

## TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 0874	TPA CHANGE NOTICE FORM	Date: 11/11/2019
Document Number, Title, and Revision: DOE/RL-2014-44-ADD2, Remedial Design Report/Remedial Action Work Plan Addendum for the 100-F/IU Groundwater		Date Document Last Issued: August 2015
Approved Change Notices Against this Document: TPA-CN-708, TPA-CN-0736, TPA-CN-0814		
Originator: M.J. Hartman		Phone: 376-4385

**Description of Change:**  
Changes are needed to incorporate new monitoring wells installed in 2019; to remove decommissioned boreholes; to clarify timing for sampling; and to remove a requirement for a redundant automated water level network station.

                    M.W. Cline                     and                     Laura Buelow                     agree that the proposed change  
**DOE** **Lead Regulatory Agency**  
 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*.

This change notice revises the groundwater sampling and analysis plan (Appendix A) and waste control plan (Appendix C). Changes are made to Table A-8, Table A-9, Figure A-16, and Table C-1 to account for installation of Phase 2 monitoring wells. Additional minor changes to the tables include removing decommissioned boreholes, clarifying the groundwater sampling schedule in a table note, and removing a requirement for a redundant automated water level station.

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

Note: Include affected page number(s): A-47, A-48, A-49, A-51, A-54, A-55, C-3.

**Justification and Impacts of Change:**  
Justification for changes in Table A-8: (a) The requirement for an AWLN station in 699-59-32 was redundant with nearby well 699-60-32. Only one station is needed. (b) Revised well IDs and well names were added for Phase 2 wells because in some cases new numbers were assigned; (c) TCE is added for two of the Phase 2 wells based on initial monitoring results from a nearby well; (d) A footnote is clarified to provide sample schedule requirements already present in the document text.

Figure A-16, Table A-9, and Table C-1 are revised to include information for Phase 2 wells, installed in 2019.

**Approvals:**

 _____ DOE Project Manager	11/18/2019 _____ Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved
 _____ EPA Project Manager	11/18/2019 _____ Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved
_____ Ecology Project Manager	N/A _____ Date	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes						Water Level		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium- 90	Trace Metals <sup>a</sup>	General Chemistry <sup>b</sup>	AWLN	Manual <sup>c</sup>	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1 (July 2016- June 2017)	Year 2 to Year 5 (July 2017- June 2022)	Year 6 and Onward (After June 2022)
Existing Monitoring Wells																		
199-F5-1			X	X		X		X	X	X		X			X	A, S <sup>d</sup>	A, S <sup>d</sup>	B
199-F5-4	X	X	X		X	X		X	X	X		X	X		X	A, S <sup>e</sup>	A, Q <sup>e</sup>	B <sup>f</sup>
199-F5-42	X		X	X		X		X	X	X	X				X	A	A	B
199-F5-43A	X		X	X	X	X		X	X	X	X		X	X	X	A	A	B <sup>f</sup>
199-F5-44	X		X	X		X		X	X	X	X				X	A	A	B
199-F5-45	X	X	X			X		X	X	X		X		X	X	A	Q	B
199-F5-46	X	X	X	X		X		X	X	X		X			X	S	S	B
199-F5-47	X		X	X		X		X	X	X		X			X	A	Q	B
199-F5-48	X	X	X		X	X		X	X	X		X	X		X	A	Q <sup>e</sup>	B <sup>f</sup>
199-F5-52	X		X			X	X	X	X	X	X		X	X	X	A	A	B
199-F5-54	X		X	X		X		X	X	X		X			X	A	A	B
199-F5-55	X		X	X		X		X	X	X		X			X	A, S <sup>d</sup>	A, S <sup>d</sup>	B
199-F5-56	X	X	X	X		X		X	X	X		X			X	A	Q	B
199-F5-6	X		X	X		X		X	X	X	X				X	A, S <sup>e</sup>	A, S <sup>e</sup>	B
199-F6-1	X		X	X		X	X	X	X	X	X		X	X	X	A	A	B
199-F7-1 <sup>h</sup>		X	X			X	X	X	X	X		X		X	X	A	A	B
199-F7-2		X	X			X	X	X	X	X		X		X	X	A	A	B
199-F7-3		X	X			X		X	X	X		X			X	A	A	B
199-F8-2	X			X				X	X	X		X			X	A	Q	B
199-F8-4			X			X	X	X	X	X			X	X	X	A	A	B
199-F8-7		X	X	X	X	X		X	X	X		X	X		X	A	A	B <sup>f</sup>
699-58-24								X		X								
699-59-32			X			X	X	X	X	X			X	X	X	A	A	B

