



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

August 28, 2001

Office of the Commander

U - 031 - 01

Mr.

Mr.

Camp Stanley Storage Activity (CSSA) collected groundwater samples from your water well on June 12 and August 8, 2001. These samples were submitted to a laboratory contracted by CSSA for volatile organic compound (VOC) analysis. This letter provides you with the VOC data from the laboratory results and a formal thank you for your assistance in this groundwater monitoring effort.

Results from the contract laboratory are attached. Below we provide a summary of detected VOC compounds compared to maximum contaminant levels (MCLs) allowed in drinking water by the U.S. Environmental Protection Agency under the Safe Drinking Water Act.

Compound	Result (ppb)	MCL (ppb)
<b>VOCs</b>		
12 June 2001		
Tetrachloroethene (PCE)	4.0	5
Trichloroethene (TCE)	0.43	5
8 August 2001 (Post-GAC)		
PCE	<0.11	5
TCE	<0.14	5

Based on the analytical data, low levels of the VOCs, PCE and TCE, was identified in water samples from your well. PCE is one of the compounds that were identified during the December 1999, June 2000, March 2000, September 2000, December 2000, and March 2001 sampling events. Although these VOCs are not naturally occurring, they are below the MCL and as such, do not prevent use of your well.

Even though the recent test results indicated 4 ppb, linear regression statistics run on the previous sampling event data points have shown that your well could have exceeded the MCL by the winter of this year. Therefore, we selected a filtration

system for installation on your well. On Tuesday, August 7, 2001, CSSA arranged to have a granular activated carbon (GAC) filtration system installed on your well.

The filtration system was installed by Carbonair Environmental Systems of San Marcos Texas. CSSA contracted with Carbonair to install the system at no cost to you on August ---. The system will remain in operation for the foreseeable future or until significant reductions in contamination levels are seen in the water in your well before it enters the filter. As we discussed at the time of installation, CSSA will be responsible for all costs associated with operation and maintenance of this system. However, we ask that you take responsibility for exchanging the five-micron pre- and post-filters that are located within the system housing. The spare filters are located inside the housing and should be changed at least monthly. Spent filters can be disposed of with your regular household trash. Please contact the installer at (800) 893-5937 should you have questions regarding the filter change-out.

Carbonair is scheduled to perform maintenance on the system every six months. Their first maintenance visit is scheduled for approximately February 8, 2002. At that time, Carbonair will exchange the first carbon canister and perform other routine maintenance operations. If you experience any problems with the system, please let the installer or CSSA know immediately. Carbonair is very responsive and can make additional maintenance visits if needed.

On Wednesday, August 8, CSSA collected a water sample from your well above the GAC filter system. Analyses of this sample found very small amounts of volatile organic compounds and confirmed the system is working effectively. A summary of the post GAC analytical results is provided above, the actual laboratory data sheets are attached. CSSA will collect additional confirmation samples periodically to confirm the system remains effective.

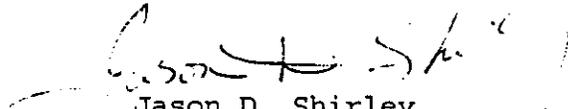
CSSA will also take periodic samples from your well during the drilling processes of an additional monitoring well. The installation of the new well is located approximately 200 feet from yours and we want to ensure that our activities do not adversely impact your drinking water supply. We will contact you as these sampling events occur to keep you informed and provide analytical data as results become available.

As part of the ongoing CSSA environmental program, we are continuing to investigate and cleanup VOC source areas on the base and to track these compounds in ground water on- and off-base. As part of this effort, we would like to schedule another sampling event for December 2001. When arrangements with

contractors are complete, we will contact you with a proposed sampling date and time. We will provide at least 72 hours notice when sampling is planned. CSSA anticipates sampling your well at least quarterly for the foreseeable future.

