



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

June 1, 2017

U-040-17

SUBJECT: Annual Status Report (Month 109 – Month 120, May 1, 2016 - April 30, 2017) 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 Pilot Study being performed to evaluate the effectiveness of enhanced anaerobic biodegradation (EAB) for treatment of chlorinated compounds in groundwater. The pilot study activities include the injection of recovered groundwater and lactate into mulch/gravel filled bioreactor trenches.

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 2016 through April 2017 (Months 109-120). The annual reporting data includes quarterly samples of the injected groundwater for volatile organic concentrations (VOCs) and total dissolved solids (TDS) and field collected parameters including injection volumes, injection pressures and the pH of recovered groundwater. 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 April 11, 2017 and April 18, 2017, 1,325 gallons total of lactate (WilClear Plus with Accelerite) was applied to the bioreactor trenches. The lactate was mixed in-line with recovered groundwater from the bioreactor system and transmitted to each of the trenches via the water conveyance and distribution system.

Between May 1, 2016 and April 30, 2017 approximately 34,712,000 gallons of groundwater from wells CS-MW16-CC (~3,259,000 gallons), CS-MW16-LGR (~5,395,000 gallons), B3-EXW-01 (~7,506,000 gallons), B3-EXW-02 (~5,181,000), B3-EXW-03

(~3,044,000), B3-EXW-04 (~6,341,000), and B3-EXW-05 (~3,986,000) were injected into SWMU B-3 bioreactor trenches 1-6. A total of 188,335,340 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 these trenches since normal bioreactor operations began. Samples of the injected groundwater were collected on July 12, September 14, and December 8, 2016, and March 14, 2017 for this reporting period. Results of analysis are summarized in the attached Table 1. Field forms which contain operating pressures and pH readings for the reporting period are also attached and the laboratory data packages are included in the accompanying CD.

If you have any questions regarding the information contained in this letter, please feel free to contact me at (210) 295-7416 or Ken Rice, Parsons, at (512) 719-6050.

Sincerely,



Jason D. Shirley  
Installation Manager

Enclosures

cc: Felicia Kraintz, CSSA Environmental Program Manager  
Julie Burdey, Parsons (ltr only)  
Ken Rice, Parsons  
File: 745953.03100

**Table 1**  
**Analytical Summary Data**

Table 1

B3-UIC Analytical Results  
April 2016 - April 2017

SW9260B (µg/L)	Sample ID		Sample Date		Sample Type		Sampling Method		Lab ID		B3-UIC		B3-UIC		B3-UIC		B3-UIC		B3-UIC		
	Lab	Lab	MDL	PQL	Criteria	RCRA	Haz.	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution		
	MDL	PQL	Criteria	RCRA	Haz.	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	Results	Flags	Dilution	
cis-DCE	0.07	1.2	--				147	2	1	75	1	152	2	1	91	1	96	1	1	96	1
trans-DCE	0.08	0.6	--				0.69	1	1	1.3	1	0.91	1	1	0.57	F	0.53	F	1	0.53	F
TCE	0.05	1.0	500				129	2	1	76	1	130	2	1	92	1	101	1	1	101	1
PCE	0.06	1.4	700				99	1	1	0.06	U	104	2	1	74	1	79	1	1	79	1
Toluene	0.06	1.1	--				0.06	U	1	0.06	U	0.06	U	1	0.06	U	0.06	U	1	0.06	U
Vinyl chloride	0.08	1.1	200				0.08	U	1	0.08	U	0.08	U	1	0.08	U	0.08	U	1	0.08	U
EPA 160.1 (mg/L)	4.4	10	--				357	1	1	349	1	336	1	1	341	1	350	1	1	350	1
TDS																					

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:

F - The analyte was positively identified, but the quantitation is an estimate

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

Personnel: B. Dietert (Week 480)