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes						Water Level		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals <sup>a</sup>	General Chemistry <sup>b</sup>	AWLN	Manual <sup>c</sup>	FSQ 1a, 1b: Contamination Decreasing as expected?	FSQ 1c: Changes in environmental conditions that reduce effectiveness?	FSQ 1d: Unacceptable impacts to river?	FSQ 1e: Evidence of new contaminant releases?	FSQ 2: Trace metals below action levels?	FSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	FSQ 4a, 4b: Remediation objectives achieved?	Year 1 (July 2016-June 2017)	Year 2 to Year 5 (July 2017-June 2022)	Year 6 and Onward (After June 2022)
699-60-32							X	X	X	X				X	X			
699-61-37							X	X						X				
699-62-31			X			X		X	X	X				X	X	A	A	B
699-63-25A			X			X		X	X	X				X	X	A	A	B
699-64-27			X			X	X	X	X	X				X	X	A	A	B
699-66-23			X			X	X	X	X	X	X			X	X	A	A	B
699-70-23							X	X		X				X				
699-71-30 <sup>b</sup>		X	X			X	X	X	X	X				X	X	A	A	B
699-74-44								X		X				X				
699-77-36		X	X			X	X	X	X	X				X	X	A	A	B
<b>Phase 1 Wells</b>																		
699-66-32			X			X	X	X	X	X				X	X	Q	A	B
699-67-26			X			X	X	X	X	X	X			X	X	Q	Q	B
699-71-34		X	X			X	X	X	X	X				X	X	Q	Q	B
699-75-28			X			X	X	X	X	X	X			X	X	Q	Q	B
699-75-31		X	X			X	X	X	X	X				X	X	Q	Q	B
699-75-34B		X	X			X		X	X	X				X	X	Q	Q	B
<b>Phase 2 Wells<sup>d</sup></b>																		
<u>699-71-24</u> C9872 (1)			X			X		X	X	X	X			X	X	-	Q	B
<u>699-70-29</u> C9985 C9873 (2)		X	X			X		X	X	X				X	X	-	Q	B
<u>699-60-27</u> C9874 (3)			X			X	X	X	X	X				X	X	-	Q	B
<u>699-73-30</u> C9875 (4)		X	X			X		X	X	X				X	X	-	Q	B

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analytes						Water Level		Data Need							Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals <sup>a</sup>	General Chemistry <sup>b</sup>	AWLN	Manual <sup>c</sup>	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1 (July 2016-June 2017)	Year 2 to Year 5 (July 2017-June 2022)	Year 6 and Onward (After June 2022)
699-71-30C D0130 C9876 (5)		X	X			X		X	X	X				X	X	-	Q <sup>d</sup>	B
699-77-34B C9877 (6)		X	X			X		X	X		X			X	X	-	Q <sup>d</sup>	B
<b>Aquifer Sampling Tubes, Seep, and River Gauge</b>																		
64-M	X		X	X				X		X						A	A	B
C6302	X		X	X				X		X						A	A	B
C6303	X		X					X		X						A	A	B
C6306	X		X	X				X		X						A	A	B
C6309	X		X	X				X		X						A	A	B
C6315	X		X	X				X		X						A	A	B
75-D			X					X		X						A	A	B
77-D			X					X		X						A	A	B
Seep 187-1	X		X					X		X						A	A	B
100-F River Gauge							X			X			X					

a. Trace metals include antimony, cadmium, and cobalt. These analytes are included for samples collected only during the first 10 years of monitoring until sufficient data are obtained for evaluation (eight samples).

b. General chemistry analytes include alkalinity, calcium, magnesium, potassium, sodium, chloride, and sulfate.

c. Manual water level measurements will be obtained at low, high, and moderate river stage every year during years 1 through 5, and biennially thereafter.