Again, we would like to thank you for your patience and cooperation. We regret that your well has been impacted, but remain committed to making sure your water is safe to use and keeping you informed. If you have any questions concerning this letter, please contact me at 295-7416.

Sincerely,



Jason D. Shirley  
Lieutenant Colonel, U.S. Army  
Commanding Officer

CC: Ms.

Mr. Greg Lyssy  
EPA Region 6

Mr. Kirk Coulter  
TNRCC

Mr. Tom Haberle  
TNRCC Region 13

Ms. Abigail Power  
TNRCC Region 13

Ms. Kyle Cunningham, R.S.  
San Antonio Metropolitan Health District

Ms. Susan Roberts  
Parsons ES

**AFCEE  
ORGANIC ANALYSES DATA SHEET 2  
RESULTS**

Analytical Method: EPA 8260B      Preparatory Method: 5030B      AAB #: 010620BH-37207  
 Lab Name: APPL, Inc      Contract #: F41689-96-D-0710/DO 5084  
 Field Sample ID: LS-7      Lab Sample ID: AP18431      Matrix: Water  
 % Solids: NA      Initial Calibration ID: H010615  
 Date Received: 15-Jun-01      Date Prepared: 20-Jun-01      Date Analyzed: 20-Jun-01  
 Concentration Units: ug/L

Analyte	MDL	RL	Concentration	Dilution	Confirm	Qualifier
1,1,1,2-Tetrachloroethane	0.21	0.5	0.21	1.0		U
1,1,1-TCA	0.15	0.8	0.15	1.0		U
1,1,2,2-Tetrachloroethane	0.15	0.4	0.15	1.0		U
1,1,2-TCA	0.15	1.0	0.15	1.0		U
1,1-DCA	0.21	0.4	0.21	1.0		U
1,1-DCE	0.23	1.2	0.23	1.0		U
1,1-Dichloropropene	0.11	1.0	0.11	1.0		U
1,2,3-Trichlorobenzene	0.26	0.5	0.26	1.0		U
1,2,3-Trichloropropane	0.53	3.2	0.53	1.0		U
1,2,4-Trichlorobenzene	0.26	0.5	0.26	1.0		U
1,2,4-Trimethylbenzene	0.08	1.3	0.08	1.0		U
1,2-DCA	0.20	0.6	0.20	1.0		U
1,2-DCB	0.06	0.3	0.06	1.0		U
1,2-Dibromo-3-chloropropane	0.64	2.6	0.64	1.0		U
1,2-Dichloropropane	0.22	0.4	0.22	1.0		U
1,2-EDB	0.12	0.6	0.12	1.0		U
1,3,5-Trimethylbenzene	0.09	0.5	0.09	1.0		U
1,3-DCB	0.09	1.2	0.09	1.0		U
1,3-Dichloropropane	0.11	0.4	0.11	1.0		U
1,4-DCB	0.09	0.3	0.09	1.0		U
1-Chlorohexane	0.14	0.6	0.14	1.0		U
2,2-Dichloropropane	0.19	3.5	0.19	1.0		U
2-Chlorotoluene	0.05	0.4	0.05	1.0		U
4-Chlorotoluene	0.10	0.6	0.10	1.0		U
Benzene	0.07	0.4	0.07	1.0		U
Bromobenzene	0.06	0.3	0.06	1.0		U
Bromochloromethane	0.23	0.4	0.23	1.0		U
Bromodichloromethane	0.11	0.6	0.11	1.0		U
Bromoform	0.14	1.2	0.14	1.0		U
Bromomethane	0.36	1.1	0.36	1.0		U
Carbon tetrachloride	0.11	2.1	0.11	1.0		U
Chlorobenzene	0.07	0.4	0.07	1.0		U
Chloroethane	0.07	0.4	0.07	1.0		U
Chloroform	0.31	1.0	0.31	1.0		U
Chloromethane	0.15	0.3	0.15	1.0		U
Cis-1,2-DCE	0.18	1.3	0.18	1.0		U
Cis-1,3-Dichloropropene	0.25	1.2	0.25	1.0		U
	0.14	1.0	0.14	1.0		U

