



DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, MCAPP
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

May 21, 2019

U-032-19

SUBJECT: Annual Status Report (Month 133 – Month 144, May 1, 2018 - April 30, 2019) of the Pilot Study Class V Aquifer Remediation Injection Wells at Camp Stanley Storage Activity, Boerne, Texas, TCEQ Authorization No. 5X2600431; WWC12002216; CN602728206/RN104431655

Mr. Bryan Smith
Texas Commission on Environmental Quality
Industrial and Hazardous Waste Permits Section
P.O. Box 13087 (MC-130)
Austin, TX 78711-3087

Dear Mr. Smith:

The Camp Stanley Storage Activity (CSSA), McAlester Army Ammunition Plant, U.S. Army Field Support Command, Army Material Command, U.S. Army, is submitting this annual report summarizing the injection activities performed at the on-post Solid Waste Management Unit (SWMU) B-3 site. The activities performed are part of the planned SWMU B-3 Corrective Measures to treat chlorinated compounds in groundwater via enhanced anaerobic biodegradation (EAB). Bioreactor activities include the injection of recovered groundwater into mulch/gravel filled bioreactor trenches and monitoring. Additional activities associated with this authorization include the injection of substrates, including lactate and emulsified vegetable oil (EVO), within bioreactor trenches and injection wells.

This annual report contains data as specified by the Texas Commission on Environmental Quality (TCEQ) Underground Injection Control (UIC) permit for the months of May 2018 through April 2019 (Months 133-144). The annual reporting data includes quarterly samples of the injected groundwater for volatile organic concentrations (VOCs), total dissolved solids (TDS), and field collected parameters including injection volumes, injection pressures and the pH of recovered groundwater, and volumes of injected substrates within injection wells. Data indicates that concentrations of contaminants did not exceed limits specified in 40 CFR §261.24 Table 1 as referenced in CSSA's UIC permit authorization.

Between May 1, 2018 and April 30, 2019 approximately 20,812,000 gallons of groundwater from wells CS-MW16-CC (~2,929,000 gallons), CS-MW16-LGR (~1,127,000 gallons), B3-EXW-01 (~2,951,000 gallons), B3-EXW-02 (~707,000 gallons), B3-EXW-03 (~5,133,000 gallons), B3-EXW-04 (~2,983,000 gallons), and B3-EXW-05 (~4,982,000 gallons) were injected into operational SWMU B-3 bioreactor

trenches 1, 2, and 6. A total of 227,241,540 gallons of recovered groundwater from CS-MW16-CC, CS-MW16-LGR, B3-EXW-01, B3-EXW-02, B3-EXW-03, B3-EXW-04, and B3-EXW-05 have been injected into trenches 1 through 6 since normal bioreactor operations began. Samples of the injected groundwater were collected during this reporting period on June 7, September 10, and December 6, 2018, and March 27, 2019. Analytical results are summarized in the attached Table 1. Field forms which contain operational pressures and pH readings for the reporting period are also attached. No substrate injections were performed within bioreactor trenches or injection wells associated with this Authorization (wells B3-MW01 through B3-MW04) during the reporting period.

Planned activities for the next reporting period, May 1, 2019 through April 30, 2020, include continued monthly, quarterly, and semi-annual monitoring, deciduous mulch refresh in trenches 1 and 2, and application of lactate within operational trenches and/or injection wells.

If you have any questions regarding the information contained in this letter, please feel free to contact me at (210) 295-7416 or Adrien Lindley, Parsons, at (512) 719-6052, adrien.lindley@parsons.com.

Sincerely,


Jason D. Shirley
Installation Manager

Enclosures

cc: Margarita Loya, CSSA Environmental Program Manager
Greg Lyssy, USEPA Region 6
Julie Burdey, Parsons (ltr only)
Ken Rice, Parsons
File: 640149.110093.04000

Table 1
Analytical Summary Data

Table 1

B3-UIC Analytical Results
March 2018 - March 2019

	Sample ID		Sample Date		Sample Type		Sampling Method		Lab ID		B3-UIC		B3-UIC		B3-UIC		B3-UIC		
	Lab MDL	Lab PQL	Lab PQL	Criteria (RCRA Haz.)	03/21/18	06/07/18	09/10/18	12/06/18	03/27/19	03/21/18	06/07/18	09/10/18	12/06/18	03/27/19	03/21/18	06/07/18	09/10/18	12/06/18	03/27/19
SW8260B (µg/L)																			
cis-DCE	0.07	1.2	--	--	53	1	1	64	1	1	18	1	102	1	1	66	1	66	1
trans-DCE	0.08	0.6	--	--	1.9	1	1	2.1	1	1	0.08	U	1.9	1	1.2	1	1.2	1	1
TCE	0.05	1.0	500		57	1	1	56	1	1	19	1	90	1	68	1	68	1	1
PCE	0.06	1.4	700		45	1	1	46	1	1	17	1	74	1	49	1	49	1	1
Toluene	0.06	1.1	--		0.06	U	1	0.06	U	1	0.06	U	0.06	1	0.06	U	0.06	U	1
Vinyl chloride	0.08	1.1	200		0.08	U	1	0.08	U	1	0.08	U	0.08	1	0.08	U	0.08	U	1
EPA 160.1 (mg/L)																			
TDS	4.4	10	--		375	1	1	410	2	2	293	1	300	1	353	1	353	1	1

Tables present all laboratory results for analytes.