d. Semiannual sample frequency will be performed for strontium-90. Other analytes are sampled at an annual frequency.

e. Trace metals sampled at an annual frequency.

f. Antimony, cadmium, and cobalt are not included for analysis after year 10.

g. Semiannual sample frequency will be performed for Cr(VI). Other analytes sampled at an annual frequency.

h. These wells are being replaced by Phase 2 wells. They will be sampled concurrently with the new wells at least once, then sampling will cease. AWLN stations will be maintained in the old wells.

i. Phase 1 wells will continue quarterly for year 2, and may change to annual thereafter, if contaminant concentrations are stable. Phase 2 wells will be sampled quarterly for the first year after installation and may change to annual thereafter, if contaminant concentrations are stable.

j. Phase 2 wells proposed in SGW-61298, *Evaluation of 100-FR-3 Groundwater Monitoring Results from Phase 1*, and discussed in Section A.3.2.2

A = annual (low river stage, September through November)

B = biennial (every other year at low river stage)

AWLN = automated water level network

Table A-8. 100-FR-3 Operable Unit Summary of Monitoring Locations, Frequencies, and Constituents

Monitoring Location	Analyzer						Water Level		Data Need						Sample Frequency		
	Cr(VI) (Filtered)	TCE and Degradation Products	Nitrate	Strontium-90	Trace Metals <sup>a</sup>	General Chemistry <sup>b</sup>	AWLN	Manual <sup>c</sup>	PSQ 1a, 1b: Contamination Decreasing as expected?	PSQ 1c: Changes in environmental conditions that reduce effectiveness?	PSQ 1d: Unacceptable impacts to river?	PSQ 1e: Evidence of new contaminant releases?	PSQ 2: Trace metals below action levels?	PSQ 3: Geologic and hydrologic data confirm Conceptual Site Model?	PSQ 4a, 4b: Remediation objectives achieved?	Year 1 (July 2016-June 2017)	Year 2 to Year 5 (July 2017-June 2022)

Cr(VI) = hexavalent chromium  
 PSQ = principal study question

Q = quarterly (low river stage, high river stage, and two transitional periods)

S = semiannual (low river stage September through November and high river stage May through early July)

TCE = trichloroethene





drilling. Borehole geophysical logging was conducted in all boreholes except C9628 (replacement for C9472).

Slug tests and/or single-well pumping tests were not performed to characterize hydraulic conductivity because the hydrogeology of the region was adequately understood.

Additional Phase 2 monitoring wells were identified based on evaluation of results from the Phase 1 well samples. Table A-9 lists information about the wells and Figure A-16 shows approximate locations. Phase 2 wells will be constructed using the same instruction as the Phase 1 wells.

### A3.2.2.1 Well Depth and Screen Placement

Each Phase 1 well was drilled approximately 3 m (10 ft) into the RUM unit to facilitate geologic and geophysical interpretations. Phase 2 wells also will be drilled 3 m (10 ft) into the RUM. Table A-9 summarizes depth and construction information.

#### A3.2.2.1 Well Depth and Screen Placement

Phase 1 Well drilling and completion were performed in accordance with WAC 173-160. The wells were drilled using 20 cm (8 in.) diameter casing and were constructed with 10 cm (4 in.) diameter stainless steel casing and 1.5 to 4.6 m (5 to 15 ft) long, continuous wire-wrap stainless steel screen, atop a 1.0 to 1.5 m (3 to 5 ft) long stainless steel sump with end cap.