Comments:	MDL	RL	Concentration	Dilution	Qualifier
Analyte	1.45	5.0	1.45	1	U
Acetone	1.64	5.0	1.64	1	U
Methyl-ethyl-ketone					

AFCEE FORM O-2

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 Field Sample ID: LS-7      Lab Sample ID: AP18431      Matrix: Water  
 % Solids: NA      Initial Calibration ID: H010615  
 Date Received: 15-Jun-01      Date Prepared: 20-Jun-01      Date Analyzed: 20-Jun-01  
 Concentration Units: ug/L

Analyte	MDL	RL	Concentration	Dilution	Confirm	Qualifier
Dibromochloromethane	0.15	0.5	0.15	1.0		U
Dibromomethane	0.26	2.4	0.26	1.0		U
Dichlorodifluoromethane	0.38	1.0	0.38	1.0		U
Ethylbenzene	0.05	0.6	0.05	1.0		U
Hexachlorobutadiene	0.34	1.1	0.34	1.0		U
Isopropylbenzene	0.07	0.5	0.07	1.0		U
m&p-Xylene	0.24	0.5	0.24	1.0		U
Methylene chloride	0.36	1.0	0.36	1.0		U
n-Butylbenzene	0.12	1.1	0.12	1.0		U
n-Propylbenzene	0.10	0.4	0.10	1.0		U
Naphthalene	0.19	0.8	0.19	1.0		U
o-Xylene	0.13	1.1	0.13	1.0		U
p-Isopropyltoluene	0.34	1.2	0.34	1.0		U
Sec-Butylbenzene	0.09	1.3	0.09	1.0		U
Styrene	0.08	0.4	0.08	1.0		U
TCE	0.16	1.0	0.43	1.0		F
Tert-Butylbenzene	0.09	1.4	0.09	1.0		U
Tetrachloroethene	0.16	1.4	4.00	1.0		U
Toluene	0.07	1.1	0.07	1.0		U
Trans-1,2-DCE	0.26	0.6	0.26	1.0		U
Trans-1,3-Dichloropropene	0.10	1.0	0.10	1.0		U
Trichlorofluoromethane	0.15	0.8	0.15	1.0		U
Vinyl chloride	0.18	1.1	0.18	1.0		U

Surrogate	Recovery	Control Limits	Qualifier
1,2-DCA-D4(S)	112	62-139	
4-Bromofluorobenzene(S)	100	75-125	
Dibromofluoromethane(S)	105	75-125	
Toluene-D8(S)	96.4	75-125	

Internal Std	Qualifier
1,4-Dichlorobenzene-D1S	
Chlorobenzene-D5(1S)	
Fluorobenzene(1S)	

Comments:

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AFCEE  
 ORGANIC ANALYSES DATA SHEET 2  
 RESULTS

Analytical Method: EPA 8260B    Preparatory Method: 5030B    AAB #: 010813AH-38567  
 Lab Name: APPL, Inc    Contract #: F11623-94-D0024-RL83  
 Field Sample ID: LS-7-POST GAC    Lab Sample ID: AP20745    Matrix: Water  
 % Solids: NA    Initial Calibration ID: H010813  
 Date Received: 10-Aug-01    Date Prepared: 13-Aug-01    Date Analyzed: 13-Aug-01  
 Concentration Units: ug/L

