

# Appendix C

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## Appendix C

### Supporting Information for Aquifer Sampling Tubes

Sampling points in the aquifer adjacent to the Columbia River on the Hanford Site provide information about water quality near the point of groundwater discharge. These sampling points are known as aquifer sampling tubes (aquifer tubes). In 2013, 18 new, shallow aquifer tubes were installed in 100-BC. These sampling points are of a different design than the conventional aquifer tubes and are known as hyporheic sampling points (HSPs).

Conventional aquifer tubes are small-diameter, flexible tubes that have a screen on one end. They are installed in the aquifer along the Columbia River shoreline by driving a temporary steel casing into the ground adjacent to the river. The temporary casing is filled with water to keep sediment from coming up into the casing, then the drive-tip on the casing end is knocked out and the screened end of a tube is inserted into the casing. The steel casing is then pulled out, leaving the tube in place. Water is withdrawn from the tube using a peristaltic pump. The head of the tubes are on dry ground when the Columbia River is at low to moderate levels. Most of the tubes become submerged when river stage is high, although some have been extended so they can be sampled at high river stage.

Over 550 aquifer tubes have been installed along the shoreline. Most aquifer tube sites include two or three separately installed tubes monitoring different depths, most commonly between 2 and 8 meters. The tube sites cover the Hanford Site shoreline, from just upstream of 100-BC to downstream at the 300 Area. Sites are more closely spaced along some segments where higher density spatial resolution of contaminant plumes is needed. A subset of tubes is selected for sampling, as specified in *Sampling and Analysis Plan for Aquifer Sampling Tubes* (DOE/RL-2000-59) as modified by TPA-CN-327, TPA-CN-353, and TPA-CN-556. Additional tubes that were installed after 2009 and not included in DOE/RL-2000-59 were sampled in 2013. Sampling generally occurs in fall and winter when river stage is relatively low.

In 2013, DOE installed 18 HSPs in 100-BC as part of RI/FS studies (TPA-CN-559, TPA-CN-593, and TPA-CN-602). These differ from the convention aquifer tubes in their depth and construction. The HSPs are shallow (most 0.5 meter deep) to monitor the biologically active portion of the hyporheic zone. They are larger diameter, stainless steel tubes that are submerged even at low river stage. The 100-BC chapter of this report describes the HSP results for 2013.

Table C.1 summarizes the total number of tubes and sites (clusters) in each segment of shoreline, the number of tubes sampled, and the number of sampling trips in 2013. In total, 283 individual aquifer tubes were sampled in 2013 (Table C.2), and many of the tubes were sampled more than once, for a total of 439 sampling trips.

Most of the aquifer tubes are scheduled to be sampled once per year, generally in the fall. Intensive, high-frequency sampling of the 100-BC HSPs consumed labor resources in November and part of December, limiting the number of other aquifer tubes that could be sampled during those months. To minimize the impact, a subset of aquifer tubes that provide the most value were selected for sampling in November and December. Sampling of an additional 113 aquifer tubes was delayed into 2014. The average river stage in January and February 2014 was approximately the same as during November and December 2013. Data from the delayed samples were used in plume map interpretations in the main body of this report.

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**Table C.1 Inventory of Hanford Site Aquifer Tubes as of December 31, 2013**

Segment	Total Tubes/Sites	Tubes Not in Service	Sites Sampled Jan-Dec 2013	Tubes Sampled Jan-Dec 2013	Tube Trips Jan-Dec 2013	Tubes Delayed into 2014	Unsuccessful Trips
100-BC	71 <sup>a</sup> /34	3	31	52 <sup>b</sup>	63	0	1
100-K	70/28	2	27	60	66	0	3
100-N	84/36	15	25	52	157	2	12
100-D	97/37	13	18	42	46	41	9
100-H	97/39	13	9	15	15	40	6
100-F	81/27	22	10	26	26	1	0
200-PO-1	28/17	5	5	10	10	10	5
300 Area	52/19	3	11	25	56	6	0
<b>Total</b>	<b>580/237</b>	<b>76</b>	<b>136</b>	<b>283</b>	<b>439</b>	<b>113</b>	<b>27</b>

- a. 53 convention aquifer sampling tubes and 18 HSPs.  
b. 35 conventional aquifer tubes and 17 HSPs

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
<b>100-BC</b>				
100BC5	01-M	9/9/2013	4.9	
100BC5	03-D	9/9/2013	4.0	
100BC5	04-D	9/9/2013	7.6	
100BC5	05-D	9/10/2013	7.8	
100BC5	05-M	9/10/2013	5.2	
100BC5	05-S	9/10/2013	2.6	
100BC5	06-D	9/10/2013	7.0	
100BC5	06-M	9/10/2013	4.7	
100BC5	06-S	9/10/2013	2.7	
100BC5	12-D	9/11/2013	3.0	
100BC5	AT-B-1-M	9/9/2013	4.0	
100BC5	AT-B-2-D	9/9/2013	5.8	
100BC5	AT-B-3-D	9/10/2013	7.1	
100BC5	AT-B-3-M	9/10/2013	4.3	
100BC5	AT-B-3-S	9/10/2013	2.5	