Data packages for laboratory results are presented in Attachment 1.

All samples were analyzed by APPL Laboratory Services.

pH results reported were field measured.

UIC criteria specified in 40 CFR 261.24 Table 1.

Data Qualifiers:

U - The analyte was analyzed for, but not detected. The associated numeric

Abbreviations:

MDL Method Detection Limit

PQL Practical Quantitation Limit

N1 Environmental Sample

UIC Underground Injection Control

Field Forms

Semi-Annual Bioreactor Sampling

Personnel: B. Dietert / S. Elliott

Sump ID	Sump Depth (ft B TOC)	Sample Date	Sample Time	Water Level (ft B TOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used	Notes
B3-T1-1	15.95	3/19/18	1450	12.10	6.56	22.06	1.122	-96.6	2.50	✓	
B3-T1-2	15.52	3/21/18	0945	11.47	6.65	22.06	1.129	-122.6	0.45		
B3-T1-3	14.97	3/19/18	1430	10.75	6.46	23.35	0.828	-106.1	0.21		
B3-T2-1	11.78	3/19/18	N/A	11.11	6.42	20.62	1.031	39.9	0.41		
B3-T2-2	11.12	3/19/18	N/A	10.81	6.49	22.57	0.741	-104.2	1.16		
B3-T3-1	11.05	3/19/18	N/A	Dry							
B3-T3-2	7.40	3/19/18	N/A	Dry							
B3-T4-1	8.42	3/19/18	N/A	Dry							
B3-T5-1	11.55	3/19/18	N/A	11.18	6.40	21.84	0.976	73.3	1.51		
B3-T5-2	11.04	3/19/18	N/A	Dry							
B3-T6-1	14.63	3/19/18	1318	12.78	6.90	22.09	0.715	30.5	1.80	✓	
B3-T6-2	15.56	3/19/18	0840	11.98	6.81	22.20	0.691	-137.0	0.22		
B3-UIC		3/21/18	1050		7.18	21.27	0.635	254.0	5.62		

Well ID	Pump Depth (ft. B TOC)	Sample Date	Sample Time	Water Level (ft. B TOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP (mV)	DO (mg/L)	Notes
B3-MW01	287									(15-month)
CS-D	253	3/5/18	N/A	256.3						Water Level Below Pump: No Sample
CS-MW1-LGR	302	3/5/18	1345	N/A	7.03	21.86	0.590	288.8	N/A	
CS-MW5-LGR	407	3/21/18	1500	N/A	7.05	22.79	0.566	308.5	N/A	

Westbay/Zone	Sampling Port (ft B TOC)	Sample Date	Sample Time	TOC Pressure (psi)	Pressure in MP (psi)	Zone Pressure
CS-WB05-LGR03B	262	3/15/18	0926	14.09	23.85	14.71
CS-WB06-LGR03B	260	3/15/18	1110	14.16	26.49	42.97
CS-WB07-LGR03B	257	3/19/18	0938	14.05	14.20	34.12
CS-WB08-LGR03B	273	3/19/18	Dry	14.05	23.53	14.31

Semi-Annual Bioreactor Sampling

Personnel: B. Dietert / S. Elliott												
Sump ID	Sump Depth (ft BTOC)	Sample Date	Sample Time	Water Level (ft BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (Y)	Notes	
B3-T1-1	15.95	6/4/18	N/A	12.08	6.56	22.06	1.122	-96.6	2.50			
B3-T1-2	15.52	6/4/18	N/A	11.87	6.65	22.06	1.129	-122.6	0.45	✓		
B3-T1-3	14.97	6/4/18	N/A	11.09	6.46	23.35	0.828	-106.1	0.21			
B3-T2-1	11.78	6/4/18	N/A	11.06	6.42	20.62	1.031	39.9	0.41			
B3-T2-2	11.12	6/4/18	N/A	10.75	6.49	22.57	0.741	-104.2	1.16			
B3-T3-1	11.05	6/4/18	N/A	Dry								
B3-T3-2	7.40	6/4/18	N/A	Dry								
B3-T4-1	8.42	6/4/18	N/A	Dry								
B3-T5-1	11.55	6/4/18	N/A	11.03	6.62	23.97	0.916	-31.4	4.07			
B3-T5-2	11.04	6/4/18	N/A	Dry								
B3-T6-1	14.63	6/4/18	N/A	11.62	7.16	23.99	0.714	-174.5	0.63	✓		
B3-T6-2	15.56	6/4/18	N/A	11.45	6.97	24.13	0.727	-211.7	0.20			
B3-UIC		6/7/18	6.94		6.94	24.64	0.580	262.1	12.33			