Analyte	MDI	RL	Concentration	Dilution	Confirm	Qualifier
1,1,1,2-Tetrachloroethane	0.14	0.5	0.14	1.0		
1,1,1-TCA	0.08	0.8	0.08	1.0		
1,1,2,2-Tetrachloroethane	0.20	0.4	0.20	1.0		
1,1,2-TCA	0.16	1.0	0.16	1.0		
1,1-DCA	0.07	0.4	0.07	1.0		
1,1-DCE	0.16	1.2	0.16	1.0		
1,1-Dichloropropene	0.12	1.0	0.12	1.0		
1,2,3-Trichlorobenzene	0.13	0.5	0.13	1.0		
1,2,3-Trichloropropane	0.23	3.2	0.23	1.0		
1,2,4-Trichlorobenzene	0.08	0.5	0.11	1.0		
1,2,4-Trimethylbenzene	0.07	1.3	0.07	1.0		
1,2-DCA	0.10	0.6	0.10	1.0		
1,2-DCB	0.08	0.3	0.08	1.0		
1,2-Dibromo-3-chloropropane	0.72	2.6	0.72	1.0		
1,2-Dichloropropane	0.14	0.4	0.14	1.0		
1,2-EDB	0.11	0.6	0.11	1.0		
1,3,5-Trimethylbenzene	0.06	0.5	0.06	1.0		
1,3-DCB	0.12	1.2	0.12	1.0		
1,3-Dichloropropane	0.10	0.4	0.10	1.0		
1,4-DCB	0.09	0.3	0.09	1.0		
1-Chlorohexane	0.12	0.6	0.12	1.0		
2,2-Dichloropropane	0.53	3.5	0.53	1.0		
2-Chlorotoluene	0.12	0.4	0.12	1.0		
4-Chlorotoluene	0.09	0.6	0.09	1.0		
Benzene	0.12	0.4	0.14	1.0		
Bromobenzene	0.08	0.3	0.08	1.0		
Bromochloromethane	0.16	0.4	0.16	1.0		
Bromodichloromethane	0.12	0.8	0.12	1.0		
Bromoform	0.14	1.2	0.14	1.0		
Bromomethane	0.36	1.1	0.36	1.0		
Carbon tetrachloride	0.09	2.1	0.09	1.0		
Chlorobenzene	0.09	0.4	0.09	1.0		
Chloroethane	0.26	1.0	0.26	1.0		
Chloroform	0.06	0.3	0.06	1.0		
Chloromethane	0.41	1.3	0.41	1.0		
Cis-1,2-DCE	0.11	1.2	0.11	1.0		
Cis-1,3-Dichloropropene	0.09	1.0	0.09	1.0		

Comments:

AFCEE  
 ORGANIC ANALYSES DATA SHEET 2  
 RESULTS

Analytical Method: EPA 8260B Preparatory Method: 5030B AAB #: 010813AH-38567  
 Lab Name: APPL, Inc Contract #: F11623-94-D0024-RL83  
 Field Sample ID: LS-7-POST GAC Lab Sample ID: AP20745 Matrix: Water  
 % Solids: NA Initial Calibration ID: H010813  
 Date Received: 10-Aug-01 Date Prepared: 13-Aug-01 Date Analyzed: 13-Aug-01  
 Concentration Units: ug/L

Analyte	MDL	RL	Concentration	Dilution	Confirm	Qualifier
Dibromochloromethane	0.09	0.5	0.09	1.0		U
Dibromomethane	0.10	2.4	0.10	1.0		U
Dichlorodifluoromethane	0.24	1.0	0.24	1.0		U
Ethylbenzene	0.06	0.6	0.06	1.0		U
Hexachlorobutadiene	0.19	1.1	0.19	1.0		U
Isopropylbenzene	0.08	0.5	0.08	1.0		U
m,p-Xylene	0.14	0.5	0.14	1.0		U
Methylene chloride	0.19	1.0	0.19	1.0		U
n-Butylbenzene	0.11	1.1	0.11	1.0		U
n-Propylbenzene	0.10	0.4	0.10	1.0		U
Naphthalene	0.08	0.8	0.08	1.0		U
o-Xylene	0.07	1.1	0.07	1.0		U
p-Isopropyltoluene	0.06	1.2	0.06	1.0		U
Sec-Butylbenzene	0.05	1.3	0.05	1.0		U
Styrene	0.07	0.4	0.07	1.0		U
TCE	0.14	1.0	0.14	1.0		U
Tert-Butylbenzene	0.05	1.4	0.05	1.0		U
Tetrachloroethene	0.11	1.4	0.11	1.0		U
Toluene	0.11	1.1	0.11	1.0		U
Trans-1,2-DCE	0.14	0.6	0.14	1.0		U
Trans-1,3-Dichloropropene	0.14	1.0	0.14	1.0		U
Trichlorofluoromethane	0.09	0.8	0.09	1.0		U
Vinyl chloride	0.27	1.1	0.27	1.0		U