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100BC5	AT-B-5-D	9/11/2013	7.3	
100BC5	AT-B-7-M	9/11/2013	4.1	
100BC5	C6227	9/9/2013	3.4	
100BC5	C6228	9/9/2013	5.3	
100BC5	C6229	9/9/2013	7.1	
100BC5	C6230	9/11/2013	2.8	
100BC5	C6231	9/11/2013	4.0	
100BC5	C6232	9/11/2013	8.1	
100BC5	C6233	1/15/2013	2.9	Delayed from 2012
100BC5	C6233	9/11/2013	2.9	
100BC5	C6234	1/15/2013	4.6	Delayed from 2012
100BC5	C6234	9/11/2013	4.6	
100BC5	C6235	1/15/2013	5.8	Delayed from 2012
100BC5	C6235	9/11/2013	5.8	
100BC5	C7718	9/10/2013	2.2	
100BC5	C7719	9/10/2013	3.8	
100BC5	C7720	9/10/2013	5.6	
100BC5	C7724	9/10/2013	1.9	
100BC5	C7725	9/10/2013	3.2	
100BC5	C7726	9/10/2013	4.7	
100BC5	C7780	9/11/2013	1.7	
100BC5	C7781	9/11/2013	2.6	
100BC5	C7782	9/11/2013	3.4	
100BC5	C8840	12/3/2013	0.5	HSP
100BC5	C8841	12/4/2013	0.5	HSP
100BC5	C8842	12/4/2013	0.5	HSP
100BC5	C8843	11/13/2013	0.5	HSP
100BC5	C8843	12/5/2013	0.5	HSP
100BC5	C8844	11/6/2013	0.5	HSP
100BC5	C8844	12/10/2013	0.5	HSP
100BC5	C8845	12/10/2013	1.0	HSP
100BC5	C8846	Not sampled	2.0	HSP. Broken; Cancelled.
100BC5	C8847	11/13/2013	0.5	HSP
100BC5	C8847	12/5/2013	0.5	HSP
100BC5	C8848	11/6/2013	0.5	HSP
100BC5	C8848	12/10/2013	0.5	HSP
100BC5	C8849	12/12/2013	1.0	HSP
100BC5	C8851	10/31/2013	0.5	HSP
100BC5	C8851	12/4/2013	0.5	HSP

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100BC5	C8852	10/31/2013	0.5	HSP
100BC5	C8852	12/6/2013	0.5	HSP
100BC5	C8853	12/6/2013	1.0	HSP
100BC5	C8855	11/20/2013	0.5	HSP
100BC5	C8855	12/6/2013	0.5	HSP
100BC5	C8856	11/20/2013	0.5	HSP
100BC5	C8856	12/9/2013	0.5	HSP
100BC5	C8859	12/9/2013	0.5	HSP
100BC5	C8860	12/9/2013	0.5	HSP
100BC5	C8861	12/9/2013	0.5	HSP
<b>100-FR</b>				
100FR3	62-M	9/26/2013	5.5	
100FR3	64-D	9/26/2013	8.2	
100FR3	64-M	9/26/2013	5.2	
100FR3	64-S	Not Sampled	2.3	No yield 9/26/13. Cancelled.
100FR3	66-D	10/10/2013	8.6	
100FR3	66-M	10/10/2013	5.9	
100FR3	66-S	10/10/2013	3.0	
100FR3	67-M	10/10/2013	6.1	
100FR3	67-S	10/10/2013	3.0	
100FR3	68-D	10/10/2013	7.6	
100FR3	68-M	10/10/2013	5.6	
100FR3	68-S	10/10/2013	3.2	
100FR3	74-D	Delayed	8.8	Delayed until 1/7/2014
100FR3	75-D	Delayed	8.2	Delayed until 1/7/2014
100FR3	76-D	Delayed	7.6	Delayed and cancelled
100FR3	77-D	Delayed	7.5	Delayed and cancelled
100FR3	AT-F-1-D	10/22/2013	8.0	
100FR3	AT-F-1-M	10/10/2013	5.5	
100FR3	AT-F-1-S	10/10/2013	3.1	
100FR3	C6302	9/26/2013	2.6	
100FR3	C6303	9/26/2013	4.1	
100FR3	C6305	9/26/2013	2.6	
100FR3	C6306	9/26/2013	4.4	
100FR3	C6307	9/26/2013	5.0	
100FR3	C6308	9/26/2013	2.9	
100FR3	C6309	9/26/2013	4.9	
100FR3	C6311	10/9/2013	3.0	
100FR3	C6312	10/9/2013	4.8	

