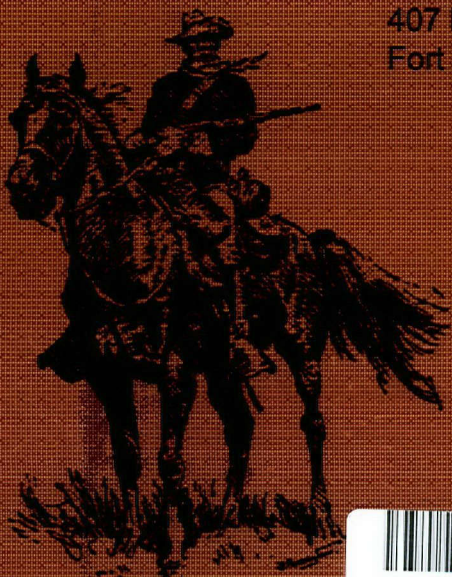


*Draft Final*  
*Remedial Action Completion Report*

**Southwest Funston Landfill Site, OU001**  
**Fort Riley, Kansas**  
**December 2009**

Department of Army, Headquarters, U.S. Army Garrison  
Directorate of Public Works, Environmental Division  
407 Pershing Court  
Fort Riley, Kansas 66442



SFL\_14\_001





1120

Decision Paper

Information Paper

Date: 12/11/2009

Initiating Office: DPW, Environmental Division

POC / Phone: Ms. Andrea Austin/239-8536

Subject: Remedial Action Completion Report (RACR), Southwest Funston Landfill Site, OU001

Purpose: This document provides all the necessary information regarding completion of the required Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions in preparation for requesting that the site be removed from the National Priorities List (NPL).

Recommendation: Have the Garrison Commander sign and date the Certification Statement on page 7-1 of the RACR

Discussion: "Site completion" for the SFL site means that the remedial action objectives are accomplished; the remedy has achieved the required reduction in risk to meet the cleanup levels (MCLs) for groundwater; and no further CERCLA response is necessary to ensure protection of human health and the environment. The SFL site is eligible for "site completion" status under CERCLA and is a valid candidate for deletion from the NPL. The Garrison Commander's approval allows for submittal to EPA for final signature, concurrence, and approval of the RACR.

Garrison Routing

X	GC	
X	DGC - T	CONCUR - RECOMMENDED SIGN DOCUMENT JCD 14 JAN 09
	GCSM	
	GAR OPS	
X	SJA	Concur - No legal objection Mr. Hardy 14 Dec 09
X	DPW	Concur 11/13/09
X	Env Div Chief	AYL 6 JAN Fact Sheet Attached

## FACT SHEET

IMWE-RLY-PW-E  
Andrea Austin/239-8536  
5 January 2010

SUBJECT: Southwest Funston Landfill Remedial Action Completion Report

1. PURPOSE: To provide information about completion of the remediation requirements at the Southwest Funston Landfill

2. FACTS:

a. Fort Riley's Southwest Funston Landfill (SFL) is located adjacent to the southwest corner of the Camp Funston Cantonment area and the Kansas River on the west side of Three-Mile Creek. Landfilling occurred at the SFL from apparently the mid-1950s until 1981. The specific waste types and quantities of wastes disposed of in the SFL are poorly documented.

b. The SFL was closed in 1983. Subsequent to closure, chemicals of potential concern were identified in the groundwater of the SFL site. The Fort Riley installation was placed on the U.S. EPA's National Priority List (NPL) in October 1990 based on the SFL site groundwater contamination and the Pesticide Storage Facility soil contamination.

c. Actions in response to the presence of the volatile organic compounds, the eroded riverbank, and the condition of the soil cover at the SFL were determined to be warranted to address the principal threat to human health or the environment through future use of the site-impacted groundwater and exposure to landfill waste. The selected actions (i.e., remediation requirements) were established in a Record of Decision approved by the Army, the U.S. EPA and the Kansas Department of Health and Environment (KDHE) in August 1997.

d. The major components of the selected remedy are:

- (1) Institutional controls to restrict future site uses and prohibit the future use of the site groundwater
- (2) Placement of bank stabilization (rock revetment) along the Kansas River bank
- (3) Repair of the existing soil cover over the landfill so that it meets the criteria of 40 CFR 258.60
- (4) Semi-annual groundwater monitoring at the site
- (5) A contingency for future active remediation of the site, if warranted.

e. Staffs of the Army, the U.S. EPA and the KDHE agree that the SFL site has been restored to conditions that protect human health and the environment and the site is eligible for deletion by the U.S. EPA from the NPL. Signature of the Remedial Action Completion Report by Fort Riley's Garrison Commander and the Superfund Division Director of the U.S. EPA's Region VII will formalize that agreement.



DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

REPLY TO  
ATTENTION OF:

March 16, 2010

Environmental Division, Directorate of Public Works

Mr. Amer Safadi, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 7  
Superfund Division  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101

Dear Mr. Safadi,

On behalf of the Department of Army, Headquarters, U.S. Army Garrison, Fort Riley, in accordance with the USEPA's Partial Deletions rule, published in the *Federal Register* in November 1, 1995, and the USEPA's Partial Deletions policy governed by 40 CFR 300.425(e), this letter requests that the Environmental Protection Agency, Region 7 (EPA-7) consider the deletion of the release of hazardous substances from the Southwest Funston Landfill (SFL) site, from the USEPA's National Priorities List (NPL).

While deletion of the entire Fort Riley installation from the NPL may take several more years, portions of the installation may have met remedial action objectives and cleanup goals. Deletion of the SFL site will allow for communication of the successful cleanup of this portion of the Fort Riley installation.

Copies of this letter are being furnished to Mr. Joe Dom, the Kansas Department of Health and Environment; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Ms. Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, SFL Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in black ink, appearing to read "Tina M. Gassen", is written over a horizontal line. The signature is fluid and cursive.

Tina M. Gassen  
Chief, Compliance & Restoration Branch





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

FEB 25 2010

Ms. Tina Gassen  
Compliance Branch Chief  
Environmental Division, DPW  
407 Pershing Court  
IMNW-RLY-PWE  
Fort Riley, Kansas 66442

**Re: Certification Statement for the Remedial Action Completion Report, Southwest Funston Landfill, Fort Riley, Kansas**

Dear Ms. Gassen:

The U. S. Environmental Protection Agency (EPA) completed its final review of the Remedial Action Completion Report for the Southwest Funston Landfill. EPA is submitting a copy of the Certification Statement, Section 7.0 of the document, signed by Cecilia Tapia, Superfund Division Director, EPA Region 7.

Thank you for the opportunity to review this document. Please contact me via e-mail at [safadi.amer@epa.gov](mailto:safadi.amer@epa.gov) or at (913) 551-7825 if you have any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "Amer Safadi".

Amer Safadi  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

Enclosure

cc: Travis Daneke, Kansas Department of Health and Environment  
Richard Van Saun, U.S. Army Corps of Engineers



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

**FEB 22 2010**

E-mailed February 19, 2010

Ms. Tina Gassen  
Compliance Branch Chief  
Environmental Division, DPW  
407 Pershing Court  
IMNW-RLY-PWE  
Fort Riley, Kansas 66442

**Re: DA-FR Request to Reduce Groundwater Monitoring Frequency at the Southwest Funston Landfill Site, Fort Riley, Kansas**

Dear Ms. Gassen:

The U. S. Environmental Protection Agency (EPA) has received your request to reduce the groundwater monitoring frequency from annual to a five-year schedule at the Southwest Funston Landfill site (Operable Unit 01). The request indicates that the next proposed sampling/monitoring event is in March 2012 which will coincide with the Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Review. After reviewing this request, which was based on the results of the Long-Term Monitoring Report dated November 2009, EPA approves the proposal.

Thank you for the opportunity to review this document. Please contact me via e-mail at [safadi.amer@epa.gov](mailto:safadi.amer@epa.gov) or at (913) 551-7825 if you have any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "Amer Safadi".

Amer Safadi  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

cc: Travis Daneke, Kansas Department of Health and Environment  
Richard Van Saun, U.S. Army Corps of Engineers





Mark Parkinson, Governor  
Roderick L. Bremby, Secretary

DEPARTMENT OF HEALTH  
AND ENVIRONMENT

[www.kdheks.gov](http://www.kdheks.gov)

Division of Environment

February 8, 2010

Ms. Andrea Austin  
Environmental Division  
U.S. Army Directorate of Public Works  
407 Pershing Ct.  
Fort Riley, KS 66442

Subject: Southwest Funston Landfill—KDHE Project Code: C5-081-03034  
5-Year Monitoring Schedule Request

Dear Ms. Austin,

The Kansas Department of Health and Environment (KDHE) has received and reviewed the request to monitoring frequency at the Southwest Funston Landfill from annual monitoring to a 5-year monitoring schedule to coincide with the CERCLA 5-Year Review in 2012. The request is based on the sampling and statistical results from the *2009 Long-Term Monitoring Report for the Southwest Funston Landfill at Fort Riley, Kansas*. The sampling schedule proposed is acceptable to KDHE. Please notify KDHE at least one week in advance of the next sampling event to occur at the Southwest Funston Landfill.

KDHE appreciates Fort Riley's continued efforts at the Southwest Funston Landfill Site. If you have any questions or require additional information please feel free to contact me at (785) 296-4367 or via email at [jdom@kdheks.gov](mailto:jdom@kdheks.gov).

Sincerely,

Joseph Dom, P.G.  
Landfill / Drycleaner Remediation Unit  
Bureau of Environmental Remediation

cc: Travis Daneke → Bob Jurgens → File → Southwest Funston Landfill: C5-081-03034 (1)  
Amer Safadi, USEPA Region 7  
Richard Van Saun, U.S. Army Corps of Engineers, Kansas City District



DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

February 2, 2010

REPLY TO  
ATTENTION OF:

Environmental Division, Directorate of Public Works

Mr. Amer Safadi, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 7  
Superfund Division  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101

Dear Mr. Safadi,

Based on the sampling and statistical results presented in the *Long-Term Monitoring Report for the Southwest Funston Landfill (SFL)*, dated November 2009, the Department of Army-Fort Riley (DA-FR) requests the U.S. Environmental Protection Agency, Region 7's approval to reduce the groundwater monitoring frequency from annual to five-year assessments of groundwater quality at the SFL site. The next proposed event is in March 2012 to coincide with the CERCLA Five-Year Review in 2012. This proposal is based on the Kansas Department of Health and Environment's comment on the SFL site's *Remedial Action Completion Report* that requests the DA-FR continue groundwater monitoring, but in five-year intervals to ensure that the future conditions remain protective of human health and the environment.

Copies of this letter are being furnished to Mr. Joe Dom, the Kansas Department of Health and Environment; Dr. Richard Van Saun, the Kansas City District Corps of Engineers; and Mr. Peter Rissell, the Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Ms. Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in black ink, appearing to read "Tina M. Gassen".