### Trench Sumps Water Levels (BTOC)

Sump ID	Sump Depth (ft BTOC)	Sump Water Level (ft BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (%)	Notes
Date: 07/12/16									
Time: 0800-1600									
B3-T1-1	15.95	6.05	6.69	23.70	0.838	-182.8	0.14		
B3-T1-2	15.52	6.12	6.68	25.31	0.787	-180.4	0.06	✓	
B3-T1-3	14.97	5.47	6.97	26.88	0.913	-164.3	0.55		
B3-T2-1	11.78	6.26	6.66	24.98	0.865	-132.4	0.08	✓	
B3-T2-2	11.12	6.08	6.64	25.11	0.879	-152.3	0.49		
B3-T3-1	11.05	5.75	6.91	23.21	0.605	97.9	1.90	✓	
B3-T3-2	7.4	5.58	6.67	26.32	1.035	-209.6	0.04	✓	
B3-T4-1	8.42	6.38	6.64	25.24	0.904	-213.2	0.02		
B3-T5-1	11.55	7.29	6.85	23.10	0.601	-245.4	0.03	✓	
B3-T5-2	11.04	7.76	6.42	27.38	1.218	-220.2	0.11		
B3-T6-1	14.63	10.15	6.86	23.05	0.605	314.8	1.42		
B3-T6-2	15.56	9.83	6.79	22.98	0.655	270.4	0.18	✓	
B3-UIC			7.12	24.26	0.627	51.4	4.08		Sample @ 1315

### B-3 Transfer System Monitoring

Well ID	Flow Meters Readings							
	Monday	Tuesday	Wednesday	Thursday	Friday	7/14/16	7/15/16	
CS-MW16-CC	13.60	5.671,464	0.00	5,696,526	13.82	5,710,026	12.17	5,726,721
CS-MW16-LGR	18.01	645,850	0.00	697,802	0.00	706,460	17.39	720,727
B3-EXW01	338	31.51	1,217,999	18	27.72	1,257,077	0	26.80
B3-EXW02	333	0.00	7,015,706	0	26.80	7,078,677	0	25.85
B3-EXW03	320	Offline	590,405	0	Offline	590,405	0	Offline
B3-EXW04	330	0.00	271,700	0	21.13	312,113	0	20.39
B3-EXW05	364	38.82	665,649	2	0.00	701,858	0	0.00
T-1	Closed →							
T-6	Closed →							
Meter In:	100.26	5,932,444	74.56	6,189,254	86.34	6,335,998	81.78	6,453,953
Meter Out:	83.47	1,770,662	76.20	2,025,840	85.31	2,172,366	81.94	2,290,642
Tank Levels:	3,000	3,000	4,000	4,000	4,000	4,100	4,000	4,000
Bag Filler Pressure (In/Out):	8/10	7/6	8/8	7/6	12/10	7/6	12/10	7/6
Change BF	150 µ	75 µ	150 µ	75 µ	150 µ	75 µ	150 µ	75 µ

Notes: EXW's flowmeter out of service, well offline.

Alternating EXW 4&5 to increase bag filter life (High NTU)

Personnel: B. Dietert (Week 491)

### Trench Sumps Water Levels (BTOC)

Sump ID	Sump Depth (ft. BTOC)	Sump Water Level (ft. BTOC)	pH	Temp. (deg. C.)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (✓)	Notes
<i>Date: 09/22/16 - 09/30/16</i>									
<i>Time: 0800 - 1600</i>									
B3-T1-1	15.95	4.47	6.15	23.96	1.622	30.9	0.20		9/28/2016 1350
B3-T1-2	15.52	4.40	6.69	24.62	1.613	-35.8	0.21	✓	9/29/2016 0825
B3-T1-3	14.97	2.85	6.38	24.34	1.619	-8.5	0.12		9/28/2016 1420
B3-T2-1	11.78	4.83	6.67	26.67	1.862	99.1	0.32	✓	9/28/2016 1100
B3-T2-2	11.12	4.22	6.70	24.58	1.298	-66.4	0.17		9/28/2016 1035
B3-T3-1	11.05	5.20	6.55	22.78	0.978	255.5	1.61	✓	9/26/2016 1152
B3-T3-2	7.4	4.50	6.65	24.01	1.471	136.9	0.42	✓	9/26/2016 1505
B3-T4-1	8.42	5.55	6.44	23.87	1.440	-36.6	0.34	✓	9/28/2016 1545
B3-T5-1	11.55	6.51	6.44	22.80	1.200	100.6	0.23	✓	9/26/2016 1015
B3-T5-2	11.04	9.21	6.22	28.71	1.748	-44.6	0.29	✓	9/22/2016 1430
B3-T6-1	14.63	14.22	6.65	24.85	1.572	-63.3	0.79	✓	9/22/2016 1345
B3-T6-2	15.56	14.69	6.37	24.29	1.503	-15.0	0.29	✓	9/22/2016 1110
B3-UIC			7.03	23.19	0.605	286.5	4.79		9/14/2016 0912