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100FR3	C6314	10/10/2013	3.5	
100FR3	C6315	10/10/2013	5.6	
100FR3	C6316	10/10/2013	8.3	
<b>100-HR-D</b>				
100HR3-D	36-D	Not Sampled	6.4	No yield 12/2/13 or previous yr. Cancelled.
100HR3-D	36-M	11/26/2013	4.3	
100HR3-D	36-S	11/26/2013	2.4	
100HR3-D	38-D	12/2/2013	5.0	
100HR3-D	38-M	12/2/2013	3.0	
100HR3-D	AT-D-1-D	11/26/2013	4.1	
100HR3-D	AT-D-1-M	11/26/2013	3.3	
100HR3-D	AT-D-1-S	11/26/2013	2.1	
100HR3-D	AT-D-2-M	11/26/2013	5.0	
100HR3-D	AT-D-2-S	11/26/2013	4.4	
100HR3-D	AT-D-3-D	12/2/2013	3.6	
100HR3-D	AT-D-3-M	12/2/2013	2.7	
100HR3-D	AT-D-3-S	12/2/2013	2.2	
100HR3-D	AT-D-4-D	11/26/2013	4.8	
100HR3-D	AT-D-4-M	11/29/2013	4.2	
100HR3-D	AT-D-4-S	11/26/2013	3.8	
100HR3-D	AT-D-5-D	Delayed	2.7	Delayed until 1/30/2014
100HR3-D	AT-D-5-M	Delayed	2.1	Delayed until 1/30/2014
100HR3-D	C6266	5/1/2013	2.9	
100HR3-D	C6266	Delayed	2.9	Delayed until 1/15/2014
100HR3-D	C6267	5/1/2013	3.9	
100HR3-D	C6267	Delayed	3.9	Delayed until 1/15/2014
100HR3-D	C6268	5/1/2013	6.6	
100HR3-D	C6268	Delayed	6.6	Delayed until 1/15/2014
100HR3-D	C6269	5/1/2013	2.4	
100HR3-D	C6269	Delayed	2.4	Delayed until 1/15/2014
100HR3-D	C6270	5/1/2013	3.9	
100HR3-D	C6270	Delayed	3.9	Delayed until 1/15/2014
100HR3-D	C6271	5/1/2013	5.6	
100HR3-D	C6271	Delayed	5.6	Delayed until 1/15/2014
100HR3-D	C6272	Delayed	2.9	Delayed until 1/16/14
100HR3-D	C6275	Delayed	3.2	Delayed until 1/16/14
100HR3-D	C6278	Delayed	3.0	Delayed until 1/16/14
100HR3-D	C6281	Delayed	2.4	Delayed until 1/30/2014
100HR3-D	C6282	Delayed	4.7	Delayed until 1/30/2014

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100HR3-D	C7645	Delayed	2.4	Delayed until 1/15/14
100HR3-D	C7646	Delayed	3.7	Delayed until 1/15/14
100HR3-D	C7647	11/25/2013	5.6	
100HR3-D	C7648	Delayed	6.4	Delayed until 1/15/14
100HR3-D	DD-06-2	Not sampled	3.7	Could not locate 1/30/2014
100HR3-D	DD-06-3	Not sampled	4.9	Could not locate 1/30/2014
100HR3-D	DD-12-2	12/4/2013	3.0	
100HR3-D	DD-12-4	Delayed	6.4	Delayed until 1/30/2014
100HR3-D	DD-15-2	Delayed	4.6	Delayed until 1/30/2014
100HR3-D	DD-15-3	Delayed	6.4	Delayed until 1/30/2014
100HR3-D	DD-15-4	Delayed	7.8	Delayed until 1/30/2014
100HR3-D	DD-16-3	Delayed	5.3	Delayed until 1/20/14
100HR3-D	DD-16-4	12/2/2013	7.8	
100HR3-D	DD-17-2	Not sampled	3.2	Could not locate 1/20/2014
100HR3-D	DD-17-3	Not sampled	4.6	Could not locate 1/20/2014
100HR3-D	DD-39-1	5/2/2013	1.7	
100HR3-D	DD-39-1	Not sampled	1.7	Broken. Cancelled.
100HR3-D	DD-39-2	Not sampled	3.2	Broken. Cancelled.
100HR3-D	DD-39-2	Not sampled	3.2	Broken. Cancelled.
100HR3-D	DD-41-1	5/1/2013	2.5	
100HR3-D	DD-41-1	Delayed	2.5	Delayed until 1/16/14
100HR3-D	DD-41-2	5/1/2013	4.1	
100HR3-D	DD-41-2	Not sampled	4.1	Plugged 1/16/14
100HR3-D	DD-41-3	5/1/2013	5.6	
100HR3-D	DD-41-3	11/25/2013	5.6	
100HR3-D	DD-42-2	5/1/2013	3.2	
100HR3-D	DD-42-2	Delayed	3.2	Delayed until 1/15/14
100HR3-D	DD-42-3	5/1/2013	4.5	
100HR3-D	DD-42-3	Delayed	4.5	Delayed until 1/15/14
100HR3-D	DD-42-4	5/1/2013	5.5	
100HR3-D	DD-42-4	Delayed	5.5	Delayed until 1/16/2014
100HR3-D	DD-43-2	5/1/2013	3.0	
100HR3-D	DD-43-2	Delayed	3.0	Delayed until 1/15/14
100HR3-D	DD-43-3	5/1/2013	4.2	
100HR3-D	DD-43-3	Delayed	4.2	Delayed until 1/15/14
100HR3-D	DD-44-3	5/1/2013	4.4	
100HR3-D	DD-44-3	Delayed	4.4	Delayed until 1/16/14
100HR3-D	DD-44-4	5/1/2013	5.3	
100HR3-D	DD-44-4	12/2/2013	5.3	