Tina M. Gassen  
Chief, Compliance & Restoration Branch





DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

February 2, 2010

REPLY TO  
ATTENTION OF:

Environmental Division, Directorate of Public Works

Mr. Joe Dom, P.G.  
Landfill/Drycleaner Remediation Unit  
Kansas Department of Health and Environment  
Curtis State Office Building  
1000 S.W. Jackson, Suite 410  
Topeka, KS 66612-1367

Dear Mr. Dom:

Based on the sampling and statistical results presented in the *Long-Term Monitoring Report for the Southwest Funston Landfill (SFL)*, dated November 2009, the Department of Army-Fort Riley (DA-FR) requests the Kansas Department of Health and Environment's approval to reduce the groundwater monitoring frequency from annual to five-year assessments of the groundwater quality at the SFL site. The next proposed event is in March 2012 to coincide with the CERCLA Five-Year Review in 2012. This proposal is based on the Kansas Department of Health and Environment's comment on the SFL site's *Remedial Action Completion Report* that requests the DA-FR continue groundwater monitoring, but in five-year intervals to ensure that the future conditions remain protective of human health and the environment.

Copies of this letter are being furnished to Mr. Amer Safadi, the U.S. Environmental Protection Agency, Region 7; Dr. Richard Van Saun, the Kansas City District Corps of Engineers; and Mr. Peter Rissell, the Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Ms. Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in cursive script, appearing to read "Tina M. Gassen".

Tina M. Gassen  
Chief, Compliance & Restoration Branch



DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

REPLY TO  
ATTENTION OF:

February 16, 2010

Environmental Division, Directorate of Public Works

Mr. Amer Safadi, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 7  
Superfund Division  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101

Dear Mr. Safadi,

Enclosed are two copies of the revised page 6-4 (paragraph 3) to replace the current page 6-4 and additional pages for Appendix B-1 to complete the previously submitted *Draft Final Remedial Action Completion Report, Southwest Funston Landfill, OU001* (SFL RACR).

Copies of this letter are being furnished to Mr. Joe Dom, the Kansas Department of Health and Environment; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Andrea Austin, directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in black ink, appearing to read "Tina Gassen".

Tina Gassen  
Chief, Compliance & Restoration Branch

Enclosure





DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

REPLY TO  
ATTENTION OF:

February 16, 2010

Environmental Division, Directorate of Public Works

Mr. Joe Dom, P.G.  
Landfill/Drycleaner Remediation Unit  
Kansas Department of Health & Environment  
Curtis State Office Building  
1000 S.W. Jackson, Suite 410  
Topeka, KS 66612-1367

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Copies of this letter are being furnished to Mr. Amer Safadi, the U.S. Environmental Protection Agency, Region 7; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Andrea Austin, directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

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Tina Gassen  
Chief, Compliance & Restoration Branch

Enclosure



DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

REPLY TO  
ATTENTION OF:

February 11, 2010

Environmental Division, Directorate of Public Works

Mr. Amer Safadi, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 7  
Superfund Division  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101

Dear Mr. Safadi,

Enclosed are two copies of each of the replacement pages and additional pages to insert in Appendix B-1, for the copies of the previously submitted *Draft Final Remedial Action Completion Report, Southwest Funston Landfill, OU001* (SFL RACR). The revisions and additions to the SFL RACR address the EPA attorney's (Mr. James D. Stevens, Assistant Regional Counsel, U.S. EPA Region VII) comments on the document.

Also enclosed are two copies of the Section 7.0 Certification Statement, Page 7-1 of the SFL RACR, signed by the Garrison Commander (Col. Kevin Brown). With final approval from EPA, the document is to be submitted to Ms. Cecilia Tapia for her signature on Page 7-2.

Copies of this letter are being furnished to Mr. Joe Dom, the Kansas Department of Health and Environment; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Ms. Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in cursive script, reading "Tina M. Gassen", is written over the typed name and title.

Tina M. Gassen  
Chief, Compliance & Restoration Branch

Enclosure





DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

REPLY TO  
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February 11, 2010

Environmental Division, Directorate of Public Works

Mr. Joe Dom, P.G.  
Landfill/Drycleaner Remediation Unit  
Kansas Department of Health & Environment  
Curtis State Office Building  
1000 S.W. Jackson, Suite 410  
Topeka, KS 66612-1367

Dear Mr. Dom:

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Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Ms. Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in cursive script, reading "Tina M. Gassen", is written over a horizontal line.

Tina M. Gassen  
Chief, Compliance & Restoration Branch

Enclosure



REPLY TO  
ATTENTION OF:

**DEPARTMENT OF THE ARMY**  
INSTALLATION MANAGEMENT AGENCY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY, KANSAS 66442-5000

December 4, 2009

Environmental Division, Directorate of Public Works

Mr. Amer Safadi, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 7  
Superfund Division  
901 N 5th Street  
Kansas City, Kansas 66101

Dear Mr. Safadi:

Enclosed are two copies of the Draft Final Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (SFL) site, Operable Unit 001. This revised document was prepared by the Fort Riley's Installation Restoration Team, on behalf of the Department of Army, Headquarters, U.S. Army Garrison. Also find in Appendix B: B-1 of the Draft Final RACR the responses to comments on the revised draft RACR.

Copies of this letter are being furnished to Mr. Travis Daneke, the Kansas Department of Health and Environment; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

A handwritten signature in black ink, appearing to read "Tina M. Gassen".

Tina M. Gassen  
Chief, Compliance & Restoration Branch



REPLY TO  
ATTENTION OF:

**DEPARTMENT OF THE ARMY**  
INSTALLATION MANAGEMENT AGENCY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY, KANSAS 66442-5000

December 4, 2009

Environmental Division, Directorate of Public Works

Mr. Travis Daneke  
Superfund Unit/Assessment & Restoration Section  
Kansas Department of Health & Environment  
Curtis State Office Building  
1000 S.W. Jackson, Suite 410  
Topeka, KS 66612-1367

Dear Mr. Daneke:

Enclosed is one copy of the Draft Final Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (SFL) site, Operable Unit 001. This revised document was prepared by the Fort Riley's Installation Restoration Team, on behalf of the Department of Army, Headquarters, U.S. Army Garrison. Also find in Appendix B: B-1 of the Draft Final RACR the responses to comments on the revised draft RACR.

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Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,

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Tina M. Gassen  
Chief, Compliance & Restoration Branch

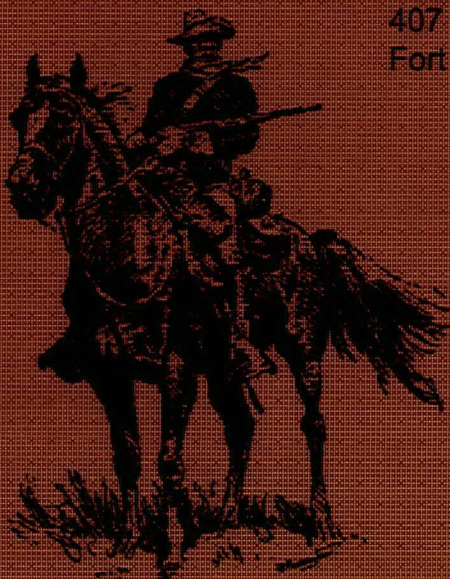




*Draft Final*  
*Remedial Action Completion Report*

**Southwest Funston Landfill Site, OU001**  
**Fort Riley, Kansas**  
**December 2009**

Department of Army, Headquarters, U.S. Army Garrison  
Directorate of Public Works, Environmental Division  
407 Pershing Court  
Fort Riley, Kansas 66442





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## APPENDICES

### APPENDIX A

- A-1: Location of Southwest Funston Landfill (Figure 1-1), (CTI, 2009c)
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### APPENDIX B

- B-1: Response to Agency (EPA-7 and KDHE) Comments
- B-2: Documents in SFL (OU001) CERCLA Administrative Record, Fort Riley's Installation Restoration Program

**APPENDICES (Continued)**

- B-3: Fort Riley's Real Property Master Plan, Subsection 4.2.2 Environmental Quality (with Table 4.2 Installation Restoration Program Site Restrictions and Figure 4.9 Environmental Overview)

**APPENDIX C**

- C-1: 2009 *Maintenance and Repair Report and Annual Inspection Report, Southwest Funston Landfill, Fort Riley, Kansas*, June 10, 2009 and Photographs of the Site Access Controls, the Landfill Cover Repair and the Rock Armoring of the Upper Riverbank Slope in September-October 2009
- C-2: CD of SFL Site Historical Analytical Data



**LIST OF ACRONYMS AND ABBREVIATIONS**

CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CIP	Community Involvement Plan
CRP	Community Relations Plan
COPCs	Chemicals of Potential Concern
DA-FR	U.S. Department of Army-Fort Riley
DoD	U.S. Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EPA-7	U.S. Environmental Protection Agency, Region VII
FFA	Federal Facility Agreement
ft/mi	feet per mile
HH & E	Human Health and the Environment
KDHE	Kansas Department of Health and Environment
LTM	Long-Term Monitoring
MCL	Maximum Contaminant Level
msl	Mean Sea Level
NCP	National Oil & Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priority List
O & M	Operation and Maintenance
OU	Operable Unit
PSF	Pesticide Storage Facility
RA	Remedial Action
RmA	Removal Action
RACR	Remedial Action Completion Report
RAOs	Remedial Action Objectives
RGs	Remediation Goals
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPMP	Real Property Master Plan
RSKs	Risk-Based Standards
SDT	Significantly Decreasing Trend
SFL	Southwest Funston Landfill
SIT	Significantly Increasing Trend
SSD	Statistically Significant Decrease
SSI	Statistically Significant Increase
SWL	Static Water Level
T & E	Threatened and Endangered
µg/L	microgram per Liter
USACE-KCD	U.S. Army Corps of Engineers, Kansas City District
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VOCs	Volatile Organic Compounds

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## 1.0 OVERVIEW

### 1.1 Purpose

This Remedial Action Completion Report (RACR) documents that the U.S. Department of Army, Fort Riley (DA-FR), in coordination with the U.S. Environmental Protection Agency, Region VII (EPA-7) and the Kansas Department of Health and Environment (KDHE), has completed the required remedial action at the Southwest Funston Landfill (SFL) site, Operable Unit (OU) 001, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This RACR is consistent with the recommendations of the joint U.S. Department of Defense (DoD) and the U.S. Environmental Protection Agency (USEPA) guidance document, *Streamlined Site Close Out and National Priorities List, Deletion Process for DoD Facilities* (DoD and USEPA, 2005).

The purpose of this document is to provide all the necessary information regarding completion of the required CERCLA response actions in preparation for requesting that the SFL site, OU001, be removed from the National Priorities List (NPL). "Site completion" for the SFL site means that the remedial action objectives (RAOs) are accomplished; the remedy has achieved the required reduction in the risk to meet the Maximum Contaminant Levels (MCLs), as prescribed in the National Oil & Hazardous Substances Pollution Contingency Plan (NCP) and as specified in the SFL Record of Decision (ROD); and no further CERCLA response is necessary to ensure protection of human health and the environment (HH & E).

