

Technical Memorandum

Subject: CDM Smith Status Report on Former Sodium Disposal Facility Groundwater Interim Measure (FSDf GWIM) – August 2016 Update

Date: August 20, 2018

Well RS-54 at the Former Sodium Disposal Facility (FSDf) was identified in the *Work Plan (revision 2) Groundwater Interim Measures* (MWH 2008) as a location to conduct a groundwater interim measure (GWIM). RS-54 is a relatively shallow well, installed approximately 45 feet into upper Chatsworth Formation bedrock. The RS-54 borehole intercepts groundwater harbored in near-surface bedrock fractures. Chatsworth Formation groundwater at the FSDf location is sometimes up to 200 feet below ground surface. RS-54 has exhibited volatile organic compound (VOC) concentrations exceeding 10,000 parts per billion and contamination in the bedrock fractures is probably the source of VOCs observed in Chatsworth Formation groundwater. The FSDf is identified in the 2007 Consent Order for Corrective Action as being the responsibility of the US Department of Energy (DOE).

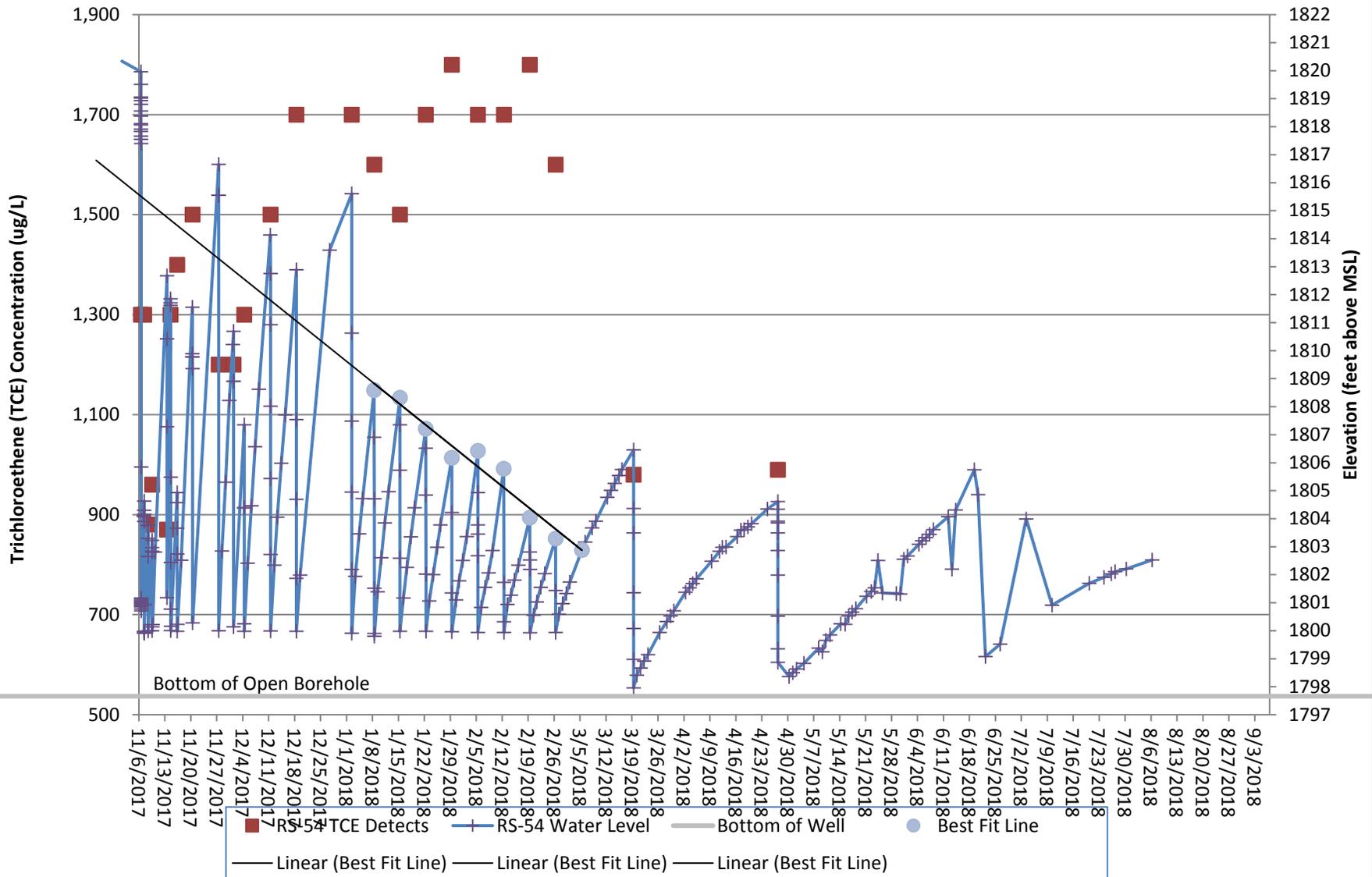
The objective of the GWIM at the FSDf is to remove contaminant mass and reduce threat to Chatsworth Formation groundwater. A review of the water level history for RS-54 illustrates that the presence of water in the well is highly dependent on seasonal rainfall. During the below average rainfall years of 2013 to 2016, RS-54 was either dry or exhibited an insufficient level of groundwater to pump. The 2016-2017 rain season was 23.47 inches, above the site average of 17.83 inches, and RS-54 exhibited groundwater again.