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100HR3-D	DD-49-1	Delayed	3.5	Delayed until 1/15/14
100HR3-D	DD-49-2	Delayed	4.6	Delayed until 1/15/14
100HR3-D	DD-49-3	12/2/2013	7.2	
100HR3-D	DD-49-4	Delayed	9.1	Delayed until 1/15/14
100HR3-D	DD-50-1	Delayed	3.9	Delayed until 1/15/14
100HR3-D	DD-50-2	Delayed	5.9	Delayed until 1/15/14
100HR3-D	DD-50-3	Delayed	7.4	Delayed until 1/15/14
100HR3-D	DD-50-4	Delayed	9.1	Delayed until 1/15/14
100HR3-D	REDOX-1-3.3	5/2/2013	1.0	
100HR3-D	REDOX-1-3.3	Delayed	1.0	Delayed until 1/20/14
100HR3-D	REDOX-1-6.0	5/2/2013	1.8	
100HR3-D	REDOX-1-6.0	11/26/2013	1.8	
100HR3-D	REDOX-2-6.0	5/2/2013	1.8	
100HR3-D	REDOX-2-6.0	Delayed	1.8	Delayed until 1/20/14
100HR3-D	REDOX-3-3.3	5/2/2013	1.0	
100HR3-D	REDOX-3-3.3	Delayed	1.0	Delayed until 1/16/14
100HR3-D	REDOX-3-4.6	5/2/2013	1.4	
100HR3-D	REDOX-3-4.6	11/25/2013	1.4	
100HR3-D	REDOX-4-3.0	5/2/2013	0.9	
100HR3-D	REDOX-4-3.0	Delayed	0.9	Delayed until 1/16/14
100HR3-D	REDOX-4-6.0	5/2/2013	1.8	
100HR3-D	REDOX-4-6.0	Delayed	1.8	Delayed until 1/16/14
<b>100-HR-H</b>				
100HR3-H	C5632	Delayed	2.2	Delayed until 2/12/2014
100HR3-H	C5633	12/2/2013	5.3	
100HR3-H	C5634	Delayed	9.4	Delayed until 2/12/2014
100HR3-H	C5635	Delayed	2.1	Delayed until 2/12/2014
100HR3-H	C5636	Delayed	4.7	Delayed until 2/12/2014
100HR3-H	C5637	Delayed	3.8	Delayed until 2/12/2014
100HR3-H	C5638	12/2/2013	1.7	
100HR3-H	C5641	12/2/2013	1.4	
100HR3-H	C5644	Delayed	2.0	Delayed until 2/12/2014
100HR3-H	C5673	Delayed	1.6	Delayed until 2/12/2014
100HR3-H	C5674	Delayed	2.5	Delayed until 2/12/2014
100HR3-H	C5676	Delayed	1.6	Delayed until 2/12/2014
100HR3-H	C5677	Delayed	2.4	Delayed until 2/12/2014
100HR3-H	C5678	12/2/2013	2.4	
100HR3-H	C5679	Delayed	1.2	Delayed until 1/14/2014
100HR3-H	C5680	Delayed	3.6	Delayed until 1/14/2014

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100HR3-H	C5681	Not sampled	4.0	Broken; cancelled
100HR3-H	C5682	12/3/2013	2.7	
100HR3-H	C6284	Delayed	3.0	Delayed until 2/12/2014
100HR3-H	C6285	Delayed	4.5	Delayed until 2/12/2014
100HR3-H	C6286	Delayed	10.4	Delayed until 2/12/2014
100HR3-H	C6287	Delayed	2.0	Delayed until 1/14/14
100HR3-H	C6288	Delayed	2.4	Delayed until 1/14/14
100HR3-H	C6290	Delayed	2.6	Delayed until 1/13/14
100HR3-H	C6291	Delayed	4.0	Delayed until 1/13/14
100HR3-H	C6293	Delayed	2.4	Delayed until 1/9/14
100HR3-H	C6296	Delayed	2.4	Delayed until 1/9/14
100HR3-H	C6297	Delayed	4.0	Delayed until 1/9/14
100HR3-H	C6299	Delayed	2.5	Delayed until 1/9/14
100HR3-H	C6300	Delayed	3.8	Delayed until 1/9/14
100HR3-H	C6301	Delayed	5.3	Delayed until 1/9/14
100HR3-H	C7649	Delayed	1.7	Delayed until 1/9/14
100HR3-H	C7650	Delayed	2.4	Delayed until 1/9/14
100HR3-H	44-M	11/25/2013	2.6	
100HR3-H	45-D	Delayed	7.0	Delayed until 1/13/14
100HR3-H	45-M	Delayed	4.6	Delayed until 1/13/14
100HR3-H	45-S	Delayed	2.4	Delayed until 1/13/14
100HR3-H	47-D	12/3/2013	2.4	
100HR3-H	47-M	12/3/2013	2.4	
100HR3-H	48-M	12/3/2013	5.2	
100HR3-H	48-S	12/4/2013	2.7	
100HR3-H	49-D	11/25/2013	7.8	
100HR3-H	50-M	Delayed	5.3	Delayed until 2/26/2014
100HR3-H	50-S	Not sampled	2.6	No yield 2/26/2014
100HR3-H	51-D	Not sampled	7.8	Could not locate 2/28/2014
100HR3-H	51-M	Not sampled	5.3	Could not locate 2/28/2014
100HR3-H	51-S	Not sampled	2.9	Could not locate 2/28/2014
100HR3-H	52-D	Delayed	7.3	Delayed until 2/18/2014
100HR3-H	52-M	Delayed	4.6	Delayed until 2/18/2014
100HR3-H	52-S	Delayed	2.1	Delayed until 2/18/2014
100HR3-H	54-D	Delayed	7.9	Delayed until 2/18/2014
100HR3-H	54-M	Delayed	5.2	Delayed until 2/18/2014
100HR3-H	54-S	Delayed	2.3	Delayed until 2/18/2014
100HR3-H	AT-H-1-D	Not sampled	3.9	Unsuccessful 12/2/13; needs repair
100HR3-H	AT-H-1-M	12/3/2013	3.4	