Ongoing CERCLA activities at the SFL site into the future that are not defined as CERCLA response actions will be required. These long-term management (LTM) and care activities will involve: site access and land use institutional controls; annual inspections and as needed repairs of the landfill vegetative soil cover and the bank stabilization structure; groundwater monitoring until formally terminated, and CERCLA five-year reviews. Perimeter fencing, locked gates, and warning signs are in place at the SFL site indicating why access is restricted. Obligations to continue the protective conditions for HH & E are in place in Fort Riley's Real Property Master Plan (RPMP), which is updated every five years. (B & V, 2007 and Appendix B: B3).

The National Oil & Hazardous Substances Pollution Contingency Plan (NCP) provides that releases of CERCLA hazardous substances, pollutants, or contaminants may be deleted from the NPL where no further remedial response is appropriate. Three of the Fort Riley installation's five OU sites are under monitored natural attenuation to reach their remediation goals (RGs): OU003-the Dry Cleaning Facility, OU004-the Former Fire Training Area-Marshall Army Airfield, and OU005-the 354 Area Solvent Detections. In 2009, the remedial action objectives (RAOs) and RGs have been met at OU004 and OU005. As such, the RACRs for these sites will be done in 2010. The

OU003 site requires re-injection of a proprietary blend of soybean oil into one area where concentrations of cis-1,2 dichloroethene (DCE) remain elevated in groundwater above the MCL for DCE. The OU002 site-the Pesticide Storage Facility (PSF) required additional soil sampling in August 2009 to confirm that the concentrations of contaminants are below the KDHE residential risk-based standards for soil. An Explanation of Significant Difference to the PSF "No Further Action" Record of Decision (NFA-ROD) will be generated to allow unrestricted land use and closeout of the site under CERCLA.

The USEPA's "site completion" (NPL site deletion) criteria are as follows:

- All required response actions have been implemented.
- All appropriate responses under CERCLA have been implemented, and no further response action is appropriate.
- There is no significant health threat above the target cleanup goals to public health or the environment.

The SFL site (OU001) (i.e., the groundwater in the alluvium of the Kansas River, the landfill cover, the limited site access and land use restrictions, and the riverbank stabilization structure) has met the above "site completion" (NPL site deletion) criteria.

The Fort Riley installation was placed on the NPL in October 1990 based on the SFL site groundwater contamination and the PSF soil contamination. The EPA-7 and the KDHE considered the landfill as posing a threat to HH & E through direct contact, landfill subsidence, slope erosion, and potential leaching and migration of contaminants into the surface water and groundwater. In June 1991, a Federal Facility Agreement (FFA) among the DA-FR, the EPA-7, and the KDHE specified the procedural requirements for the environmental investigations and cleanups at the installation.

Fort Riley was identified in the FFA as the lead agency for environmental cleanup under Executive Order 12580 (i.e., the NCP) as applied to Federal Facilities. In support of the DA-FR, the U.S. Army Corps of Engineers, Kansas City District (USACE-KCD), has provided scientific and engineering oversight, and has awarded contracts for document preparation and restoration activities at the SFL site. Under the FFA, the SFL site was specifically identified as a potential area of contamination, and a schedule for a CERCLA Remedial Investigation/Feasibility Study (RI/FS) was established. (DA-FR, 1991 and USACE-KCD, 1997a). Subsequent measures taken following the RI/FS have addressed the requirements of the FFA.

## **1.2 Summary of the SFL Site Characteristics**

A summary of the history of the SFL site leading to the need for CERCLA response for protection of HH & E is provided in this subsection. The major findings and results of the RI/FS are presented in Subsection 1.3. The information in Subsections 1.2 and 1.3

was cited from the following references listed in Section 8.0: LAW, 1993; LAW, 1994a, LAW, 1994b; USACE-KCD, 1997a; DA-FR, 1997.

### **1.2.1 Site Location**

The SFL site is located in the southern portion of Fort Riley, adjacent to the southwest corner of the Camp Funston cantonment area, in the 50-100 year flood plain of the Kansas River. The landfill is bounded by an extensive bank stabilization (rock revetment) structure along the Kansas River on the south and southeast, Well House Road on the north, a former meander bend in the Kansas River on the west, and Threemile Creek on the east. (Appendix A: A-1 and A-2).

### **1.2.2 Site History**

According to historical records, the landfill operated from the mid-1950s until 1981 under a “grandfathered” KDHE permit (No. 370). The specific waste types disposed of and the quantities of waste contained in the landfill were poorly documented. Both land farming and trench disposal land-filling methods were used. The trenches were typically excavated to a maximum depth of 16 feet below the ground surface. Since groundwater was observed to seep into the working trenches at a depth of about 20 feet during high river conditions, trench depths were recommended for reduction to 12 feet to 15 feet. The surface area of the landfill is approximately 4,147,500 square feet. Assuming a maximum depth of the trenches at 16 feet and some separation between trenches and borders, the maximum quantity of waste potentially contained in the landfill is estimated as 2,089,111 cubic yards. (Appendix A: A-2 and A-3a).

The landfill was used for typical municipal waste and industrial wastes from various activities at the Fort Riley installation. Fort Riley’s function as a military training, equipment supply, and maintenance center has historically required management and disposal of wastes generated by these activities. Maintenance activities associated with rotary and fixed-wing aircraft, and tracked and wheeled vehicles have occurred. The waste materials disposed of at the landfill were from the vehicle and aircraft maintenance shops, the print shops, the furniture repair shops, the painting facilities, the oil analysis laboratory, the autoclaved biological waste from the hospital, pesticide/herbicide storage and preparation, the laundry and dry cleaning facilities, and the wastewater treatment plants. Some of the waste materials likely contained hazardous chemicals that became potential sources of groundwater contamination.

By volume, most waste consisted of domestic refuse, construction debris (some potentially containing asbestos disposed of in the southwest portion of the landfill), and dried sludge from the wastewater treatment plants; however, inks, paint sludge, and pesticides/herbicides were apparently also disposed of in the landfill. From 1950 to 1970, waste motor oils and degreasing solvents from vehicle maintenance operations were mixed and then disposed of in the landfill. During this 20-year time period, most



degreasing solvents used consisted of chlorinated hydrocarbons, including trichloroethylene, tetrachloroethylene, and carbon tetrachloride.

A description of apparent land-filling activities since the 1950s, based on aerial photographs is as follows. Signs of land filling were evident in a 1960 aerial photograph, and more extensive operations within the landfill limits were seen in more recent photographs. Waste disposal near the riverbank was detected from aerial photos taken in February 1972. At least six open trenches were seen in an area adjacent to the riverbank in the southwest portion of the landfill. These trenches contained oil and grease per personal communications. Several debris piles were scattered throughout the southern portion of the landfill. The debris piles were graded and the trenches were covered by the time of closure in 1983. Historical photos show that material conducive to erosion control (including construction demolition debris and other unmanageable white goods, such as household appliances) were segregated and were dumped within the southern portion of the landfill against certain areas of the bank in an attempt to provide erosion control. A two-day white goods retrieval and bank repair project occurred in approximately 1989, but unstable areas still existed.

In September 1992, a survey of the riverbank condition revealed a limited amount (along 20 percent of the length of the riverbank) of bank protection debris consisting of construction rubble (i.e., rock, bricks, concrete, and other material) protruding from the riverbank at the southern boundary of the landfill. The rubble was not in an established continuous pattern, but randomly covered all or part of the bank in certain areas. (Appendix A: A-3b).

Closure activities at the SFL site occurred in 1982 and 1983 under a closure plan that was approved by KDHE on August 9, 1982. The closure involved burning all combustible materials on the landfill surface, grading and contouring the surface, adding clayey to silty loam soil obtained from a former rifle range berm to provide an average 2-foot thick cover, and planting a vegetative cover. Following inspection in 1983, the landfill closure was approved by KDHE (KDHE, 1983).

As part of the closure, six monitoring wells (MW-1 through MW-6) were installed at the landfill in May 1983 (Appendix A: A-2). These closure wells were sampled periodically between 1984 and 1990. The integrity of these wells and the validity of sample results became questionable, since the wells were completed with glued casing joints that could potentially introduce vinyl chloride into the groundwater. In addition, the wells were screened in three distinct intervals within a single well further biasing the results. From 1984 to 1987, the initial concentrations of organic compounds of concern were above the MCLs (i.e., the maximum concentrations of contaminants allowed in a public drinking water system under State and Federal regulations). Vinyl chloride was detected in three of eighteen samples taken at the six closure wells in March 1984, January 1987, and October 1987, at concentrations of 5 µg/L, 54 µg/L, and 20 µg/L, respectively. Benzene was detected in the October 1987 sample at 10 µg/L. No organic compounds were detected in 1989 in samples from the same six wells.

### 1.3 Major Findings and Results of the RI/FS

In 1991, the FFA required performance of a RI/FS at the SFL site to determine the nature and extent of the contamination problem. Based on the results of the RI and the Baseline Risk Assessment, it was determined that remedial action to address the low levels of volatile organics in the shallow portion of the Kansas River alluvial aquifer beneath the landfill may be warranted. The risk assessment indicated potentially unacceptable risks if impacted groundwater were ever to be used as a potable water supply at Fort Riley.

#### 1.3.1 Nature and Extent of Contamination

In late October and early November 1991, the contaminant source investigation (i.e., the soil-gas survey of unsaturated soil) was performed. Assumptions were made concerning the types and concentrations of constituents expected to be present based on the analysis of samples collected from the six landfill closure wells. Soil-gas samples were collected at 61 locations at the SFL site. Total volatile organic results revealed detectable concentrations at the western survey boundary to the north and in other isolated samples. Detections occurred primarily near the western survey boundary of the landfill, but volatile organics were also present in isolated areas on the southern survey boundary and in the north central survey area.

Field activities in 1992 through 1993 included the installation and sampling of 20 monitoring wells in eight cluster locations based on the results of the 1991 soil-gas survey. Geophysical surveys were also performed, prior to soil sampling and monitoring well installation, to locate areas of buried metallic debris as well as nonmetallic anomalies. The surveys helped to evaluate the lateral boundary of the landfill. The sampling results indicated sporadic, low concentrations of volatile organic compounds and metals contamination in the groundwater. Organic compounds detected in the groundwater at concentrations that exceeded the MCLs included vinyl chloride (exceedance frequency: 2 of 56 samples, maximum detection concentration of 18 µg/L); 1,2-dichloroethane (exceedance frequency: 3 of 56 samples, maximum detection concentration of 16 µg/L); benzene (exceedance frequency: 7 of 56 samples, maximum detection concentration of 14 µg/L); and 1,1,2-trichloroethane (exceedance frequency: 1 of 56 samples, maximum detection concentration 8.8 µg/L). Metals such as iron, manganese, and aluminum were also detected in groundwater, but were attributed to naturally occurring conditions. The metals antimony, arsenic, and beryllium were also detected in groundwater.

Twenty-three soil samples were collected from each of eight deep well borings. The surface soil investigation indicated that lead was present in the site cover soil at levels consistent with background conditions in the majority of samples analyzed. Subsurface soil data indicated the isolated presence of several low-level concentrations of

constituents, including petroleum hydrocarbons, volatile organic compounds (VOCs), and phthalates.