Table A-9. 100-FR-3 Operable Unit Phase 1 and 2 Monitoring Well Locations

Well ID	Well Name	Northing (m)	Easting (m)	Depth to Water (m bgs)	Aquifer Thickness (m)	Total Depth (m bgs)	Elevation Top of Screen (m)	Elevation Bottom of Screen (m)
<b>Phase 1 Wells (Installed 2016)</b>								
C9472	699-75-34	146444.09	579477.05	7.28	2.7	13.6	Decommissioned <sup>a</sup>	
C9474	699-71-26	145176.00	581918.55	9.37	0.1	12.4	Decommissioned <sup>b</sup>	
C9475	699-71-34	145271.21	579602.08	6.28	1.6	11.2	116.1	113.0
C9476	699-75-31	146516.19	580385.85	8.87	0.6	12.4	115.3	113.8
C9477	699-75-28	146514.93	581538.22	11.79	2.8	18.0	115.0	110.4
C9478	699-66-32	143628.39	580059.33	7.49	1.0	11.9	119.6	118.0
C9479	699-66-30	143649.79	580895.57	None	0.0	9.6	Decommissioned <sup>b</sup>	
C9480	699-67-26	143798.07	581949.54	8.28	0.9	12.6	113.2	111.6
C9628	699-75-34B	146447.03	579478.30	7.84	2.5	12.6	117.1	112.6
<b>Phase 2 Wells (Installed 2019)<sup>c</sup></b>								
<u>C9874</u>	<u>699-60-27</u>	<u>141878</u>	<u>581838</u>	<u>14.9</u>	<u>30.2</u>	<u>46.3</u>	<u>13.7</u>	<u>19.8</u>
<u>C9873</u>	<u>699-68-29</u>	<u>144383</u>	<u>581103</u>	<u>7.7</u>	<u>0.0</u>	<u>11.5</u>	Decommissioned <sup>b</sup>	
<u>C9985</u>	<u>699-70-29</u>	<u>144753</u>	<u>581195</u>	<u>8.8</u>	<u>2.1</u>	<u>14.9</u>	<u>7.9</u>	<u>11.0</u>

Table A-9. 100-FR-3 Operable Unit Phase 1 and 2 Monitoring Well Locations

Well ID	Well Name	Northing (m)	Easting (m)	Depth to Water (m bgs)	Aquifer Thickness (m)	Total Depth (m bgs)	Elevation Top of Screen (m)	Elevation Bottom of Screen (m)
<u>C9872</u>	<u>699-71-24</u>	<u>145087</u>	<u>582415</u>	<u>10.3</u>	<u>4.0</u>	<u>17.8</u>	<u>8.2</u>	<u>14.3</u>
<u>C9875</u>	<u>699-71-30B</u>	<u>145243</u>	<u>580707</u>	<u>9.3</u>	<u>1.1</u>	<u>14.2</u>	Decommissioned <sup>d</sup>	
<u>D0130</u>	<u>699-71-30C</u>	<u>145243</u>	<u>580707</u>	<u>9.0</u>	<u>1.1</u>	<u>13.2</u>	<u>8.5</u>	<u>10.1</u>
<u>C9875</u>	<u>699-73-30</u>	<u>145874</u>	<u>580687</u>	<u>7.8</u>	<u>0.8</u>	<u>12.3</u>	<u>7.0</u>	<u>8.5</u>
<u>C9877</u>	<u>699-77-34B</u>	<u>146974</u>	<u>579538</u>	<u>4.4</u>	<u>2.9</u>	<u>12.2</u>	<u>4.3</u>	<u>7.3</u>
<b>Planned Phase 2 Wells<sup>e</sup></b>								
<u>C9872</u>	1 (1b)	145183 (145913 <sup>d</sup> )	582501 (582189 <sup>d</sup> )	7.0 to 9.5	2.5 (5.5 <sup>d</sup> )	15 (16 <sup>d</sup> )	TBD	TBD
<u>C9873</u>	2 (2b)	144393 (144753 <sup>d</sup> )	581096 (581195 <sup>d</sup> )	7.5 to 8.0	3.0 (3.0 <sup>d</sup> )	14 (14 <sup>d</sup> )	TBD	TBD
<u>C9874</u>	3	141878	581838	12 to 13.5	7.5	24.0	TBD	TBD
<u>C9875</u>	4	145874	580687	6.7 to 7.2	1.8	12.0	TBD	TBD
<u>C9876</u>	5	145251	580707	9.0 to 9.5	1.5	14.0	TBD	TBD
<u>C9877</u>	6	146974	579538	4.2 to 4.5	4.5	12.0	TBD	TBD
<p>bgs = below ground surface  ID = identification  TBD = to be determined</p> <p>a. Well constructed incorrectly, decommissioned and replaced by C9628  b. Insufficient aquifer thickness  c. Approximate coordinates; surveys had not yet been completed when this table was prepared.  d. Screen parted from casing during construction. Decommissioned and replaced by 699-71-30C.  e. Well names listed for Phase 2 wells correspond to those shown in Figure A-16. Hanford Site well names will be assigned after installation. Locations and depths are approximate. Depths to water include low and high river stage.  f. Information for alternative locations shown in parentheses</p>								

Protective casing, protective guard posts, and cement pad were installed at the completed wells.