DOE initiated the GWIM pumping of RS-54 on November 6, 2017, when the water column height was 22 feet above the bottom of the well. Since starting of pumping, the well has been pumped down to the level of the pump inlet twenty-five times. (On March 19, 2018, the aging Grundfos pump was replaced with a new pump with a lower intake, allowing access to an additional foot of groundwater.) Following each pumping event, the well was allowed to recover. Over time, the period of water level recovery became longer and thus the period between pumping events increased. Figure 1 provides an illustration of the rate of recover of rate of RS-54 over time.

When last pumped dry on June 20, 2018, the water column height was 6.97 feet. When the water level was last measured on August 16, 2018, the well had recovered about 3 feet. DOE will continue to monitor water levels in RS-54 for sufficient water for pumping. In summary, approximately 330 gallons were pumped from RS-54, November 6 to June 26. Table 1 provides the pumping data and Table 2 the VOC water quality results for the well.

As part of the effort to identify bedrock fractures harboring VOCs at the FSDf, eight approximately 50-foot borings were drilled in bedrock at the FSDf in June 2018 (Figure 2). Two of these coreholes, C-21 and C-23, have captured bedrock fracture groundwater. Corehole C-21 was sampled and pumped dry on July 26, 2018. C-21 exhibited 2,300 µg/L TCE in the July 26 sample. DOE will continue to monitor FSDf water levels on a weekly basis. Should any of the coreholes produce sufficient water for pumping, it will be pumped and sampled as part of the FSDf GWIM.

RS-54, FSDF 7 ft. to 46 ft. Open Hole



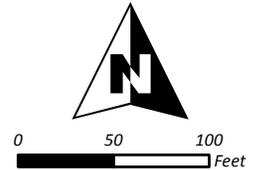


LEGEND

- | | | | |
|---------------------------|-------------------|----------------------|------------------------|
| Soil Gas Location | Road Centerline | Existing Structure | SSFL Property Boundary |
| Corehole Location | Former FSDF Pond | Existing Substation | Area IV Boundary |
| Existing Well/Piezometer | Existing Landfill | Demolished Structure | |
| Abandoned Well/Piezometer | | | |

Notes:
 - Original GIS layers provided by MWH/Boeing;
 updated by CDM Smith as needed.

Service Layer Credits:
 - Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX,
 Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
 - Road Centerline Source: Esri, TomTom.



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FIGURE 2
FSDF Soil Gas and Corehole Sample Locations - 2018

Table 2 - RS-54 Purge Water Results for VOCs

Sampling Date		Chemical										
Date/Time	1,1,1-TCA Conc. ug/L	1,1,2-TCA Conc. ug/L	1,1-DCA Conc. ug/L	1,2-DCA Conc. ug/L	Chloro- ethane ug/L	PCE Conc. ug/L	TCE Conc. ug/L	1,1-DCE Conc. ug/L	Vinyl Chloride ug/L	1,4- Dioxane ug/L	Benzene Conc. ug/L	
1	11/6/17 12:45	11000	4.5	2300	16	5.5	5	1300	2700	3.2	NA	7.8
2	11/7/17 10:15	10000	4.1	1900	15	4.5	5.2	1300	2600	3.0	NA	7.5
3	11/8/17 10:10	5600	4.3	1600	15	2.4	3.4	880	1200	1.3	NA	5.3
4	11/9/17 14:01	6000	4.1	1800	15.4	2	3.6	960	1100	0.985	NA	5.9
5	11/13/17 13:23	3900	4.4	1600	14	2.6	4.3	870	760	1.0	NA	6.2
6	11/14/17 12:50	6900	4.3	2100	14	2	5.3	1300	1400	1.3	NA	6.7
7	11/16/17 8:11	7400	3.9	2000	13	3	5.1	1400	1600	1.5	NA	6.7
8	11/20/17 10:35	7600	3.9	2200	13	4.3	5.8	1500	1700	1.5	NA	7.1
9	11/27/17 11:56	6800	3.5	2100	14	5.5	7.2	1200	1500	3.2	NA	8.9
10	12/1/17 11:58	6300	3	1800	10	2.5	4.7	1200	1900	2.7	NA	6.5
11	12/4/17 9:52	6300	3.3	1900	11	2.2	6.1	1300	1800	2.3	NA	6.8
12	12/11/17 11:28	7200	3.2	2100	11	3.1	7.1	1500	2220	5.0	NA	7.3
13	12/18/17 11:22	7300	3	2400	10	6.4	6.7	1700	2900	2.7	NA	6.9
14	01/02/18 09:37	8000	3.9	2100	13	3.8	7.1	1700	2000	2.4	NA	7.6
15	01/08/18 11:15	6900	5.6	2100	16	2.6	7	1600	1400	1.5	NA	7.7
16	01/15/18 09:30	6800	6.9	2400	18	11	6.8	1500	1500	2.3	NA	8.3
17	01/22/18 09:32	8300	7.4	2500	19	12	6.7	1700	1800	3.2	NA	8.2
18	01/29/18 09:39	11000	11	3300	25	3.6	8.6	2000	2100	6.4	NA	11
19	2/05/18 10:05	9100	12	2500	28	3.4	7.4	1700	1700	1.6	16	10
20	02/12/18 10:26	11000	12	2800	34	3.6	7	1700	1900	6.1	16	9.9
21	02/19/2018 11:00	10000	15	3200	36	9.4	9	1800	2000	2.1	25	13
22	02/26/2018 09:54	8200	13	2700	30	3.7	7.6	1600	1700	1.6	18	9.8
23	03/19/2018 10:02	5500	13	2300	34	3.2	4.6	980	930	1.3	28	8.5
24	4/27/2018 08:18	5700	12	2900	39	9.5	5	990	1000	2.8	27	9.2
25	6/20/2018 :09:15	2700	8.9	2300	24	1.1	2.7	720	670	0.71	NA	6.5