

TPA-CN-0779, 2017, *Tri-Party Agreement Change Notice Form: DOE/RL-2009-80, Investigation Derived Waste Purgewater Management Work Plan, Rev 0*, dated March 27, U.S. Department of Energy, Richland Operations Office, and U.S. Environmental Protection Agency, Richland, Washington. Available at: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0071624H.