Seven surface water and seven sediment samples were collected, and benthic and threatened and endangered (T & E) species surveys were conducted. High river conditions dislocated several of the benthic sediment samplers so the benthic samples were not evaluated. Twenty-two T & E species were identified to potentially occur at the landfill, but the bald eagle (now delisted) is the only known protected species occasionally cited at the SFL site. The data from the surface water and sediment investigation indicated that the SFL site was not contributing organic contaminants to the Kansas River and its tributary, Threemile Creek. Additionally, surface water and sediment samples collected at locations both upstream and downstream of the SFL site contained similar concentrations of inorganics, indicating that the SFL site was not contributing inorganics to the Kansas River and Threemile Creek.

### **1.3.2 Characterization of Risk**

A Baseline Risk Assessment was prepared for the SFL site, and conclusions were presented in the SFL ROD. The landfill site lies entirely within the flood plain of the Kansas River, so the only receptors expected to be on or adjacent to the site were occupational, recreational, or ecological receptors. The landfill is underlain by alluvial sediment and an alluvial aquifer that is protected by the State of Kansas from degradation of water quality and for the designated beneficial use as a drinking water source.

The exposure assumptions used to develop the risk assessment included both current exposures (occupational and conservative recreational hunter scenarios) and future exposures (occupational, recreational hunter, and hypothetical future resident using groundwater scenarios). The occupational, recreational hunter, and ecological risks were judged to be minimal. Exposure to contaminated groundwater at the site was determined to represent a significant exposure pathway if the groundwater beneath the site or site-impacted groundwater was ever to be used as a source of potable water. The risk assessment states that the potential significant risk due to residential consumption of contaminated groundwater is likely an overestimation. Future residential development of the SFL site is not probable and unrealistic, since on a landfill that lies within the flood plain of the Kansas River and which is located on an active military installation.

Chemicals of potential concern (COPCs) in the groundwater were identified as metals-antimony, arsenic, beryllium, and the volatile organic compounds: benzene, cis-1,3-dichloropropene, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, and vinyl chloride. Several VOCs were detected at concentrations greater than the MCLs. Remedial actions to address metals were not warranted because none of the metals contributed to unacceptable risk levels except antimony. Antimony was detected only once in two of the five groundwater sampling events of different monitoring wells.

### 1.3.3 Constituent Fate and Transport

The primary contaminant migration pathway was assumed at the time of the RI/FS to be for contaminants to leach or migrate from the landfill contents to the groundwater. Contaminants could be mobilized from the landfill by percolating rainwater that further could carry contamination down to the water table. Contaminants could also be mobilized when the water table rises into the landfill and saturates the waste. Groundwater would likely be in contact with landfill wastes at groundwater levels higher than 1,034 feet above mean sea level (msl), the approximate bottom of the landfill trenches.

During the July 1993 Kansas River flood, the entire thickness of the alluvial aquifer was saturated when the landfill surface was inundated with flood water. Water levels during the July 1993 flood rose to about 1,053 ft msl (the approximate land surface elevation at monitoring well SFL92-601 in 1993), or more than 18 ft above the bottom of the landfill trenches. Elevated concentrations of contaminants in the groundwater beneath the landfill were measured following the July 1993 flood event.

Based on available data at the time of the RI/FS, water levels in areas distant from the Kansas River appeared to fluctuate in response to an annual cycle, highest in spring and lowest in other parts of the year. As a result, the groundwater gradient in areas distant from the river was expected to remain relatively stable as the groundwater table moved up and down in response to precipitation cycles. The highest elevations of the hydrologic system in the SFL site vicinity appeared to be the Kansas River upstream of the landfill under transient conditions.

Groundwater gradients were found to fluctuate in response to changes in the Kansas River stage. During times of relatively low groundwater levels, northerly groundwater flow developed as the river raised groundwater levels in the southern portion of the SFL site. During these periods, very little discharge of groundwater to the Kansas River was expected. When the Kansas River stage dropped to relatively low elevations, southerly groundwater flow developed and groundwater was expected to discharge to the Kansas River along the southern edge of the SFL site.

Groundwater flow during the RI/FS was, on average, toward the south and east toward Threemile Creek and the Kansas River as represented on the potentiometric surface maps. Groundwater flowing beneath the landfill was expected to discharge to Threemile Creek and the Kansas River. Due to the effects of transient conditions in Threemile Creek and the Kansas River, groundwater flow under Threemile Creek could possibly occur under certain circumstances. It was highly unlikely that groundwater flow under Threemile Creek would continue for a substantial distance parallel to the Kansas River toward Ogden, as the expected regional groundwater flow direction is towards the Kansas River.

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### **1.3.4 Engineering Evaluation/Cost Analysis and Removal Actions**

An Engineering Evaluation/Cost Analysis (EE/CA) was performed to assess the appropriateness of performing non-time critical removal actions (RmAs) at the SFL site. The RmAs were proposed to reduce the risk of exposing landfill contents by stabilizing the Kansas River bank immediately adjacent to the landfill and by repairing the existing landfill cover. The riverbank stabilization project was initiated in January 1994 and completed in the spring of 1994. Placement of 13,000 tons of quarry run stone revetment, approximately 1,200 linear feet along the bank slope and at the toe of the bank, adjacent to the landfill, was accomplished to physically stabilize the riverbank. (Appendix A: A-3c). The native soil cover repair to improve landfill drainage and evaporation and transpiration began in the fall of 1994. Construction activities were completed during the 1995 calendar year. The cover improvement project, designed to meet the minimum cover thickness criteria of 40 CFR 258.60(a), specified as an applicable or relevant and appropriate requirement in the SFL ROD, was completed in October 1996. Placement and grading of approximately 160,000 cubic yards of soil (composed of alluvial silt material) on the landfill was accomplished. A native grass seed mixture was drilled into the newly placed cover soil. The inspection on October 17, 1996 confirmed the minimum thickness of two feet for the cover soils that were generally a clay to silty loam and clayey to fine-grained sands.

### **1.3.5 Feasibility Study**

The RI report provided the basis for the FS report, which evaluated six alternatives for addressing the risks associated with the landfill. The RmAs (i.e., the landfill cover repair and bank stabilization project) discussed in the EE/CA report, were elements of the alternatives considered during the FS. The recommended alternative in the Proposed Plan, accepted by the KDHE and the EPA-7 in October 1994, included implementation of institutional controls, construction of a riverbank stabilization structure, soil and vegetation cover repair, performance of long-term groundwater monitoring, and a Future Action Contingency.



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## 2.0 RECORD OF DECISION

The SFL ROD listed the components of the selected remedial action and was signed by the DA-FR, the EPA-7, and the KDHE in August 1997. Subsequently, three plans were prepared for the implementation of the remedy: the Operation and Maintenance Plan, the Long-Term Groundwater Monitoring Plan, and the Institutional Controls Plan. The ROD findings, the remedial action objectives and the remediation goals, and the components of the selected remedy are summarized in the following subsections. The information was cited from the SFL ROD. (DA-FR, 1997).

### 2.1 ROD Findings

Actual or threatened releases of hazardous substances, pollutants, or contaminants from this site, if not addressed by implementing the response action selected in the SFL ROD, may present a potential future threat to human health or the environment. The principal threat pertained to the hypothetical future use of site-impacted groundwater. The SFL ROD specified long-term groundwater monitoring that would initially include semi-annual sampling.

### 2.2 Remedial Action Objectives and Remediation Goals

The selected remedial action (RA) included the landfill cover repair and riverbank stabilization with annual inspections and periodic maintenance, limitation of site access, and groundwater monitoring, all intended to prevent exposure to landfill waste and the COPCs greater than the MCLs in the groundwater. The RGs were specified in the SFL ROD based on the principal threat pertaining to the hypothetical future use of impacted groundwater and a limited potential threat to nearby down gradient groundwater users. The MCLs, as prescribed in the NCP, were the desired endpoint concentrations or risk levels and the basis of the remediation goals. Where not available, the human health risk assessment results were used. Further, the Kansas River alluvial aquifer beneath the landfill is protected by the State of Kansas from degradation and for the beneficial use as a drinking water source. The occupational, recreational hunter, and the ecological risk were judged to be minimal.

The remedy goals are expressed in the SFL ROD as the RAOs and RGs. The RAOs provide for what the remediation will accomplish. The RAOs are listed as follows:

- Minimize human and ecological direct contact with landfill contents.
- Reduce the potential for leachate generation by reducing storm-water ponding and infiltration as practical.

- Stabilize the Kansas River bank slope adjacent to the SFL site to prevent movement of the channel into the landfill and to prevent exposure and erosion of the landfill contents.
- Prevent ingestion, inhalation, and dermal contact with groundwater having organic contaminant concentrations exceeding the RGs.

### 2.3 Remedial Action Taken to Accomplish RAOs and Meet RGs

In the SFL ROD, assumptions were made as to the anticipated land and natural resource uses potentially impacted by the release of contaminants from the landfill waste containment area, and the remedy was selected that is protective for those uses. The remedial action was meant to address immediate risks of exposure to landfill contents and to stabilize conditions at the SFL site to minimize leaching of hazardous substances, pollutants, or contaminants from the landfill to the groundwater, i.e., into the alluvial aquifer.

The major components of the selected remedy established in the SFL site ROD are as follows:

- 1) institutional controls to restrict future site uses and prohibit the future use of the site groundwater;
- 2) placement of bank stabilization (rock revetment) along the Kansas River bank (completed in the spring of 1994 as a RmA);
- 3) repair of the existing soil cover over the landfill so that it meets the criteria of 40 CFR 258.60a (performed in 1995 and 1996 as part of the RmAs);
- 4) semi-annual groundwater monitoring at the site; and
- 5) a contingency for future active remediation at the site, if warranted.

The remedy driver was ensuring that the leachate from the landfill did not continue to significantly degrade the alluvial aquifer with increasing concentrations of contaminants exceeding the MCLs and did not migrate beyond the perimeter of the landfill, impacting potential nearby receptors. The hypothetical future residential land use, the most conservative land use scenario, although unrealistic for the SFL site, was chosen to protect the groundwater to the MCLs, since groundwater in the Kansas River alluvium is protected by the State of Kansas from degradation and for the beneficial use as a drinking water source, not because the SFL site as a landfill would ever be used for residential purposes.

### **3.0 DEMONSTRATION OF “SITE COMPLETION”**

The following summary of remedy measures performed at the SFL site demonstrates that the RAOs are accomplished; the RGs are attained; and no further CERCLA response is appropriate. The SFL site has been restored to conditions that protect human health and the environment.

#### **3.1 Institutional Controls**

The RAOs to minimize human and ecological direct contact with the landfill contents and to prevent ingestion, inhalation, and dermal contact with groundwater having contaminant concentrations exceeding the RGs were accomplished through land use and site access institutional controls. The Institutional Controls Plan and the O & M Plan for the SFL site’s remedy established the location and maintenance of signage, fencing, and locked gates to control site access and specified land use and the actions to be taken to limit future site land uses and restrict groundwater use.

The information presented in Subsection 3.1 to demonstrate “site completion” was cited from the following references in Section 8.0: USACE-KCD, 1997b; USACE-KCD, 2009; and B & V 2007.