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100HR3-H	AT-H-1-S	12/3/2013	1.9	
100HR3-H	AT-H-2-D	Delayed	3.7	Delayed until 1/9/14
100HR3-H	AT-H-2-M	Delayed	2.8	Delayed until 1/9/14
100HR3-H	AT-H-2-S	Delayed	1.6	Delayed until 1/9/14
100HR3-H	AT-H-3-D	12/3/2013	2.2	
100HR3-H	AT-H-3-S	12/3/2013	1.6	
<b>100-KR</b>				
100KR4	14-D	9/12/2013	6.6	
100KR4	17-D	9/12/2013	5.9	
100KR4	18-S	9/17/2013	2.6	
100KR4	19-D	9/17/2013	6.7	
100KR4	19-M	9/17/2013	3.0	
100KR4	21-M	9/25/2013	4.6	
100KR4	21-S	9/25/2013	3.4	
100KR4	22-D	10/1/2013	3.7	
100KR4	22-M	10/1/2013	2.3	
100KR4	23-M	10/1/2013	2.1	
100KR4	25-D	10/2/2013	2.3	
100KR4	26-D	10/2/2013	7.0	
100KR4	26-M	10/2/2013	4.3	
100KR4	26-S	10/2/2013	1.8	
100KR4	AT-K-1-D	9/12/2013	6.6	
100KR4	AT-K-2-D	9/17/2013	6.8	
100KR4	AT-K-3-D	9/19/2013	7.0	
100KR4	AT-K-3-M	9/19/2013	5.4	
100KR4	AT-K-3-S	9/19/2013	4.1	
100KR4	AT-K-4-M	10/1/2013	4.0	
100KR4	AT-K-4-S	10/1/2013	3.4	
100KR4	AT-K-5-D	10/3/2013	6.4	
100KR4	AT-K-5-M	10/3/2013	4.8	
100KR4	AT-K-5-S	10/3/2013	3.2	
100KR4	AT-K-6-D	10/2/2013	6.6	
100KR4	AT-K-6-M	10/2/2013	4.6	
100KR4	AT-K-6-S	10/2/2013	3.5	
100KR4	C6236	9/12/2013	3.0	
100KR4	C6237	9/12/2013	4.6	
100KR4	C6238	9/12/2013	6.6	
100KR4	C6239	9/16/2013	3.1	
100KR4	C6240	9/16/2013	4.5	

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100KR4	C6241	9/16/2013	6.7	
100KR4	C6242	9/17/2013	3.9	
100KR4	C6243	9/17/2013	6.3	
100KR4	C6244	9/17/2013	8.4	
100KR4	C6245	9/17/2013	3.4	
100KR4	C6246	9/17/2013	5.1	
100KR4	C6247	9/17/2013	7.0	
100KR4	C6248	9/19/2013	3.1	
100KR4	C6249	9/19/2013	4.6	
100KR4	C6250	9/19/2013	7.1	
100KR4	C6251	9/19/2013	3.1	
100KR4	C6252	9/19/2013	5.6	
100KR4	C6253	9/19/2013	7.3	
100KR4	C6254	9/25/2013	2.4	
100KR4	C6255	9/25/2013	3.3	
100KR4	C6256	9/25/2013	5.0	
100KR4	C6257	9/25/2013	3.0	
100KR4	C6258	9/25/2013	4.6	
100KR4	C6259	9/25/2013	5.9	
100KR4	C6260	10/1/2013	2.5	
100KR4	C6261	10/1/2013	4.1	
100KR4	C6263	10/2/2013	3.9	
100KR4	C6264	10/2/2013	6.2	
100KR4	C6265	10/2/2013	8.3	
100KR4	C7641	Not sampled	6.7	Missed
100KR4	C7641	4/3/2013	6.7	
100KR4	C7641	8/6/2013	6.7	
100KR4	C7641	9/16/2013	6.7	
100KR4	C7642	Not sampled	3.9	Missed
100KR4	C7642	4/3/2013	3.9	
100KR4	C7642	8/6/2013	3.9	
100KR4	C7642	9/16/2013	3.9	
100KR4	C7643	Not sampled	6.3	Missed
100KR4	C7643	4/3/2013	6.3	
100KR4	C7643	8/6/2013	6.3	
100KR4	C7643	9/16/2013	6.3	
100KR4	DK-04-2	10/2/2013	3.5	
<b>100-NR</b>				
100NR2	C6132	3/20/2013	1.7	

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100NR2	C6132	6/3/2013	1.7	Also 6/20/13 for bioremediation
100NR2	C6132	9/5/2013	1.7	
100NR2	C6132	12/29/2013	1.7	
100NR2	C6135	Not sampled	1.5	Broken; not repairable.
100NR2	C6135	Not sampled	1.5	Broken; not repairable.
100NR2	C6135	Not sampled	1.5	Broken; not repairable.
100NR2	C6317	1/28/2013	2.4	Delayed from 2012
100NR2	C6317	10/3/2013	2.4	
100NR2	C6318	1/28/2013	4.1	Delayed from 2012
100NR2	C6318	10/3/2013	4.1	
100NR2	C6319	1/28/2013	6.8	Delayed from 2012
100NR2	C6319	10/3/2013	6.8	
100NR2	C6320	1/10/2013	2.6	Delayed from 2012
100NR2	C6320	9/20/2013	2.6	
100NR2	C6321	1/10/2013	3.8	Delayed from 2012
100NR2	C6321	9/20/2013	3.8	
100NR2	C6322	1/28/2013	5.7	Delayed from 2012
100NR2	C6322	9/20/2013	5.7	
100NR2	C6323	1/8/2013	2.3	Delayed from 2012
100NR2	C6323	9/20/2013	2.3	
100NR2	C6324	1/8/2013	4.3	Delayed from 2012
100NR2	C6324	9/20/2013	4.3	
100NR2	C6325	1/8/2013	7.1	Delayed from 2012
100NR2	C6325	9/20/2013	7.1	
100NR2	C6326	9/20/2013	3.0	
100NR2	C6327	9/20/2013	5.1	
100NR2	C6328	9/20/2013	7.6	
100NR2	C6329	1/16/2013	4.8	Delayed from 2012
100NR2	C6329	10/7/2013	6.7	
100NR2	C6330	1/16/2013	8.7	Delayed from 2012
100NR2	C6330	10/7/2013	3.0	
100NR2	C6331	1/16/2013	5.2	Delayed from 2012
100NR2	C6331	10/7/2013	7.5	
100NR2	C6332	10/8/2013	3.0	
100NR2	C6333	10/8/2013	5.1	
100NR2	C6334	10/8/2013	7.6	
100NR2	C6352	1/9/2013	4.3	Delayed from 2012
100NR2	C6352	10/8/2013	4.3	
100NR2	C7881	1/10/2013	C7881	Delayed from 2012