### B-3 Transfer System Monitoring

Meter		Flow Meters Readings				
Date Time:	Pump Depth (ft)	Monday	Tuesday	Wednesday	Thursday	Friday
CS-MW16-CC	405	9/26/16 1545	9/27/16	9/28/16	9/29/16	9/30/16
CS-MW16-LGR	302	6,539,772		0.00	6,568,983	
B3-EXW01	338	2,010,904		15.30	2,056,604	
B3-EXW02	333	2,994,275	34	19.88	3,024,995	18
B3-EXW03	320	Offline	Offline	Offline	7,810,468	0
B3-EXW04	330	Offline	Offline	Offline	590,405	0
B3-EXW05	364	17.60	1,261,900	50	17.30	1,362,474
		29.1	1,853,720	20	28.27	1,949,393
Old Mainfield	T-1	Closed →				
	T-6	Closed →				
New Building	Meter In:	90.2	2,885,830		80.06	3,159,652
	Meter Out:	88.06	8,725,922		81.33	8,999,742
	Tank Levels:	4,000	4,000		4,000	6,400
	Bag Filter Pressure (In/Out):	24/10	8/7		34/10	8/6
	Change BF	150 μ	75 μ		150 μ	75 μ

Notes: EXW3 flowmeter out of service, well offline. EXW2 offline for solar array testing.

Heavy rain: approx. 5" over past couple days.

Alternating EXW 4&5 to increase bag filter life (High NTU)

Flushed EXW3 pump for 10 min.

Personnel: B. Dietert (Week 506)

### Trench Sumps Water Levels (BTOC)

Sump ID	Sump Depth (ft BTOC)	Sump Water Level (ft BTOC)	pH	Temp. (deg. C)	SpCond (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (%)	Notes
<i>Date: 01/13/2017</i>									
<i>Time: 1200 - 1500</i>									
B3-T1-1	15.95	5.15	6.84	20.36	0.699	29.9	0.07		01/13/2017 1357
B3-T1-2	15.52	4.80	6.78	19.25	0.733	117.2	0.00	✓	01/13/2017 1415
B3-T1-3	14.97	3.50	6.96	12.62	0.733	-17.1	0.00		01/13/2017 1421
B3-T2-1	11.78	4.45	6.57	20.77	0.822	97.4	0.03	✓	01/13/2017 1351
B3-T2-2	11.12	4.82	6.72	20.11	0.768	-55.5	0.01		01/13/2017 1412
B3-T3-1	11.05	6.66	6.76	19.93	0.696	127.8	0.64	✓	01/13/2017 1346
B3-T3-2	7.4	5.09	6.74	21.15	0.733	83.1	0.06		01/13/2017 1401
B3-T4-1	8.42	5.98	6.60	21.53	0.793	-49.3	0.00	✓	01/13/2017 1408
B3-T5-1	11.55	6.82	6.67	21.73	0.731	3.7	0.04	✓	01/13/2017 1332
B3-T5-2	11.04	5.34	6.79	21.40	0.902	-66.4	0.04		01/13/2017 1432
B3-T6-1	14.63	9.31	6.89	21.60	0.659	87.8	1.59		01/13/2017 1320
B3-T6-2	15.56	9.05	6.53	21.51	0.864	-129.4	0.08	✓	01/13/2017 1325
B3-UIC			6.97	20.03	0.578	168.7	6.02		12/18/2016 1300

### B-3 Transfer System Monitoring

Well ID	Date Time:	Flow Meters Readings					Rate (gpm) / Cumulative Total (gal) / Well Head Pressure
		Monday	Tuesday	Wednesday	Thursday	Friday	
CS-MW16-CC	405	10.92	7,208,061	1530	1545	1315	1445
CS-MW16-LGR	302	14.59	3,435,484	1530	1545	1315	1445
B3-EXW01	338	0.00	4,777,731	1/10/17	1/11/17	1/12/17	1/13/17
B3-EXW02	333	21.03	8,602,687	0.00	13.12	10.99	11.15
B3-EXW03	320	26.81	1,777,337	15.94	0.00	14.32	14.41
B3-EXW04	330	18.98	3,218,736	21.90	22.51	22.05	21.76
B3-EXW05	364	Offline	13,164,223	0.00	0.00	0.00	0.00
T-1	Closed →	Offline	13,164,223	0	Offline	0	Offline
T-6	Closed →	Offline	13,164,223	0	Offline	0	Offline
Meter In:	91.11	2,539,480	100.11	2,681,450	82.82	2,815,455	2,918,268
Meter Out:	91.91	8,344,171	106.30	8,486,718	80.90	8,616,808	8,718,668
Tank Levels:	4,000	4,000	3,700	3,700	5,900	5,900	6,400
Bag Filter Pressure (In/Out):	6/9	7/6	8/10	7/6	8/8	7/6	7/6
Change BF	150 µ	75 µ	150 µ	75 µ	150 µ	75 µ	75 µ

Notes: EXW5 out of service; pump awaiting replacement.