Well ID	Pump Depth (ft. BTOC)	Sample Date	Sample Time	Water Level (ft. BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP (mV)	DO (mg/L)	Notes
B3-MW01	287									(15-month)
CS-D	253									Semi-Annual
CS-MW1-LGR	302									Semi-Annual
CS-MW5-LGR	407									Semi-Annual

Westbay Zone		Sampling Port (ft. BTOC)	Sample Date	Sample Time	TOC Pressure (psi)	Pressure in MP (psi)	Zone Pressure (psi)
CS-WB05-LGR03B	262	6/14/18	Profile Only	14.17	21.84	14.94	
CS-WB06-LGR03B	260	6/18/18	Profile Only	14.09	24.46	43.64	
CS-WB07-LGR03B	257	6/18/18	Profile Only	14.12	14.25	33.76	
CS-WB08-LGR03B	273	6/21/18	Profile Only	14.1	21.54	14.11	

Semi-Annual Bioreactor Sampling

Personnel: B. Dietert / S. Elliott												
Sump ID	Sump Depth (ft B TOC)	Sample Date	Sample Time	Water Level (ft B TOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used	Notes	
B3-T1-1	15.95	9/20/18	1110	4.60	6.78	24.61	1.149	42.5	0.10	✓		
B3-T1-2	15.52	9/24/18	0810	4.03	6.88	25.81	1.440	-186.2	0.39			
B3-T1-3	14.97	9/20/18	0950	2.65	7.04	26.00	1.427	36.3	0.43			
B3-T2-1	11.78	9/20/18	N/A	5.05	6.73	30.11	1.239	18.8	0.17			
B3-T2-2	11.12	9/20/18	N/A	4.31	6.78	29.37	1.177	-210.5	0.35			
B3-T3-1	11.05	9/20/18	N/A	6.79	6.45	27.58	2.819	-204.1	0.15			
B3-T3-2	7.40	9/20/18	N/A	5.77	7.23	29.61	0.930	40.4	0.33			
B3-T4-1	8.42	9/20/18	N/A	7.32	7.04	29.80	0.989	22.9	0.30			
B3-T5-1	11.55	9/20/18	N/A	10.17	6.81	23.62	0.564	73.7	0.80			
B3-T5-2	11.04	9/20/18	N/A	7.82	6.84	31.73	1.439	-97.0	0.44			
B3-T6-1	14.63	9/20/18	0855	12.51	6.85	23.48	0.560	-135.8	0.41	✓		
B3-T6-2	15.56	9/20/18	0915	11.45	6.77	23.15	0.570	54.7	0.20			
B3-UIC		9/10/18	1410		7.02	22.82	0.477	189.8	5.53			

Well ID	Pump Depth (ft. B TOC)	Sample Date	Sample Time	Water Level (ft. B TOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP (mV)	DO (mg/L)	Notes
B3-MW01	287									(15-month)
CS-D	253	9/6/18	1013	N/A	7.13	22.39	0.491	150.2	3.74	
CS-MW1-LGR	302	9/6/18	0808	N/A	7.09	21.64	0.536	139.7	0.86	
CS-MW5-LGR	407	9/6/18	1106	N/A	7.04	22.48	0.500	-30.4	1.76	

Westbay Zone	Sampling Port (ft B TOC)	Sample Date	Sample Time	TOC Pressure (psi)	Pressure in MP (psi)	Zone Pressure
CS-WB05-LGR03B	262	9/18/18	1332	14.14	21.53	76.04
CS-WB06-LGR03B	260	9/19/18	0828	14.13	24.51	61.09
CS-WB07-LGR03B	257	9/19/18	1030	14.15	14.28	85.17
CS-WB08-LGR03B	273	9/19/18	1255	14.12	21.62	77.31