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100NR2	C7881	3/19/2013	C7881	
100NR2	C7881	6/3/2013	C7881	
100NR2	C7881	9/6/2013	C7881	
100NR2	C7881	Delayed	C7881	Delayed until 1/17/14
100NR2	C7934	10/7/2013	4.4	
100NR2	C7935	3/25/2013	5.7	Added to confirm tritium increase
100NR2	C7935	8/6/2013	5.7	Added to confirm tritium increase
100NR2	C7935	10/7/2013	5.7	
100NR2	C7935	Not sampled	5.7	Missed
100NR2	C7935	Not sampled	5.7	Missed
100NR2	C7936	3/25/2013	8.9	Added to confirm tritium increase
100NR2	C7936	8/6/2013	8.9	Added to confirm tritium increase
100NR2	C7936	10/7/2013	8.9	
100NR2	C7936	Not sampled	8.9	Missed
100NR2	C7936	Not sampled	8.9	Missed
100NR2	C7937	10/7/2013	3.1	
100NR2	C7938	10/7/2013	4.5	
100NR2	C7939	10/7/2013	5.8	
100NR2	APT1	5/6/2013	2.7	
100NR2	APT1	9/6/2013	2.7	
100NR2	APT5	5/6/2013	3.1	
100NR2	APT5	9/6/2013	3.1	
100NR2	N116mArray-0A	1/10/2013	1.6	Delayed from 2012
100NR2	N116mArray-0A	3/20/2013	1.6	
100NR2	N116mArray-0A	6/3/2013	1.6	Also 6/20/13 for bioremediation
100NR2	N116mArray-0A	9/4/2013	1.6	
100NR2	N116mArray-10A	1/8/2013	1.0	Delayed from 2012
100NR2	N116mArray-10A	3/18/2013	1.0	
100NR2	N116mArray-10A	6/4/2013	1.0	
100NR2	N116mArray-10A	9/4/2013	1.0	
100NR2	N116mArray-11A	1/8/2013	1.0	Delayed from 2012
100NR2	N116mArray-11A	3/18/2013	1.0	
100NR2	N116mArray-11A	6/4/2013	1.0	
100NR2	N116mArray-11A	9/4/2013	1.0	
100NR2	N116mArray-12A	Not sampled	1.1	Broken; not repairable.
100NR2	N116mArray-12A	Not sampled	1.1	Broken; not repairable.
100NR2	N116mArray-12A	Not sampled	1.1	Broken; not repairable.

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100NR2	N116mArray-13A	3/19/2013	1.6	
100NR2	N116mArray-13A	6/4/2013	1.6	
100NR2	N116mArray-13A	Not sampled	1.6	Missed; cancelled
100NR2	N116mArray-13A	Delayed	1.6	Delayed until 1/24/14
100NR2	N116mArray-15A	1/8/2013	1.7	Delayed from 2012
100NR2	N116mArray-15A	3/18/2013	1.7	
100NR2	N116mArray-15A	6/4/2013	1.7	
100NR2	N116mArray-15A	9/4/2013	1.7	
100NR2	N116mArray-1A	1/10/2013	1.2	Delayed from 2012
100NR2	N116mArray-1A	3/19/2013	1.2	
100NR2	N116mArray-1A	6/3/2013	1.2	
100NR2	N116mArray-1A	9/6/2013	1.2	
100NR2	N116mArray-2A	1/18/2013	0.6	Delayed from 2012
100NR2	N116mArray-2A	3/19/2013	0.6	
100NR2	N116mArray-2A	6/3/2013	0.6	
100NR2	N116mArray-2A	9/6/2013	0.6	
100NR2	N116mArray-3A	1/10/2013	0.6	Delayed from 2012
100NR2	N116mArray-3A	1/29/2013	0.6	
100NR2	N116mArray-3A	2/25/2013	0.6	
100NR2	N116mArray-3A	3/26/2013	0.6	
100NR2	N116mArray-3A	4/15/2013	0.6	
100NR2	N116mArray-3A	5/28/2013	0.6	
100NR2	N116mArray-3A	6/18/2013	0.6	Changed to quarterly
100NR2	N116mArray-3A	9/6/2013	0.6	
100NR2	N116mArray-4A	1/10/2013	1.0	Delayed from 2012
100NR2	N116mArray-4A	1/29/2013	1.0	
100NR2	N116mArray-4A	2/25/2013	1.0	
100NR2	N116mArray-4A	3/26/2013	1.0	
100NR2	N116mArray-4A	4/15/2013	1.0	
100NR2	N116mArray-4A	5/28/2013	1.0	
100NR2	N116mArray-4A	6/18/2013	1.0	Changed to quarterly
100NR2	N116mArray-4A	9/6/2013	1.0	
100NR2	N116mArray-6A	1/9/2013	0.7	Delayed from 2012
100NR2	N116mArray-6A	1/29/2013	0.7	
100NR2	N116mArray-6A	2/25/2013	0.7	
100NR2	N116mArray-6A	3/26/2013	0.7	
100NR2	N116mArray-6A	4/15/2013	0.7	
100NR2	N116mArray-6A	5/28/2013	0.7	
100NR2	N116mArray-6A	6/18/2013	0.7	Changed to quarterly