Surrogate	Recovery	Control Limits	Qualifier
1,2-DCA-D4(S)	102	62-139	
4-Bromofluorobenzene(S)	98.8	75-125	
Dibromofluoromethane(S)	96.4	75-125	
Toluene-D8(S)	96.2	75-125	

Internal Std	Qualifier
1,4-Dichlorobenzene-D1(S)	
Chlorobenzene-D5(IS)	
Fluorobenzene(IS)	

Comments:  
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## Linear Regression of Quarterly Groundwater Tetrachloroethylene (PCE) Data at Well LS-7

### Approach and Methodology:

Simple linear regression was performed on seven (7) groundwater concentration measurements of PCE (2.51, 2.87, 2.2, 3.12, 3.73, 3.76, and 4.02 parts per billion; ppb) from well LS-7 located south-southwest of Camp Stanley. These data were collected at regularly spaced intervals (3 months) in time from December 1999 to June 2001. The dependent variable used was the PCE concentration in ppb, and the independent variable used was unit time (i.e. 1,2,3,4,5,6,7). The time unit corresponds to dates in this manner; Dec 1999=1, Mar 2000=2, ....., June 2001=7. The model equation for this simple regression is:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

Where Y is the dependent variable  $\beta_0$  is the estimated y-intercept,  $\beta_1$  is the estimate slope coefficient, X is the independent variable and  $\varepsilon$  is the error variation.

In the regression procedure we are primarily concerned with testing the null hypothesis that the slope coefficient of the least squares regression line is zero, rejection of which would indicate that a linear relationship exists between the independent and dependent variables. Moreover, in this event, the model equation could be used to predict future values of the independent variable given known values of the dependent variable or vice versa.

### Results:

The slope coefficient was significantly different from zero ( $\beta_1=0.28, T=4.08, DF=5, p=0.01$ ). Since we know from the regression procedure the estimated parameters are we can construct a new model equation,

$$Y = 2.053 + 0.28X + \varepsilon$$

Using the above equation by inserting 4.5 ppb for the Y variable gives between the 8<sup>th</sup> and 9<sup>th</sup> time periods (between September 2001 and December 2001) when the well may reach 4.5 ppb.

### Conclusion:

Based on the least squares regression line we can estimate that between September 2001 and December 2001 the well may reach 4.5 ppb. However, this statistical approach is contingent on the process remaining linear in the future, and the regression model does not include variables other than time that may be sources of variation in PCE concentration (e.g., precipitation, probable but not currently quantifiable influx of source material into the aquifer, and variations in water levels). Therefore the uncertainty involved with this evaluation must be considered along with the results.

### Qualifications:

Since there is variability associated with the regression estimates, and these estimates were made with a very small sample (seven measurements spanning 18 months) there is uncertainty associated with the prediction of when in the future a critical concentration may be surpassed. In fact the 95 % confidence interval for the true average concentration of PCE at the last sampling date (June 2001) includes 4.5 ppb. This is significant because it indicates with 95% probability the true average well concentration is contained in this interval that includes 4.5 ppb (see confidence limits graphed with the regression line). Therefore, based on the seven data points, we cannot rule out the possibility that well LS-7 may currently contain PCE levels at 90% of its MCL, 5 ppb.

Scatterplot (Lv7.STA 10v\*11c)

$y=2.053+0.28*x+eps$