##### ***Land Use Institutional Controls***

Land use institutional controls are implemented with the Fort Riley *Real Property Master Plan* (RPMP). Fort Riley’s RPMP restricts development at the SFL site and prohibits any construction involving excavation or permanent occupancy at the site, utility easements, and use of groundwater in the Kansas River alluvium. The RPMP requires physical controls including fencing and signs at the perimeter of the landfill, locked gates, prohibition of drilling drinking water wells in the landfill, digging and trenching, the use of track vehicles, and building construction and demolition at the SFL site.

The RPMP is updated and revised every five years. The 2007 RPMP is the most recent document specifying land use institutional controls for the SFL site. (Appendix B: B-3). Any land use change would require a revision in the RPMP. In addition to the RPMP, land use at the SFL site is restricted because of its location in a flood plain (i.e., Executive Order 11988, Flood Plain Management Construction Criteria for Army Facilities).

##### ***Site Access Institutional Controls***

Fencing and signs are placed at the locked access gate, warning that access to the SFL

site is restricted and that potentially hazardous conditions may be present. The information on the signs is updated to correct contact information, as necessary.

Current land use on the surface of the landfill includes ecological, recreational, and light (non-intrusive, non-habitation) activities and agricultural out-leasing under the DA-FR Agricultural Outlease Program. Access for other land uses is restricted in the RPMP.

Based on observations of fencing and signage during the 2009 inspection, new fencing, signage, and vegetation/tree removal was completed in September-October 2009. (Appendix C: C-1, Photograph 1).

### **3.2 Landfill Cover and Bank Stabilization Structure**

The RAOs, to stabilize the Kansas River bank slope adjacent to the SFL site to prevent movement of the channel into the landfill, to prevent exposure and erosion of the landfill contents, and to reduce the potential for leachate generation by reducing storm-water ponding and infiltration, was accomplished through many landfill cover and bank stabilization projects.

The information presented in Subsection 3.2 to demonstrate “site completion” was cited from the following references in Section 8.0 and Appendix C-1: USACE-KCD, 1996; USACE-KCD, 1997a; USACE-KCD, Annual Inspection and Maintenance/Repair Reports: 1999, 2002, 2007a, 2008, and 2009.

By the time the FFA went into effect in February 1991, surface erosion and settlement had led to widespread storm-water ponding across the landfill surface. In addition, a portion of the southern perimeter of the landfill was being eroded by the Kansas River. A survey of the riverbank condition in September 1992 revealed a limited amount (along 20 percent of the length of the riverbank) of landfill contents, principally composed of construction debris, which was exposed in a discontinuous pattern along portions of the riverbank. (Appendix A: A-3b).

In 1994, Fort Riley initiated non-time critical RmA at the site to reduce the risk of exposing and eroding landfill contents along the riverbank and to repair the existing landfill cover. The RmA was executed in three projects from February 1994 through March 1997. A summary of the elements of the cover and bank stabilization construction work accomplished during this time is as follows:

#### ***February through March 1994***

- 13,000 tons of quarry run stone revetment and baffles installed (approximately 1,200 linear feet along the bank slope and at the toe of the bank to physically stabilize the riverbank)

***November 1994 through October 1995***

- Contouring of landfill surface, landfill cover repaired (with approximately 160,000 cubic yards of soil), native grass planted

***May 1996 through March 1997***

- Corrected deficiencies in the thickness of the existing cover, planted a mixture of native grasses on the surface of the landfill, and tree cuttings were planted along the Kansas River bank to complete the final phase of the cover improvement project
- Riverbank, back-cutting eroded area filled with quarry run stone in October 1996

The O & M plan for the SFL site remedy established annual inspections as a means to insure that the features of the landfill including the native soil and vegetative cover, riverbank stabilization (rock revetment) and remedy groundwater monitoring wells were properly maintained and continued to function as they were originally designed. The O&M Plan required that a Maintenance/Repair Report be prepared whenever these activities were accomplished. A summary of the cover and bank stabilization work in compliance with the remedy O & M Plan, accomplished from 1998 to 2009, is as follows:

***March and May 1998***

- Replanted a six acre tract of land on the eastern edge of the landfill with native grass
- Installed a root rock (trench filled with quarry run rock) at the upstream end of the rock revetment on the riverbank

***June 2002***

- 21,000 cubic yards of fill placed to repair differential settlement, monitoring well access road regraded and new gravel placed on road

***March 2003***

- Repaired areas on the landfill cover planted with native grass seed mixture

***November 2006***

- Extended the riverbank stabilization structure 100 feet upstream with approximately 1,800 tons of quarry run stone and previously noted back cut erosion areas repaired

***December 2006***

- Landfill repairs of differential settlement areas on the western half of the landfill (approximately 10,000 cubic yards of fill placed, graded and compacted to

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restore differentially settled areas to their original grade in the northwest quadrant of the landfill

***March 30 and May 2007***

- Repaired areas on the landfill cover seeded with a native grass seed mixture

***May 20 through July 16, 2008***

- Landfill repairs of the differential settlement areas on eastern half of the landfill (approximately 10,000 cubic yards of fill (native topsoil from Tank Area 49)); placed, graded, and compacted to restore differentially settled areas in several areas on the eastern side of the landfill)

***January and March 2009***

- Repaired areas on the landfill cover were seeded with a native grass mixture in January 2009 and seeding was completed in March 2009

***September and October 2009***

- Landfill repairs of the differential settlement areas on the northeastern and eastern half of the landfill (approximately 10,000 cubic yards of fill (native topsoil from Tank Area 49)); placed, graded, and compacted to restore differentially settled areas in several areas on the northeastern and eastern side of the landfill
- Rock armoring of 250 linear feet of the Kansas River bank with 1,000 cubic yards of 9-inch nominal size quarry run stone, was placed over the rubble area along the SFL riverbank slope where limited sampling in 2009 found 4% Chrysotile asbestos tiles

Weeds and volunteer saplings are managed routinely following annual inspections with an approved herbicide, by cut down, and/or by burning. Burrowing animals such as badgers are also managed by capture and/or destruction of their habitats on the SFL site. In addition, the cover vegetation is managed via periodic seeding with a native grass mixture, prescribed burning, and haying.

The landfill soil cover with native grasses was inspected in 2004 and determined to be usable for hay. The SFL site was incorporated into the Fort Riley Agricultural Outlease Program in 2006. The lease provides for haying 50 percent of the landfill surface each year. Approximately half of the landfill was hayed in July 2006. The primary area hayed was the western half of the landfill; however, selected grid zones on the east were also mowed. The eastern half of the landfill was burned in March 2007, and the entire landfill was burned in March 2008 and again in March 2009 to facilitate the annual cover inspection conducted in May 2009.

Areas of storm-water ponding and settlement were noted during the 2009 inspection;



however, the results of the March and August 2009 groundwater sampling events did not indicate a negative effect on the quality of the groundwater in the Kansas River alluvial aquifer beneath the landfill. The potential for leachate generation has been reduced by repairing the native soil cover to achieve a thickness of at least 2 feet, seeding with a native grass mixture, and minimizing storm-water ponding and infiltration into the waste containment area.

The areas of differential settlement and storm-water ponding noted in the northeastern and east central portions of the landfill during the 2009 annual inspection were repaired in September to October 2009 using local top soil from an off-site borrow site (Training Area 49) on Fort Riley. (Appendix C: C-1, Photographs 2 and 3). Fill areas from the repair will be seeded with a mixture of native grass seed in early December. These areas were the recommended cover repairs in the 2009 Annual Inspection Report (Appendix C: C-1).

Rock armoring of 250 linear feet of the Kansas River bank with 1,000 cubic yards of 9-inch nominal size quarry run stone was placed in October 2009 over the rubble area along the SFL riverbank slope where limited sampling found 4% Chrysotile asbestos tiles. (Appendix C: C-1, Photographs 4 and 5). The back cut erosion at the downstream edge of the riverbank stabilization structure and southeast of the landfill, noted during the 2009 annual inspection, is an outstanding deficiency that will be addressed as funds become available. (Photograph SFL2009-8 in Appendix C: C-1).

### **3.3 Long-Term Groundwater Monitoring**

The information presented in Subsection 3.3 to demonstrate “site completion” was cited from the following references in Section 8.0: LAW, 1993; USACE-KCD, 1997d; USGS, 1999; USGS, 2000; KDHE, 2007; CTI, 2008a; CTI, 2008b; CTI, 2009a; CTI, 2009b; CTI, 2009c; and USACE-KCD, 2009. The SFL historical data tables are presented on the CD included in Appendix C, C-2.

The RAO to prevent ingestion, inhalation, and dermal contact with groundwater contaminant concentrations greater than the RGs has been accomplished through the long-term groundwater monitoring program. The trends in contaminant concentrations have been evaluated for many years to ensure the protection of human health and the environment.

The objectives of the long-term groundwater monitoring program have been to detect increases in contaminant concentration in the vicinity of the landfill, which would warrant additional actions and to determine if constituents from the landfill are migrating under Threemile Creek toward potential receptors.

Long-term groundwater monitoring reports for the SFL site have been prepared on an annual basis since 1997 to the present, 2009. The reports focus on the interpretations of the groundwater level measurements, trends in contaminant concentrations at individual wells and across the landfill, and potential fate and transport of contaminants in the area. The reports include the evaluation of the time-data charts and statistical analysis of data and provide recommendations for actions to be taken when a significant increase in a chemical concentration has been detected.

The following summary of the long-term groundwater monitoring program demonstrates that the SFL site is functionally stable; the remedy has performed as expected, obviating the need to implement a contingency remedy to cleanup groundwater contamination; and significant increases in contaminant concentrations have not occurred to threaten human health and the environment. (Appendix A: A-8 and A-9; Appendix C: C-2).

### **3.3.1 Hydrogeologic Conditions**

The long-term groundwater monitoring program has been valuable for developing an understanding of groundwater flow paths at the SFL site and the migration of groundwater contaminants. Once mobilized and incorporated into groundwater, the contaminants generally migrate in the direction of groundwater flow. The dominant southerly or southeasterly groundwater flow towards the Kansas River, infiltration from Threemile Creek into the river alluvium of the Kansas River, and natural attenuation have influenced the pattern of contaminant detections in the shallow and deep wells at the SFL site.

Flooding, such as the July 1993 event, likely played an important role in mobilizing groundwater contaminants at the SFL site. Precipitation infiltration through the soil cover and landfill wastes may also have mobilized some contaminants prior to and during the addition of the soil cover in 1995 and 1996.

The summary and maps, in Appendix A: A-5 and A-6, present yearly stream stage and monitoring well static water levels (SWLs) from 1999 to 2009 and the USGS potentiometric surface maps for 2005-2009. This data demonstrates that the groundwater has not saturated the landfill waste from 1999 to 2009 with the average SWLs between 1029.29 ft msl and 1033.54 ft msl and the bottom of trenches at 1034 ft msl. On March 22, 2007, the static water level in monitoring well SFL92-603 was measured at 1034.75 ft msl. However, the correlation of contaminant concentrations increasing when the groundwater rose to this level was not seen by the May 22, 2007 groundwater sample result for vinyl chloride and other contaminants in this well.