**Table C.2 Aquifer Tube Sample Dates in 2013**

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100NR2	N116mArray-6A	9/6/2013	0.7	
100NR2	N116mArray-8.5A	3/19/2013	1.1	
100NR2	N116mArray-8.5A	6/4/2013	1.1	
100NR2	N116mArray-8A	1/9/2013	1.0	Delayed from 2012
100NR2	N116mArray-8A	3/18/2013	1.0	
100NR2	N116mArray-8A	6/4/2013	1.0	
100NR2	N116mArray-8A	9/6/2013	1.0	
100NR2	N116mArray-9A	1/9/2013	1.0	Delayed from 2012
100NR2	N116mArray-9A	3/18/2013	1.0	
100NR2	N116mArray-9A	6/4/2013	1.0	
100NR2	N116mArray-9A	9/4/2013	1.0	
100NR2	NVP1-1	1/9/2013	1.0	Delayed from 2012
100NR2	NVP1-1	4/15/2013	1.0	
100NR2	NVP1-1	6/5/2013	1.0	
100NR2	NVP1-1	Not sampled	1.0	Dry
100NR2	NVP1-2	1/9/2013	1.2	Delayed from 2012
100NR2	NVP1-2	4/15/2013	1.2	
100NR2	NVP1-2	6/5/2013	1.2	
100NR2	NVP1-2	9/5/2013	1.2	
100NR2	NVP1-3	1/9/2013	1.7	Delayed from 2012
100NR2	NVP1-3	3/14/2013	1.7	
100NR2	NVP1-3	6/5/2013	1.7	
100NR2	NVP1-3	9/5/2013	1.7	
100NR2	NVP1-4	1/9/2013	1.7	Delayed from 2012
100NR2	NVP1-4	3/14/2013	1.7	
100NR2	NVP1-4	6/5/2013	1.7	
100NR2	NVP1-4	9/5/2013	1.7	
100NR2	NVP1-5	1/9/2013	2.2	Delayed from 2012
100NR2	NVP1-5	3/14/2013	2.2	
100NR2	NVP1-5	6/5/2013	2.2	
100NR2	NVP1-5	9/5/2013	2.2	
100NR2	NVP2-115.1	1/10/2013	1.9	Delayed from 2012
100NR2	NVP2-115.1	3/14/2013	1.9	
100NR2	NVP2-115.1	6/5/2013	1.9	
100NR2	NVP2-115.1	9/5/2013	1.9	
100NR2	NVP2-115.4	1/10/2013	1.6	Delayed from 2012
100NR2	NVP2-115.4	3/14/2013	1.6	
100NR2	NVP2-115.4	6/5/2013	1.6	
100NR2	NVP2-115.4	9/5/2013	1.6	

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
100NR2	NVP2-115.7	1/10/2013	1.3	Delayed from 2012
100NR2	NVP2-115.7	3/14/2013	1.3	
100NR2	NVP2-115.7	6/5/2013	1.3	
100NR2	NVP2-115.7	9/5/2013	1.3	
100NR2	NVP2-116.0	1/10/2013	1.0	Delayed from 2012
100NR2	NVP2-116.0	1/29/2013	1.0	
100NR2	NVP2-116.0	2/25/2013	1.0	
100NR2	NVP2-116.0	3/26/2013	1.0	
100NR2	NVP2-116.0	4/15/2013	1.0	
100NR2	NVP2-116.0	5/28/2013	1.0	
100NR2	NVP2-116.0	6/18/2013	1.0	Changed to quarterly
100NR2	NVP2-116.0	9/6/2013	1.0	
100NR2	NVP2-116.3	1/10/2013	0.7	Delayed from 2012
100NR2	NVP2-116.3	3/14/2013	0.7	
100NR2	NVP2-116.3	6/5/2013	0.7	
100NR2	NVP2-116.3	9/5/2013	0.7	
<b>200-PO</b>				
200PO1	82-D	Delayed		Delayed until 2014
200PO1	82-M	Delayed	4.4	Delayed until 1/7/14
200PO1	82-S	Delayed	2.6	Delayed until 1/7/14
200PO1	83-D	Not sampled	6.1	Tube not in service
200PO1	84-D	12/5/2013	6.7	
200PO1	84-M	12/5/2013	4.3	
200PO1	84-S	12/5/2013	2.4	
200PO1	85-D	Not sampled	7.9	No yield 10/14/13
200PO1	85-M	Delayed	5.2	Delayed until 1/8/14
200PO1	85-S	Delayed	2.4	Delayed until 1/8/14
200PO1	86-D	Delayed	7.9	Delayed until 1/8/14
200PO1	86-M	12/16/2013	3.0	
200PO1	86-S	Delayed	2.1	Delayed until 1/8/14. Low yield.
200PO1	C6353	Not sampled	1.0	Line cracked. Cancelled
200PO1	C6356	10/14/2013	1.0	
200PO1	C6359	10/14/2013	1.3	
200PO1	C6362	Delayed	2.0	Delayed until 1/23/14
200PO1	C6368	Not sampled	2.0	Cancelled
200PO1	C6371	Not sampled	2.3	No yield FY13. Cancelled
200PO1	C6374	Delayed	2.1	Delayed until 1/22/14
200PO1	C6375	10/15/2013	2.7	
200PO1	C6378	10/15/2013	1.5	

