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TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0791	TPA CHANGE NOTICE FORM	Date: 10/2/2017
Document Number, Title, and Revision: DOE/RL-2001-27, *Remedial Design/Remedial Action Work Plan for the 100-NR-2 Operable Unit*, Rev. 2 1239736		Date Document Last Issued: July 2016
Approved Change Notices Against this Document: TPA-CN-0747, TPA-CN-0751		
Originator: Art Lee		372-1763

Description of Change:
The attached pages of the *Remedial Design/Remedial Action Work Plan for the 100-NR-2 Operable Unit* (DOE/RL-2001-27, Rev. 2) are modified as shown to update period of performance for activities dependent on completion of the National Historic Preservation Act (NHPA) Section 106 cultural review process and additional analysis of the Permeable Reactive Barrier (PRB) performance in the 100-N area RI/FS.

M.W. Cline (DOE) and N.M. Menard (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*.

- Updated period of performance time frames on pages vi and 3-16 for activities dependent on finalization of analysis in the 100-N area RI/FS.
- Caption to Table 7-1, 100-NR-2 OU Interim Action Cost Estimate, updated to identify cost period is through build out of the PRB.
- Updated period of performance for the activities that are dependent on NHPA Section 106 cultural review process and finalization of analysis in the 100-N area RI/FS in Table 7-2, Interim RD/RAWP Schedule.

Added text is shown with double underline. Deleted text is shown with ~~strikethrough~~.

NOTE: Include affected page number(s): vi, xi, 3-16, 7-1 and 7-2

Justification and Impacts of Change:

A revised traditional cultural property boundary, effective in January 2014, now encompasses the 100-N PRB project area. A cultural review of the project activities have deemed the project to have an "adverse effect" on the traditional cultural property. As such, the project activities are dependent upon completion of the NHPA Section 106 process.

A Draft B of the 100-N area RI/FS is also being prepared which extends completion of Revision 0 of the 100-N Area RI/FS beyond the period identified in *Remedial Design/Remedial Action Work Plan for the 100-NR-2 Operable Unit* (DOE/RL-2001-27, Rev. 2). An analysis in the 100-N RI/FS will help to determine the optimum placement for the PRB barrier.

The following activities have been changed due to the NHPA Section 106 process and additional evaluation of the PRB placement being performed under the RI/FS for the final action Record of Decision:

- Added activity to complete the NHPA Section 106 cultural review process.
- Adjusted PRB reinjection to FY2018 and FY2019 to account for both high and low water injections.
- Adjusted additional 500 ft of PRB build out to FY2019 and FY2020 to account for both high and low water. This additional 500 ft of PRB corresponds to the areas of higher Sr-90 contamination in the groundwater.
- Adjusted remainder of PRB build out and jet injection to coordinate with the final determination in the 100-N Area RI/FS (DOE/RL-2015).

Approvals:

DOE Project Manager	10/10/2017 Date	[X] Approved [ ] Disapproved
N/A EPA Project Manager	Date	[ ] Approved [ ] Disapproved
Ecology Project Manager	10/10/17 Date	[X] Approved [ ] Disapproved

support attainment of the interim action remedial action objectives along the 100-N Area shoreline. Concurrent with or following completion of the apatite PRB injections, the former interim remedial action P&T system will be decommissioned.

This RD/RAWP is organized into the following eight chapters:

- Chapter 1 identifies the purpose for the RD/RAWP and describes the history and environmental setting of the 100-N Area.
- Chapter 2 presents the basis for the selected remedy as described in the Interim Action ROD, as amended.
- Chapter 3 provides a conceptual design for the individual remedy components.
- Chapter 4 describes the project management team, facility procurement, and construction and operational approaches to implement the interim remedial action.
- Chapter 5 summarizes the environmental management controls associated with waste management, health and safety, emergency response, and the quality assurance program.
- Chapter 6 discusses interim remedial action completion requirements.
- Chapter 7 provides an initial cost estimate for ~~fiscal year 2014 through fiscal year 2018~~ reinjection of existing PRB, buildout of the PRB, including injection and monitoring, and D&D of the 100-NR-2 pump and treat system, as well as a planning-level schedule for apatite PRB buildout activities.
- Chapter 8 contains a list of the references cited.

This RD/RAWP was prepared to fulfill Tri-Party Agreement[1] Milestone M-015-60.

[1] Ecology, EPA, and DOE, 1989a, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=81.