The USGS analyzed the effects of the stage changes in the Kansas River and in Threemile Creek prior to 1995, on the groundwater flow in the vicinity of the SFL site

and the Camp Funston Area. The USGS concluded that the direction of shallow groundwater movement at the SFL site and the Camp Funston Area is primarily dependent upon regional and local precipitation, and upon stage fluctuations of the Kansas River system, including occasional releases from upstream reservoirs. The analyses indicated that when the Kansas River stage is high or rising, the groundwater flow direction at the SFL site is northeast away from the Kansas River. When the Kansas River stage is low or falling, the groundwater flow direction at the SFL and the Camp Funston Area is south to southeast toward the Kansas River.

The extent to which the Kansas River stage affects groundwater flow is related to the magnitude and duration of stage changes in the river. When the Kansas River stage at the Henry River Bridge is less than 1,038.50 ft msl, the Threemile Creek downstream stage at the Threemile Creek Middle gauging station does not appear to be affected. When the Kansas River stage at the Henry River Bridge is more than approximately 1,046 ft msl, the Threemile Creek stage at the Threemile Creek middle gauging station, located approximately 2,000 feet from the Kansas River, begins to show backwater effects.

The larger the magnitude and duration of stage increases, the more effect the river will have on groundwater flow at the SFL site. Large stage increases (5 ft or more) cause northeasterly to easterly groundwater flow. The southerly or southeasterly groundwater flow is predominant at the SFL site. Locally, water infiltrating the aquifer from Threemile Creek into the Camp Funston Area could mix with and dilute the concentrations of contaminants, if present, in the shallow groundwater.

The 2009 groundwater monitoring results combined with the historical interpretation of previous groundwater sampling events confirmed that the dominant route for contaminant migration at the SFL site is to the south to southeast toward the Kansas River. Once in the groundwater, the contaminants leached from the landfill waste may be transported toward the Kansas River and Threemile Creek.

From December 1994 through January 1995, the USGS installed twelve wells on the west and east banks of Threemile Creek, which runs parallel to the eastern boundary of the SFL site. These wells were installed as cluster wells (one deep and one shallow well per cluster) at six locations to monitor migration of contaminants from the landfill under Threemile Creek into the Camp Funston Area groundwater. Based on evaluation of the chemical and hydrological data from the 1994 to the 2009 sampling events, migration of contaminants at significant concentrations (above the MCLs) under Threemile Creek has not occurred. On the east side of Threemile Creek, contaminants migrating from the SFL site in the deeper alluvium, if occurring, would likely be naturally attenuated to undetectable levels before reaching the Kansas River. Threemile Creek apparently continues as a barrier to eastward migration from the SFL site in the shallow alluvium.

### **3.3.2 Analytical Results and 2009 Monitoring Well Maintenance**

#### **Analytical Results**

The long-term groundwater monitoring program initially was performed semi-annually and included sampling and analysis for VOCs, antimony, and lead. The COPCs identified in the SFL ROD were: benzene, beryllium, cis-1,3-dichloropropene, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, and vinyl chloride. Vinyl chloride is a possible degradation product of 1,2-dichloroethene (total), tetrachloroethene, and trichloroethene; therefore, the aforementioned compounds are included in the annual long-term monitoring reports as COPCs. The metals were subsequently dropped because of low concentrations and infrequency of detections.

The well sampling history reveals that monitoring wells have been sampled under the monitoring program at the SFL site since July 1992. Variability in contaminant concentrations in the groundwater and no strong upward or downward long-term trends were evident for most COPCs from the July 1992 through December 1998 timeframe. From 1997 to 2006, semi-annual analytical results revealed a decreasing trend in COPCs. In July 2006, the EPA-7 approved decreasing the frequency of groundwater monitoring from semi-annual to annual sampling and discontinuing monitoring for lead. All COPCs in March 2006 were present at concentrations less than their MCLs or not detected in any of the monitoring wells.

The average concentration of vinyl chloride in 2007 from samples collected in March (2.6 µg/L) and May (resample results of 1.1 µg/L and the duplicate of at 1.2 µg/L) from well MW92-603, was 1.6 µg/L. In 2008, the distribution of VOCs in groundwater beneath the SFL site above the analytical method reporting limit was limited to the nested monitoring well containing SFL92-601/SFL92-603. The March 2008 vinyl chloride concentration was below the MCL (2 µg/L) at well SFL92-601 and SFL92-603 (0.64 µg/L and 1.4 µg/L, respectively). These concentrations are consistent with the May 2007 resample results. The KDHE's and the EPA-7's oversight samples in 2008 from the same well showed the vinyl chloride concentration at 2.1 µg/L.

Centrally located in the landfill, the SFL92-601 and SFL92-603 wells have exhibited a diverse range of low-level contaminants with concentrations and diversity decreasing substantially down gradient toward the Kansas River in SFL92-401 and SFL92-403. The location of the SFL92-601 and SFL92-603 wells is approximately 2,400 feet from the river. Contaminants migrating from the deep alluvium at this location appear to naturally attenuate to undetectable levels before discharging to the Kansas River.

The vinyl chloride levels exceeded the MCL in wells SFL92-401 and SFL92-403 during 2002 through 2005 sampling events. The 2006 results for these two wells were: SFL92-401, during March (1.68 µg/L) and September (1.21 µg/L) and SFL92-403, during

March (1.11 J  $\mu\text{g/L}$ ) and September (0.77  $\mu\text{g/L}$ ). During 2007, vinyl chloride was not detected at well SFL92-401 and it was detected at approximately one-half the 2006 level at well SFL92-403 indicating a decreasing trend. Vinyl chloride was not detected in monitoring wells SFL92-401 and SFL92-403 during the March 2008 groundwater sampling event.

During the March 2009 annual sampling event, vinyl chloride concentrations were less than the MCL of 2  $\mu\text{g/L}$  in all wells sampled (on April 1 and 2) and the method reporting limit (of 1  $\mu\text{g/L}$ ) but detected at greater than the method detection limit (of 0.062  $\mu\text{g/L}$ ) and flagged as estimated with a J code in the following wells: SFL 94-04B (0.39J), SFL92-401 (0.44J), SFL92-403 (0.44J), SFL92-601 (0.40J), and SFL92-603 (0.24J). (Appendix A: A-4a and A-4b). The KDHE's oversight sample from the same well showed the vinyl chloride concentration at 0.5  $\mu\text{g/L}$ . Fort Riley's oversight sample was also 0.5  $\mu\text{g/L}$ , the practical quantitation limit. The KDHE considered the March 2009 (April 1 and 2) sample results invalid and inconclusive since the groundwater samples were received outside the temperature allowance specified in the SFL Quality Assurance Plan. It was suspected that the samples did not cool to the required temperature due to the VOC vials being placed into foam sleeves and wrapped in bubble wrap to prevent breakage during shipping. This protection added significant thermal insulation resulting in receipt of the samples above the required 4 degree Celsius temperature at the laboratory. Consequently, all sampling results were flagged with a "J" as estimated, but were considered valid by the laboratory.

To address the KDHE's concern with the March 2009 annual sampling event, a subsequent sampling event was performed in August 2009 where the VOC vials were cooled overnight on ice to reduce the elevated groundwater collection temperature prior to packaging the VOC vials for shipment to the laboratory. Vinyl chloride was detected in samples from the following wells: SFL92-601 at 0.59J  $\mu\text{g/L}$ , SFL92-603 at 0.21J  $\mu\text{g/L}$ , SFL92-401 at 0.19J  $\mu\text{g/L}$ , and SFL92-403 at 0.30J  $\mu\text{g/L}$ . Vinyl chloride was also detected in well SFL94-04B during the August 2009 groundwater sampling event at 0.30J  $\mu\text{g/L}$ . (Appendix A: A-4a and A-4b).

Prior to June 1999, benzene was consistently detected at well SFL92-601 at concentrations greater than or equal to the MCL for benzene. From 2002 through 2006 benzene was detected at well SFL92-601 at concentrations less than the MCL of 5  $\mu\text{g/L}$ . The 2007 result was similar to the level during 2006; however, an overall downward trend was noted. The downward trend was observed to continue in the 2008 data (benzene concentration reported as 1.9  $\mu\text{g/L}$ ). Benzene was not detected in the remainder of the wells sampled in March 2008. Benzene was detected at well SFL92-601 (2.2  $\mu\text{g/L}$ ) during the March 2009 sampling event at the concentration less than the MCL. In the past ten years, benzene was also detected in SFL92-403. In August 2009, benzene was detected in one well, SFL92-601, at 1.6  $\mu\text{g/L}$ . Benzene was not detected in the remainder of the wells sampled in August 2009.

The VOC, trichloroethene, was detected during the September 2006 sampling event at low concentrations. Trichloroethene had not been detected in any of the wells during 2002 through 2005 sampling events, and it was not detected during March 2007 and March 2008 sampling events. In 2006, it was noted that the detections may indicate a change at the wells where it was detected; however, the concentrations were so low that additional data were needed before any conclusions could be made. Based on non-detect results for 2007, 2008, and 2009 and the absence of historical detection for this compound prior to 2006, it is concluded that the low-level detections in 2006 were likely a laboratory artifact rather than an actual change in conditions at the wells. In March and August 2009, trichloroethene was not detected in any of the wells sampled.

The VOC, trans-1,2 dichloroethene was detected in monitoring wells SFL92-401 and SFL92-403 during the March 2009 groundwater sampling event at concentrations of 0.25J µg/L and 0.22J µg/L, respectively. From 2002 to 2008, trans-1,2-dichloroethene was not detected in any wells. The highest concentration of cis-1,2 dichloroethene historically detected at the SFL site was reported during October 1994 (3.4 µg/L). From 2002 to 2007, all detected concentrations of cis-1,2-dichloroethene were consistently low, rarely exceeding 1 µg/L. The VOC, cis-1,2-dichloroethene was not detected in 2008 at any wells and was detected in monitoring wells SFL92-401 and SFL92-403 during the March 2009 groundwater sampling event at a concentration of 0.25J µg/L and 0.22J µg/L, respectively. The VOCs, cis- and trans-1,2 dichloroethene, were detected at well SFL92-601 at concentrations less than the method reporting limit in August 2009 and not in the remainder of the wells sampled in August 2009.

In 2007, sampling for lead was discontinued at the request of the DA-FR and the USACE-KCD. Historically, detected concentrations of lead in the groundwater were consistently less than the USEPA Action Level of 15 µg/L.

The VOC, tetrachloroethene, was not detected in any wells sampled during the March 2009 groundwater sampling event. In August 2009, tetrachloroethene was also not detected in any of the wells sampled.