Personnel: B. Dietert, S. Elliott (Week 514)

**Trench Sumps Water Levels (BTOC)**

Sump ID	Sump Depth (ft BTOC)	Sump Water Level (ft BTOC)	pH	Temp. (deg. C)	SpCond. (mS/cm)	ORP	DO (mg/L)	Trench Currently Being Used (%)	Notes
<i>Date: 03/06/2017 - 303/21/2017</i>									
<i>Time: 0800 - 1600</i>									
B3-T1-1	15.95	5.21	6.97	21.12	0.639	164.4	0.10		03/09/2017 1050
B3-T1-2	15.52	5.20	6.67	21.30	0.729	-20.6	0.21	✓	03/09/2017 0945
B3-T1-3	14.97	4.23	6.86	19.18	0.770	-45.0	0.08		03/09/2017 0900
B3-T2-1	11.78	5.21	6.51	21.22	0.856	123.3	0.05	✓	03/13/2017 0950
B3-T2-2	11.12	4.74	6.56	21.01	0.828	-24.3	0.03		03/13/2017 0908
B3-T3-1	11.05	5.47	6.95	21.58	0.628	227.2	2.27	✓	03/13/2017 1040
B3-T3-2	7.4	5.10	6.93	20.58	0.656	159.2	1.30		03/13/2017 1022
B3-T4-1	8.42	6.37	6.48	22.10	0.886	-15.1	0.02	✓	03/21/2017 1350
B3-T5-1	11.55	7.96	6.70	22.02	0.632	199.9	0.08	✓	03/13/2017 1433
B3-T5-2	11.04	8.22	6.47	21.57	0.887	-32.7	0.15		03/13/2017 1353
B3-T6-1	14.63	10.82	6.66	21.83	0.694	148.3	0.89		03/13/2017 1530
B3-T6-2	15.56	9.96	6.72	21.91	0.748	117.2	0.43	✓	03/14/2017 1058
B3-UIC			7.06	21.97	0.639	220.2	4.53		12/18/2016 1300

**B-3 Transfer System Monitoring**

Well ID	Date Time:	Flow Meters Readings					Rate (gpm) / Cumulative Total (gal) / Well Head Pressure				
		Monday	Tuesday	Wednesday	Thursday	Friday					
CS-MW16-CC	405	0.00	7,722,210				12.08	7,751,212	11.95	7,765,924	
CS-MW16-LGR	302	0.00	4,038,531					4,069,063	17.60	4,090,653	
B3-EXW01	338	0.00	5,901,950	0	27.04	5,928,941	18	5,999,362	18	25.85	6,031,741
B3-EXW02	333	0.00	9,857,380	0	24.38	9,891,561	34	9,955,623	32	22.70	9,985,254
B3-EXW03	320	15.07	2,400,605	60	41.62	2,420,656	48	2,462,822	0	0.00	2,462,822
B3-EXW04	330	0.00	4,131,674	0	0.00	4,155,041	0	4,173,938	0	0.00	4,173,938
B3-EXW05	364	Offline	13,164,223	0	Offline	13,164,223	0	Offline	0	Offline	13,164,223
Old	T-1	Closed →									
	T-6	Closed →									
New Building	Meter In:	91.11	2,539,480	100.11	2,681,450			7,916,465	78.55	8,014,357	
	Meter Out:	91.91	8,344,171	106.30	8,486,718						
	Tank Levels:	4,000	4,000	3,700	3,700			4,000	4,000	4,000	
Change BF	Bag Filter Pressure (In/Out):	6/9	7/6	8/10	7/6			6/6	10/8.5	6/6	
		150 μ	75 μ	150 μ	75 μ			75 μ	150 μ	75 μ	

Notes: EXW5 out of service; pump awaiting replacement. Meter Out flowmeter inaccessible for bioreactor building maintenance.