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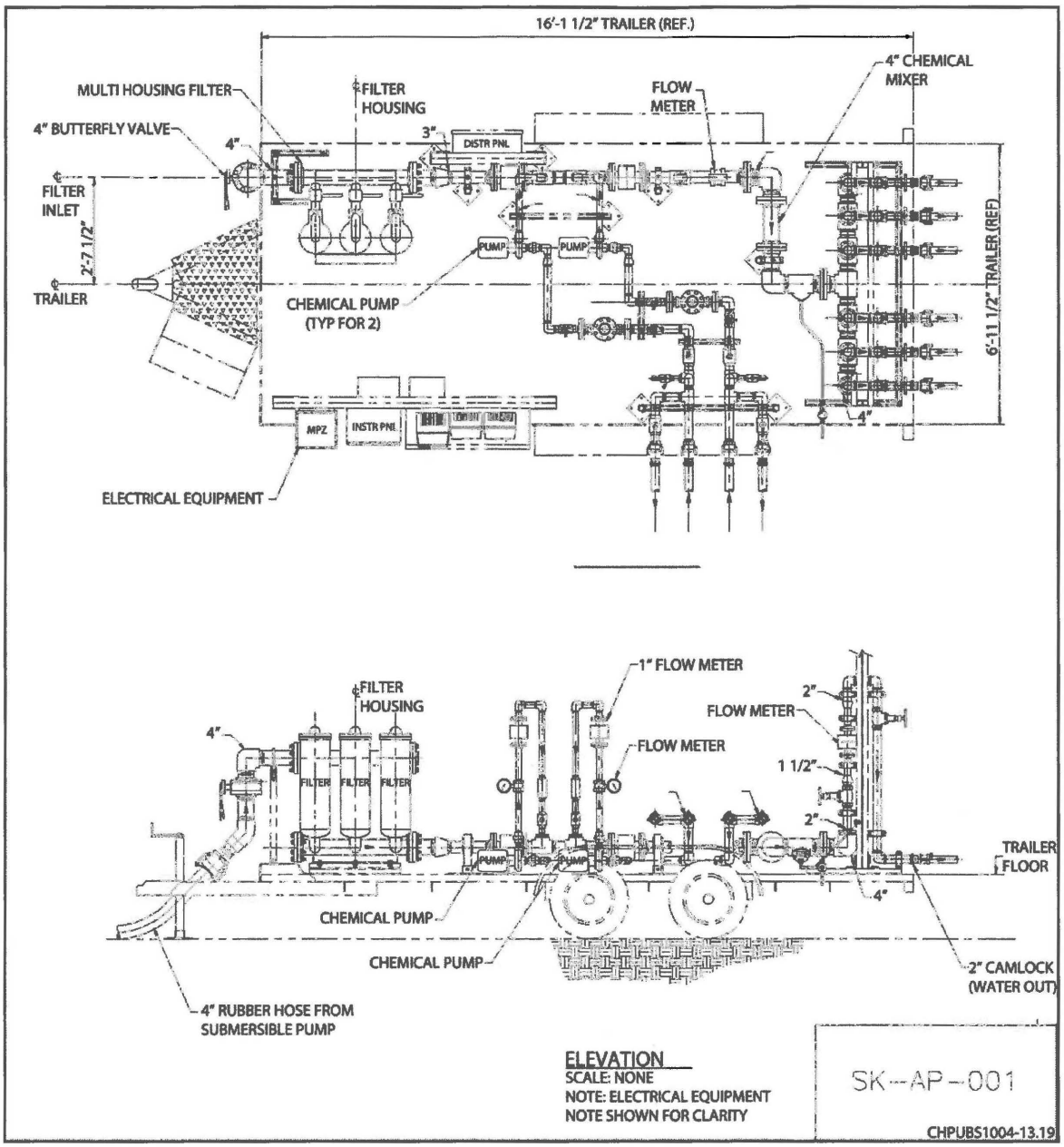

Figure 3-11. Generalized Schematic of Injection System

Field instructions have been prepared for the expansion of the PRB ~~to be implemented in 2014~~ (SGW-57140, *Field Instruction for 100-NR-2 Operable Unit Saturated Zone Apatite Permeable Reactive Barrier Extension*). These instructions and detailed operational procedures guide injections and ensure that sufficient phosphate is injected and monitoring is performed to determine the arrival and distribution of apatite solution in the aquifer.

7 Cost and Schedule

This chapter provides the project schedule, which is divided into major phases or components. The schedule will reflect completed milestones to date and will provide sufficient detail to allow development of future milestones. Document review protocol and requirements will be incorporated into the schedule. If developed, schedules for performing activities will be provided subsequent to or in coordination with this project.

7.1 Cost Summary

A cost estimate and schedule for the 100-NR-2 OU interim actions for decommissioning the existing 100-NR-2 pump and treat system and buildout of the PRB ~~the time frame of fiscal year (FY) 2014 to FY 2018~~ are provided in Tables 7-1 and 7-2, respectively. The schedule shown in Table 7-2 includes the buildout and footage to be added each year. The cost estimate includes costs for the following:

- **Project support:** Includes project management and coordination-related activities and technical consultation, as required, during the course of the design, construction, and operation.
- **PRB performance monitoring:** Includes groundwater sampling and sample analysis of PRB monitoring wells and aquifer tubes.
- **Groundwater monitoring and reporting:** Includes groundwater sampling, sample analysis, and reporting for long-term monitoring for identified COCs and COPCs for the 100-NR-2 OU.
- **O&M:** Represents supplies, labor, and craft supervision costs associated with well maintenance and maintaining ICs.
- **Saturated zone injections:** Includes materials and labor for planning, designing, conducting injections, and reporting. Also includes subcontractor fees for materials and equipment.
- **Vadose zone injections:** Includes materials and labor for planning, designing, conducting injections, and reporting. Also includes subcontractor fees for materials and equipment, drilling, injecting, and decommissioning boreholes.
- **TPH removal:** Represents supplies, labor, and craft supervision costs associated with TPH free-product removal.
- **P&T demolition:** Includes costs for demolition of the 100-NR-2 OU P&T system.