Historical detections of VOCs other than the COPCs and associated daughter product VOCs are consistently at low concentrations at the SFL site. Because VOC detection limits tend to be very low, variation in the list of VOCs reported as detected is expected. In March and August 2009, the list of VOCs reported as detected at low concentrations varied from the past sampling events. In March 2008, 1,4-dichloroethane, 1,2,4-trimethylbenzene, chlorobenzene, isopropylbenzene, isopropyl ether, sec butylbenzene, methyl tert-butyl ether, toluene, m&p-xylenes, and o-xylenes were detected in monitoring well SFL 92-601 at concentrations less than their respective MCLs and KDHE risk-based standards (RSKs). Monitoring well SFL92-601 is screened in the shallow aquifer within the boundaries of the landfill. In March 2008 and August 2009, naphthalene was

detected in this well at concentrations greater than the method detection limit but less than the method reporting limit, at 8 µg/L and 8.8 J µg/L, respectively. The residential RSK for naphthalene is 3 µg/L, and the industrial RSK is 9 µg/L. In August 2009, 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, chlorobenzene, chloroethane, dichlorodifluoromethane, isopropylbenzene, isopropyl ether, sec-butylbenzene, tert-butylbenzene, n-propylbenzene, methyl tert-butyl ether (MTBE), 2-butanone (MEK), m&p-xylenes, o-xylenes, and total xylenes were detected at monitoring well SFL92-601 at concentrations less than their MCLs and RSKs. Additionally 1,4-dichlorobenzene was detected below the method detection limit in wells SFL92-401, SFL92-403, and SFL92-603, and chlorobenzene was detected below the method reporting limit in wells SFL92-401 and SFL92-403.

### **2009 Monitoring Well Maintenance**

During the March 2009 sampling event, each bladder pump was removed from the well, inspected, repaired (if necessary), tested, and positioned at the midpoint of the monitoring well screen. The 2009 Long-Term Monitoring Report presents the monitoring well maintenance and pump intake modifications performed prior to the collection of the March 2009 groundwater samples. (Appendix A: A-7).

### **3.3.3 Statistical Results**

Groundwater constituents identified for statistical evaluation included long-term monitoring constituents and associated daughter product long-term monitoring constituents. Intrawell comparison tests, where concentration level comparisons are made within the same well, were performed (as data were available) for these constituents from 1997 to 2009. The statistical evaluation of the 2009 groundwater data was conducted in accordance with the methods recommended by the SFL long-term groundwater monitoring plan using Sanitas®. The statistical evaluation outputs are included in Appendix A: A-9 and Appendix C: C-2 on a CD.

**Benzene:** The intrawell prediction limit test was performed on the August 2009 benzene result for monitoring well SFL92-601 and was found to be within predicted limits. A significantly decreasing trend (SDT) was identified in SFL92-601 for the August 2009 sampling event (decrease in benzene concentration of 0.355 µg/L per year). No other statistically significant increases (SSIs), statistically significant decreases (SSDs), or statistical outliers were identified for benzene in 2009.

**cis-1,2-dichloroethene:** The intrawell tests were performed on the August 2009 cis-1,2-dichloroethene results. No significantly increasing trends (SITs), SSIs, or SSDs were identified in the wells that detected cis-1,2-dichloroethene. SDTs were identified in wells



SFL92-601 and SFL94-04B. Statistical outliers were identified in well SFL92-401 data for the sample collected in March 2007 and in well SFL92-403 data for samples collected in 2006 and 2007. The identified outliers were not removed for the statistical analyses.

**Vinyl Chloride:** The intrawell tests were performed on the August 2009 vinyl chloride results for monitoring wells SFL92-401, SFL92-403, SFL92-601, SFL92-603, SFL94-04B, and SFL97-903. SDTs were identified in wells SFL92-601 (decrease of 1.262 µg/L per year), SFL94-02A (decrease of 0.51 µg/L per year), SFL94-04B (decrease of 0.132 µg/L per year), and SFL97-903 (decrease of 0.103 µg/L per year). The identified outlier from March 2007 was not removed for statistical analyses. No SSIs or SSDs were identified in the data.

In 2008, most detections were reported as “J values” (estimated concentrations between the method detection limits and the method reporting limits), and all detections except two (naphthalene and benzene below their MCLs) were reported as “J values.” Variation in concentrations at these levels is expected using USEPA Method 8260B. Additionally, detections of compounds alternating with non-detects is expected when compounds are present at these low concentration levels. The estimated nature of detections at these concentrations should be taken into consideration for assessment of the useful application of statistical evaluations. Some trending may also be an artifact of changing detection limits. (Appendix A: A-8 and A-9, and Appendix C: C-2).

### 3.4 Contingency for Future Active Remediation

The information presented in Subsection 3.4 to demonstrate “site completion” was cited from the following references in Section 8.0: CTI, 2009b; DA-FR, 1997; and USACE-KCD, 2009.

The RAO to prevent ingestion, inhalation, and dermal contact with groundwater having contaminant concentrations exceeding the RGs is accomplished with the vegetative and soil cover, the riverbank stabilization structure, and institutional controls for land use and site access. These response activities have substantially decreased the human health and environmental risks at the SFL site since October 1990 when the Fort Riley installation was placed on the NPL.

The groundwater analytical results demonstrate that decreases in the contamination have occurred at the SFL site. The potential exposure pathways remain incomplete, and no new contaminants and/or contaminant sources have been identified. The groundwater contaminant concentrations in 2009 are less than the MCLs. The SFL site is functionally stable, and the remedy has performed as expected obviating the need to implement a contingency remedy to cleanup groundwater contamination.

Use of the aquifer for drinking water is not required and remains highly unlikely based on the fact that the installation has a large capacity well field in the alluvium of the Republican River approximately 4 miles up gradient of the SFL site. No contaminant concentrations remain greater than the MCLs in the alluvial aquifer beneath the landfill, thus no response action is necessary. The land uses are for agricultural, ecological, and recreational activities.

### **3.5 Comparison of Costs in Record of Decision with Actual Costs**

The comparison of costs in the SFL ROD with the actual costs for the completed efforts at the SFL site to accomplish the RAOs and to meet the RGs is as follows.

#### ***SFL ROD Estimated Cost for Alternative 3, the Selected Remedy***

Conceptual Estimated Capital Costs: \$2,530,000

Estimated Annualized O & M Costs: \$50,000

Estimated Net Present Worth Cost for Construction and 30 Years of O & M: \$3,150,000

#### ***Actual Costs to Accomplish RAOs (1989-2009)***

1989-1996 Removal Action: \$7,503,000; 1997-2009 O & M and LTM: \$2,729,322.90

Total Actual Costs (1989-2009): \$10,232,322.90

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## 4.0 ONGOING ACTIVITIES

### 4.1 Five-Year Reviews

The DA-FR has met the legal responsibility to ensure the continued effectiveness of all CERCLA remedies at the Fort Riley installation through conducting CERCLA five-year reviews. The purpose of the reviews is to assess the human health and environmental protectiveness of Fort Riley's restoration efforts. The reviews in 2002 and 2007 were statutory reviews for the five Fort Riley OUs. The scope of the reviews also covered other Fort Riley sites initially identified for further evaluation in the FFA as "past practice" units and areas of concern regulated under CERCLA and/or RCRA.

The focuses of the reviews for the SFL site were on assurance of protectiveness of the remedy through exposure protection via the bank stabilization structure, the landfill cover, the institutional controls, and the groundwater monitoring. The inspection of the landfill during the 2007 review confirmed that land use at the SFL site remained the same with restriction on the use of groundwater. The inspection of the landfill cover identified the need for repairs to differentially settled areas on the eastern portion of the landfill to eliminate storm-water ponding. The review report stated that the cover repairs to be performed in 2008 would reduce ponding on the eastern half of the landfill. No other information about environmental risks, site conditions, natural disaster impacts, or other data was identified to affect the protectiveness of the remedy. The RAOs specified in the SFL ROD continued to be protective. The original repairs and improvements made to the landfill cover and the construction of the riverbank stabilization structure were effective in achieving the RAOs of the SFL ROD.

The conclusions in the 2007 review stated that the selected remedy was functioning as intended. The results of the groundwater monitoring program indicated that the native cover has assisted in maintaining the low levels of the COPCs and other VOCs in the groundwater. No activities were observed during annual inspections that violated the institutional controls. The landfill cover and surrounding areas were undisturbed; there were no uses of groundwater within the SFL site and surrounding area of the landfill; and the gate protecting access to the landfill was in good repair. (USACE-KCD, 2007b).

The requirement for statutory five-year reviews under CERCLA is based on a remedial action that results in a hazardous substance, pollutant, or contaminant remaining at a site above levels that allow unlimited use and unrestricted exposure. Unlimited use and unrestricted exposure mean that there are no restrictions on the potential use of the land or other natural resources. A five-year review may be part of the LTM activities at a CERCLA site where RAOs and RGs are met, but institutional controls and groundwater monitoring are continued post "site completion" to confirm whether the remedy remains protective and that all the contaminants are actually gone or degraded to levels protective of HH & E.

In 2009, the COPCs and other VOCs in the groundwater at the SFL site have naturally attenuated to concentrations less than the MCLs and/or are no longer present. Although the RGs for the groundwater, the MCLs, have been met, the DA-FR will perform groundwater sampling for the next five-year review in 2012 to assure that the landfill remains functionally stable with site access and land use controls in place and that the concentrations of contaminants in groundwater are less than the MCLs. Subsequent CERCLA five-year reviews will be required at the SFL site until an unlimited use and unrestricted exposure determination is made. Unlimited use generally means that conditions are safe for any exposure scenario, including residential use, subsistence farming, and subsistence fishing. However, it does not necessarily imply cleanup to pristine or background conditions.

## 4.2 Long-Term Site Management and Care Activities

The remedy operation and maintenance (O & M) activities at the SFL site have been conducted as part of ongoing measures to maintain the integrity and effectiveness of the vegetative soil cover and the bank stabilization structure and to monitor the contaminated groundwater to ensure protection of HH & E. In 2009, the remedy RAOs are accomplished and the RGs have been met. Therefore, the level of site management and care can be reduced to *de minimis* based on the absence of threats to HH & E posed by the SFL site. It is appropriate for the ongoing activities at the SFL site to transition to the LTM and care phase of CERCLA post “site completion.”

The USEPA does not define O & M-LTM as a CERCLA response action; therefore, a site with an O & M program for LTM and care following achievement of the “site completion” milestone under CERCLA may still be deleted from the NPL, although the site has not achieved the “site close-out” milestone. For sites no longer requiring significant LTM and care activities, a RACR may also document achievement of the “site closeout” milestone under the CERCLA process.

Since the SFL site is a landfill with buried waste, continued LTM and care activities will be required to accommodate the land uses specified in the RPMP (e.g., agricultural outlease and other noninvasive activities on the landfill surface), to ensure that water quality in the alluvial aquifer remains less than the MCLs and to maintain the bank stabilization structure to prevent erosion. Land use and site access institutional controls will continue to ensure protection from exposure to the buried wastes that remain in the landfill. These controls are enforced through the RPMP. Although the concentrations of contaminants in the groundwater are less than the MCLs in the Kansas River alluvium in 2009, the restriction on groundwater use will remain, since the site is a landfill with buried wastes.

The final *end use* LTM and care plan for the SFL site will replace the remedy’s 1996 O & M Plan and 1997 Institutional Controls Plan. The DA-FR’s obligations for site management and care of the landfill following “site completion” ensures that the landfill

will continue to not pose a threat to HH & E. The final *end use* LTM and care plan will include the following measures.