Phase 2 wells will be drilled and constructed to the same specifications.

Final well design, including screen placement and length, were determined by concurrence of the field geologist, drilling lead, and OU lead based upon field conditions.

Following completion, well locations and elevations will be surveyed, and dedicated sampling pumps will be installed in each well.

### **A3.2.3 Automated Water Level Network**

AWLN is the combination of equipment, hardware, and software for the measurement, collection, transmittal, storage, and management of water level data in the aquifer. Water-level data are measured by submersible pressure transducers installed in a network of monitoring locations. The data are then directly transmitted to a base station via telemetry or can be manually downloaded to portable computers.

AWLN stations were established at 20 monitoring wells and the 100-F gauging station during Phase 1 (Table A-8). After installation of Phase 2 wells, some of the stations may be relocated to optimize the network.

Table C-1. Wells Associated with the 100-FR-3 Operable Unit

Well Name	Well Identification	Well Name	Well Identification	Well Name	Well Identification
199-F1-2	A4586	199-F8-2	A4607	699-69-45R	A9761
199-F5-1	A4587	199-F8-3	A4608	699-70-23	A5318
199-F5-4	A4590	199-F8-4	A4609	699-71-30	A5320
199-F5-42	A4591	199-F8-7	C6834	699-71-52	A5321
199-F5-43A	A4592	699-57-29A	A5267	699-74-44	A5328
199-F5-43B	A4593	699-57-29B	A5268	699-77-36	A5330
199-F5-44	A4594	699-58-24	A5275	699-77-54	A5331
199-F5-45	A4595	699-59-32	A5276	699-80-43P	A8993
199-F5-46	A4596	699-60-32	A5279	699-80-43S	A5336
199-F5-47	A4597	699-62-31	A5287	699-81-38	A5337
199-F5-48	A4598	699-63-25A	A5289	699-83-47	A5341
199-F5-52	C7790	699-64-27	A5295	699-84-34B	A9021
199-F5-53	C7791	699-65-22	A5297	699-84-35A	A5342
199-F5-54	C7792	699-66-23	A5306	699-84-35AO	A9769
199-F5-55	C7970	699-66-38	A5307	699-84-35AP	A9770
199-F5-56	C7972	699-66-39	A5308	699-84-35AQ	A9771
199-F5-6	A4600	699-69-38	A5316	699-84-35AR	A9772
199-F6-1	A4602	699-69-45	A8967	699-84-35AS	A9773
199-F7-1	A4603	699-69-45O	A5317	699-86-42	A5344
199-F7-2	A4604	699-69-45P	A9759	699-87-42A	A5345
199-F7-3	A4605	699-69-45Q	A9760	699-61-37	A5283
<b>Phase 1 Boreholes or Wells</b>					
<del>699-75-34*</del>	C9472	699-75-31	C9476	<del>699-66-30*</del>	C9479
<del>699-71-26*</del>	C9474	699-75-28	C9477	699-67-26	C9480
699-71-34	C9475	699-66-32	C9478	699-75-34B	C9628
<b>Planned Phase 2 Wells</b>					
<u>C9874</u>	<u>699-60-27</u>	<u>C9872</u>	<u>699-71-24</u>	<u>C9875</u>	<u>699-73-30</u>
<u>C9985</u>	<u>699-70-29</u>	<u>D0130</u>	<u>699-71-30C</u>	<u>C9877</u>	<u>699-77-34B</u>
TBD	C9872	TBD	C9874	TBD	C9876
TBD	C9873	TBD	C9875	TBD	C9877

Note: Wells identified in Table C-1 are associated with the 100-FR-3 groundwater interest area as of August 2019 July 2016.

\*Decommissioned

TBD = Well names to be determined after installation