Semi-Annual Bioreactor Sampling

Personnel: B. Dietert / S. Elliott												
Sump ID	Sump Depth (ft BTOC)	Sample Date	Sample Time	Water Level (ft BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (N)	Notes	
B3-T1-1	15.95	12/27/18	N/A	5.68	7.10	20.94	0.672	41.5	0.73			
B3-T1-2	15.52	12/27/18	N/A	5.40	6.96	20.11	0.629	23.7	0.28	✓		
B3-T1-3	14.97	12/27/18	N/A	3.88	7.19	17.69	0.733	-347.7	0.20			
B3-T2-1	11.78	12/27/18	N/A	6.10	6.80	20.08	0.863	112.2	0.23	✓		
B3-T2-2	11.12	12/27/18	N/A	5.40	6.87	20.67	0.786	-37.7	0.17			
B3-T3-1	11.05	12/27/18	N/A	7.45	6.78	20.83	0.742	36.8	0.23			
B3-T3-2	7.40	12/27/18	N/A	6.31	6.83	19.72	0.812	81.1	1.62			
B3-T4-1	8.42	12/27/18	N/A	6.96	6.69	20.89	0.774	138.5	1.36			
B3-T5-1	11.55	12/27/18	N/A	7.60	6.99	20.63	0.607	168.2	1.15			
B3-T5-2	11.04	12/27/18	N/A	7.25	6.60	20.97	0.860	154.6	0.44			
B3-T6-1	14.63	12/27/18	N/A	7.49	7.00	19.85	0.623	177.4	1.18	✓		
B3-T6-2	15.56	12/27/18	N/A	7.25	7.19	20.67	0.612	173.1	3.51			
B3-UIC		12/6/18	1400		7.13	21.56	0.591	78.0	6.96			

Well ID	Pump Depth (ft. BTOC)	Sample Date	Sample Time	Water Level (ft. BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP (mV)	DO (mg/L)	Notes
B3-MW01	287									(15-month)
CS-D	253									Semi-Annual
CS-MW1-LGR	302									Semi-Annual
CS-MW5-LGR	407									Semi-Annual

Westbay Zone	Sampling Port (ft BTOC)	Sample Date	Sample Time	TOC Pressure (psi)	Pressure in MP (psi)	Zone Pressure (psi)
CS-WB05-LGR03B	262	12/10/18	Profile Only	14.33	22.58	81.19
CS-WB06-LGR03B	260	12/10/18	Profile Only	14.33	24.66	86.26
CS-WB07-LGR03B	257	12/10/18	Profile Only	14.33	14.47	84.42
CS-WB08-LGR03B	273	12/10/18	Profile Only	14.32	21.79	81.8

Semi-Annual Bioreactor Sampling

Personnel: B. Dietert / S. Elliott

Sump ID	Sump Depth (ft. BTOC)	Sample Date	Sample Time	Water Level (ft. BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used	Notes
B3-T1-1	15.95	4/3/19	1045	6.27	7.00	21.63	0.654	69.3	2.03		
B3-T1-2	15.52	3/27/19	1305	6.41	6.84	21.36	0.833	-158.2	0.57	✓	
B3-T1-3	14.97	4/3/19	0945	4.99	7.04	21.02	0.752	-4.5	0.61		
B3-T2-1	11.78	3/27/19	1025	6.89	6.78	20.26	0.842	42.6	1.67	✓	
B3-T2-2	11.12	4/3/19	1015	6.05	6.67	20.30	0.770	-165.8	0.69		
B3-T3-1	11.05	3/27/19	N/A	8.05	6.71	18.67	0.787	140.4	1.32		
B3-T3-2	7.40	3/27/19	N/A	Dry							
B3-T4-1	8.42	3/27/19	N/A	Dry							
B3-T5-1	11.55	3/27/19	N/A	7.85	7.14	20.82	0.695	413.2	3.65		
B3-T5-2	11.04	3/27/19	N/A	10.38	6.52	22.02	1.135	-198.2	4.38		
B3-T6-1	14.63	3/27/19	1000	8.32	7.00	21.46	0.712	458.0	1.85		
B3-T6-2	15.56	3/27/19	0820	8.21	7.01	21.30	0.711	394.3	0.64	✓	
B3-UIC		3/27/19	1415		7.02	22.49	0.711	93.5	6.56		

Well ID	Pump Depth (ft. BTOC)	Sample Date	Sample Time	Water Level (ft. BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP (mV)	DO (mg/L)	Notes
B3-MW01	287									(15-month)
CS-D	253	3/6/19	0830	N/A	7.12	18.79	0.465	180.6	9.32	
CS-MW1-LGR	302	3/6/19	1310	N/A	7.04	19.79	0.491	113.1	3.50	
CS-MW5-LGR	407	3/6/19	1125	N/A	7.06	20.30	0.484	127.9	8.81	

Westbay Zone	Sampling Port (ft. BTOC)	Sample Date	Sample Time	TOC Pressure (psi)	Pressure in MP (psi)	Zone Pressure
CS-WB05-LGR03B	262	3/20/19	0807	14.15	21.22	79.56
CS-WB06-LGR03B	260	3/21/19	1320	14.14	23.51	85.02
CS-WB07-LGR03B	257	3/20/19	1447	14.14	14.45	82.42
CS-WB08-LGR03B	273	3/22/19	1357	14.16	21.56	80.08