The cost estimate presented in this section is based on the best available information regarding the scope of the interim actions. The cost estimate represents an order of magnitude estimate, with an expected accuracy of +50 to -30 percent. Changes in the scope of the apatite PRB design and its construction may arise as a result of new information obtained through the implementation of the work described in DOE/RL-2010-29 and DOE/RL-2010-68. These changes will likely result in a final project cost that differs from the estimate presented in this RD/RAWP.

7.2 Schedule

Table 7-2 provides a projected activity schedule through the full buildout of the apatite PRB. This schedule reflects ~~projected dates prior to~~changes resulting from a boundary revision to an existing traditional cultural property. The revised traditional cultural property boundary, effective in January 2014, now encompasses the project area. A cultural review of the project activities addressing the requirements of the NHPA Section 106 process (specifically 36 CFR 800.3, "Initiation of the Section 106 Process,"

through 800.5, "Assessment of Adverse Effects") have deemed the project to have an "adverse effect" on the traditional cultural property, as defined in 36 CFR 800.5(b). As such, the work involved in completion of the barrier and the facility decommissioning and demolition is dependent upon completion of the NHPA Section 106 reviews and is subject to schedule delays pending establishment of a memorandum of understanding to conduct the project activities deemed to have an adverse effect on the traditional cultural property.

The following activities have been changed due to the NHPA Section 106 process and additional evaluation of the PRB placement being performed under the remedial investigation/feasibility study for the final action Record of Decision:

- Added activity to complete the NHPA Section 106 cultural review process.
- Adjusted PRB reinjection to FY2018 and FY2019 to account for both high and low water injections.
- Adjusted additional 500 ft of PRB build out to FY2019 and FY2020 to account for both high and low water. This additional 500 ft of PRB corresponds to the areas of higher Sr-90 contamination in the groundwater.
- Adjusted remainder of PRB build out and jet injection to coordinate with the final determination in the 100-N Area RI/FS (DOE/RL-2012-15).

Table 7-1. 100-NR-2 OU Interim Action Cost Estimate Through Buildout of the PRB~~(2014 through 2018)~~

Activity	Estimated Cost ($)
Project support	2,739,460
PRB performance monitoring	2,138,564
Groundwater monitoring and reporting	6,371,949
Operations and maintenance	2,429,371
Saturated zone injections	5,363,769
Vadose zone injections	7,494,890
TPH removal	175,385
Pump and treat decommissioning and demolition	1,601,124
Saturated zone injections (reinjections)	1,610,791
Total estimated cost	**$27,882,422**

Table 7-2. Interim RD/RAWP Schedule

Activity	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021 - 2022
Complete NHPA Section 106 cultural review				X	X			
Initiate and complete work to treat additional 152 m (500 ft) to expand groundwater PRB to 4579 m (1,5900 ft)	X[a]			X[b,c]	X[b,c]	X[b]	X[b]	

Table 7-2. Interim RD/RAWP Schedule

Activity	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021 - 2022
Initiate and complete work to treat additional 305 m (1,000 ft) to expand groundwater PRB to 762 m (2,500 ft)	X[a]			~~X[b,c]~~	~~X[b,c]~~		X[b,c]	X[b,c]
Initiate and complete work for vadose zone jet injection 305 m (1,000 ft)	X[a]			~~X[b]~~	~~X[b]~~		X[b,c]	X[b,c]
Pump and treat facility decommissioning planning	X							
Pump and treat decommissioning and demolition			X	X				
PRB monitoring	X	X	X	X	X	X	X	X
PRB reinjections, as needed				~~X[b]~~	X[b]	X[b]		

a. Activity initiated but then suspended to complete cultural resources reviews associated with revision of traditional cultural property boundary.

b. Anticipated period of performance including completion of *National Historic Preservation Act of 1966* Section 106 reviews.

c. Anticipated period of performance following confirmation of PRB placement based on finalization of analysis in the 100-N Area RI/FS (DOE/RL-2012-15, Rev 0 pending).

FY = fiscal year

PRB = permeable reactive barrier

A second set of PRB injections will occur within 5 years of the first injections, if necessary (as described in Section 3.1.1.4). Monitoring will be conducted until the preliminary remediation goal has been achieved along the length of the PRB at the river boundary, which, according to the groundwater modeling presented in the 100-N Area RI/FS (DOE/RL-2012-15, Draft A), is approximately the year 2125. The time frame for cleanup is being further evaluated and will be updated with the 100-N Area RI/FS (DOE/RL-2012-15, Rev. 0 pending)