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
200PO1	C6380	10/15/2013	0.5	
200PO1	C6383	Delayed	2.2	Delayed until 1/22/14
200PO1	C6384	10/15/2013	4.4	
<b>300-FF</b>				
300FF5	AT-3-1-D	Delayed	6.4	Delayed until 1/6/14
300FF5	AT-3-1-M	3/4/2013	5.1	
300FF5	AT-3-1-M	Delayed	5.1	Delayed until 1/6/14
300FF5	AT-3-1-S	Delayed	3.5	Delayed until 1/22/14
300FF5	AT-3-2-M	3/4/2013	5.1	
300FF5	AT-3-2-M	Delayed	5.1	Delayed until 1/23/14
300FF5	AT-3-2-S	Delayed	3.3	Delayed until 1/6/14
300FF5	AT-3-3-D	3/4/2013	8.9	
300FF5	AT-3-3-D	12/18/2013	8.9	
300FF5	AT-3-3-M	3/4/2013	4.6	
300FF5	AT-3-3-M	12/18/2013	4.6	
300FF5	AT-3-3-S	3/4/2013	2.1	
300FF5	AT-3-3-S	12/18/2013	2.1	
300FF5	AT-3-4-D	3/5/2013	2.9	
300FF5	AT-3-4-D	12/18/2013	2.9	
300FF5	AT-3-4-M	3/5/2013	2.8	
300FF5	AT-3-4-M	12/18/2013	2.8	
300FF5	AT-3-4-S	3/5/2013	2.1	
300FF5	AT-3-4-S	12/18/2013	2.1	
300FF5	AT-3-5-S	1/2/2013	2.3	Delayed from 2012
300FF5	AT-3-5-S	3/6/2013	2.3	
300FF5	AT-3-5-S	12/17/2013	2.3	
300FF5	AT-3-6-D	1/2/2013	11.8	Delayed from 2012
300FF5	AT-3-6-D	3/7/2013	11.8	
300FF5	AT-3-6-D	12/18/2013	11.8	
300FF5	AT-3-6-M	1/2/2013	6.7	Delayed from 2012
300FF5	AT-3-6-M	12/17/2013	6.7	
300FF5	AT-3-6-S	1/2/2013	2.9	Delayed from 2012
300FF5	AT-3-6-S	3/7/2013	2.9	
300FF5	AT-3-6-S	12/18/2013	2.9	
300FF5	AT-3-7-D	1/3/2013	11.4	Delayed from 2012
300FF5	AT-3-7-D	3/7/2013	11.4	
300FF5	AT-3-7-M	1/3/2013	6.4	Delayed from 2012
300FF5	AT-3-7-M	3/7/2013	6.4	
300FF5	AT-3-7-M	12/17/2013	6.4	

Table C.2 Aquifer Tube Sample Dates in 2013

Segment	Tube Name	2013 Sample Dates	Depth (m)	Comment
300FF5	AT-3-7-S	1/3/2013	2.6	Delayed from 2012
300FF5	AT-3-7-S	12/17/2013	2.6	
300FF5	AT-3-8-M	1/3/2013	4.3	Delayed from 2012
300FF5	AT-3-8-M	12/17/2013	4.3	
300FF5	AT-3-8-S	1/3/2013	2.4	Delayed from 2012
300FF5	AT-3-8-S	3/7/2013	2.4	
300FF5	AT-3-8-S	12/17/2013	2.4	
300FF5	C6341	3/5/2013	3.6	
300FF5	C6341	12/18/2013	3.6	
300FF5	C6342	3/5/2013	5.3	
300FF5	C6342	12/18/2013	5.3	
300FF5	C6343	3/5/2013	6.3	
300FF5	C6343	12/18/2013	6.3	
300FF5	C6344	3/5/2013	2.2	
300FF5	C6344	12/18/2013	2.2	
300FF5	C6347	1/2/2013	3.0	Delayed from 2012
300FF5	C6347	3/6/2013	3.0	
300FF5	C6347	Delayed	3.0	Delayed until 1/6/14
300FF5	C6348	1/2/2013	3.1	Delayed from 2012
300FF5	C6348	3/6/2013	3.1	
300FF5	C6348	12/17/2013	3.1	
300FF5	C6350	1/2/2013	2.6	Delayed from 2012
300FF5	C6350	3/6/2013	2.6	
300FF5	C6350	12/17/2013	2.6	
300FF5	C6351	1/2/2013	4.3	Delayed from 2012
300FF5	C6351	3/6/2013	4.3	
300FF5	C6351	12/17/2013	4.3	

## Notes:

- (1) Aquifer tubes listed by groundwater interest area (upstream to downstream), and then alphanumerically
- (2) Blue color shading indicates clustered tubes (e.g., tubes installed at different depths at same location) or multiple sampling events.

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