### ***Inspections***

- Conduct annual inspections (in May) of the riverbank stabilization structure and landfill cover conditions to identify needed repairs. Burn, mow, and/or hay the vegetation (in March) to assist the inspection efforts.
- Observations for signs of landfill methane gas (i.e., distressed vegetation, odors, or bulges in slope from landfill gases) will be documented during annual inspections.

### ***Routine Operation and Maintenance***

- Maintain the top layer of the vegetative soil cover to prevent run-on and run-off from eroding or otherwise damaging the landfill cover and to sustain water quality in the Kansas River alluvial aquifer beneath the landfill. Perform *de minimis* (periodic, as needed) cover repair for settlement, subsidence, erosion, lack of or low density of native grass or other dominant plant species, sufficient to permit mowing for hay as dictated by the agricultural outlease, recreational, ecological, and/or non-intrusive/non-habitation activities being considered.
- Maintain the riverbank stabilization structure (periodic, as needed) to ensure no landfill debris is exposed and deposited into the Kansas River.
- Keep the landfill in the restricted category in the installation's RPMP. Maintain the SFL site institutional control features. This will preclude drilling of a drinking water well, any building construction, excavation, and other incompatible uses as given in Table 4.2 of the RPMP (Appendix B: B-3). The institutional controls found in the RPMP are considered when each proposed project at Fort Riley undergoes its screening by Fort Riley's National Environmental Policy Act coordinator. The fencing and signage are to be maintained.

### ***Sampling, Monitoring, and Analysis***

- Sample the groundwater in March 2012 for the five-year review in 2012. If the groundwater concentrations of contaminants remain less than the MCLs in 2012, the groundwater sampling program will be terminated. It will be 15 years post-ROD and 29 years post closure. If the concentrations of contaminants are greater than the MCLs in 2012, the DA-FR will evaluate the risk to HH & E and recommend the appropriate strategy for continued monitoring.
- Monitoring for methane gas in the capped monitoring well will be performed for safety prior to collecting groundwater samples.

***Reporting***

- Provide routine written reports as appropriate: Groundwater Monitoring Reports, Field Inspection Reports, Maintenance/Repair Reports, and Five-Year Review Reports.
- Provide special written reports as appropriate: Special Field Inspection Reports in the case of high water events whenever the Kansas River overtops the crest of the riverbank stabilization structure and upper riverbank slope and causes erosion damage to the riverbank or attacks the upstream and downstream edges of the bank stabilization structure.

The ongoing LTM and care activities will be performed under CERCLA by Fort Riley's DPW-Environmental Division under LTM-O & M contract(s) awarded by the USACE with oversight by the USACE, the EPA, and the KDHE.

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## 5.0 COMMUNITY INVOLVEMENT

Fort Riley revised its existing Community Relations Plan (CRP) and developed a Community Involvement Plan (CIP) in August 2005 to guide communication efforts among the people in communities surrounding Fort Riley and the organizations responsible for remediation. Significant program milestones and events in Fort Riley's remediation program warranted the CIP replacing the 1992 CRP. Specific requirements in CERCLA 117(a), as amended, require certain reports to be released to the public and that the public be notified of proposed cleanup plans and remedial actions. All CERCLA requirements regarding communication with the public about the SFL (OU001) activities have been met with the CRP, the CIP, and periodic meetings between the public, the EPA, the KDHE, and the installation in the form of Restoration Advisory Board (RAB) meetings. RAB meetings have occurred periodically throughout the investigation and CERCLA cleanup process at the SFL site.

The RAB was formed in 1997 and continues today. The information meetings are held in the evening from 1900 to 2000 in Building 407, Pershing Court, on an annual basis to discuss and share information regarding the cleanup program at Fort Riley. Fort Riley often uses visual aids, such as fact sheets and power-point presentations to explain the cleanup activities and encourage discussion. Meetings are required for significant regulatory issues to get input from the public for the decision-making process. Notices announcing the meetings are published in local newspapers to allow for participation of all people interested in the environmental cleanup activities at Fort Riley. Written responses from the public are accepted by DA-FR during a public comment period. The written responses are required to be formally addressed and responses to public comments are included in the appendix of the primary document. (DA-FR, 2005).

The RAB will be the public forum used by Fort Riley throughout the NPL deletion process for the Fort Riley installation. The public forum website is located at <http://www.riley.army.mil/Services/Fort/Environment/RAB.aspx>. This website includes the latest information, fact sheets, and contact information on the CERCLA site restorations at Fort Riley. All OU RACRs and the final RACR requesting full deletion of the Fort Riley installation from the NPL will be posted on the website to facilitate public review. In addition, documents relied upon for the recommendation of the deletion from the NPL will be available at the Fort Riley information repository as well as at the Dorothy Bramlage Public Library (Junction City, KS) and the Manhattan, KS Public Library.

## 6.0 SUMMARY AND CONCLUSIONS

Since closure of the landfill in 1983, a number of CERCLA response actions and remedy O & M activities have been performed at the SFL site (OU001) for protection of HH & E. Remedial response activities have been conducted in accordance with the SFL ROD, the remedy implementation plans, and in compliance with the procedural requirements of the FFA. The remedy included the following measures:

- establishing a functional soil cover with native grasses to improve water quality in the Kansas River alluvium;
- limiting site access and restricting land use activities;
- constructing the riverbank stabilization structure; and
- restoring the groundwater to meet the MCLs.

These measures and subsequent remedy O & M activities have been effective in diminishing the threats initially considered to pose risks to HH & E through direct contact with exposed waste, landfill subsidence, slope erosion along the Kansas River, and potential leaching and migration of contaminants into the groundwater and surface water. Restoration activities have restored the groundwater quality in the Kansas River alluvium to a level that assures protection of HH & E. Moreover, response measures have restored the groundwater quality to less than the MCLs.

### ***Summary and Conclusions-Institutional Controls***

Potential human and ecological direct contact with landfill contents has been minimized by the implementation of land use and site access institutional controls. Ingestion, inhalation, dermal contact with groundwater having organic contaminant concentrations exceeding the RGs (i.e., the MCLs) has been prevented.

The site access and land use institutional control features are in place and maintained. Their requirements are enforced through the RPMP and will be specified in the final *end use* LTM plan. Although the groundwater contaminant concentrations are less than the MCLs in the Kansas River alluvium, the restriction on groundwater use will remain in the RPMP, since the site is a landfill with buried wastes.

### ***Summary and Conclusions-Landfill Cover and Bank Stabilization***

The Kansas River bank slope adjacent to the SFL site has been physically stabilized for long-term reliability in preventing further movement of the river channel into the landfill and erosion of landfill contents. During annual inspections, the riverbank stabilization has been observed to be functioning as designed, and there has been no evidence of erosion of the upper slope of the riverbank. The bank stabilization structure will be sustained to prevent erosion of the southern boundary of the landfill. In 2009-2010, rock



armor will be placed over the construction debris/rubble area along the SFL riverbank slope found to be contaminated with asbestos.

The potential for leachate generation has been reduced by repairing the soil and vegetative cover and minimizing storm-water ponding and infiltration into the waste containment area of the landfill. The water quality in the Kansas River alluvial aquifer beneath the landfill has been restored by the soil cover with native grasses and natural attenuation of contaminants to below the RGs specified in the SFL ROD.

In May 2009, the native grasses were observed to be mature, healthy, and in excellent condition on a majority of the landfill surface, although they had undergone prescribed burn in March 2009 to enhance inspection of the landfill soil cover by KDHE and the EPA-7. Native grasses planted on repaired areas were beginning to show signs of development.

The soil cover with native grasses will be maintained by the DA-FR to permit the agricultural outleasing of the landfill and the other non-invasive land uses specified in the RPMP and to sustain the water quality in the alluvial aquifer beneath the landfill. Differential settlement, ponded areas, and a back cut eroded area at the downstream edge of the riverbank stabilization structure and southeast of the landfill were noted during the 2009 inspection. The differential settlement, ponded areas were repaired in September-October 2009. The back cut erosion area is an outstanding deficiency that will be addressed as funds become available.

### ***Summary and Conclusions-Long-Term Groundwater Monitoring***

The dominant route for contaminant migration continues to be south-southeastward toward the Kansas River, approximately parallel to a line from monitoring wells SFL92-601 and SFL92-603 to wells SFL92-401 and SFL92-403. Threemile Creek apparently continues as a barrier to eastward migration from the SFL site in the shallow alluvium, given the continuing absence of VOCs in wells SFL94-03A, SFL94-04A, and SFL97-901. Contamination in the deeper alluvium apparently can migrate eastward beneath the creek to deep wells. The migration has occurred but rarely, possibly as a result of the influence of Threemile Creek.

Contaminant migration toward the Kansas River at the SFL site continues to occur, as indicated by the number and low concentrations of VOC compounds detected above the method detection reporting limit at wells SFL92-401 and SFL92-403 in March 2009 and in August 2009. However, the VOCs in the alluvium that migrate with groundwater flow would likely volatilize once they are transported to the surface waters and would not bioconcentrate in aquatic organisms. As such, food chain human health from ingestion of fish and surface water is not of concern at the SFL site.

Seventeen (17) years (1992-2009) of data reveal that no concentrations of contaminants from the SFL site remain in the groundwater to threaten human health and the

environment. Concentration trends of contaminants are stable based on the evaluation of the data from a sufficient number of monitoring periods (many years). There is no apparent evidence that the groundwater contaminant concentrations will increase over time to greater than the MCLs based on the statistical evaluations and trend analyses of the groundwater data. Based on the groundwater monitoring data, the migration of constituents under Threemile Creek was found to be a transient and not a prevailing condition. The water quality in the Kansas River alluvial aquifer has been restored and is no longer being degraded by leachate from the buried waste at the SFL site.

The frequency of groundwater monitoring will decrease post “site completion.” The next groundwater sampling event will be performed in 2012 for the five-year review in 2012. If the contaminant concentrations in groundwater remain less than the MCLs, the DA-FR will evaluate the current and future conditions at the SFL landfill and request approval from the EPA-7 and the KDHE for formal termination of the groundwater program (based on 15 years of data, 1997 (SFL ROD)-2012 and 29 years of data since closure in 1983). If the concentration of a contaminant is greater than the MCL for that contaminant in 2012, the DA-FR will evaluate the risk to HH & E and recommend the appropriate strategy for continued monitoring.

#### ***Summary and Conclusion-Contingency for Future Active Remediation***

The landfill has reached a functional stability that is predictable and protective of HH & E; the RAOs are accomplished and the RGs specified in the SFL ROD have been met; and the contingency for future active remediation is not needed to protect HH & E. The principal threat of future exposure to contaminated groundwater no longer exists at the SFL site, since concentrations of contaminants are less than the MCLs. The aquifer beneath the landfill is no longer contaminated with COPCs and other VOCs at concentrations presenting a potential threat to HH & E. No active remediation of groundwater is or will be required since the establishment of the sufficient vegetative soil cover and natural attenuation of contaminants have restored the groundwater quality to concentrations less than the MCLs.

#### **Current Conditions for “Site Completion” Status**

The SFL site conditions have improved significantly since the NPL listing and implementation of CERCLA response actions specified in the SFL ROD. Although some residual risks may remain at the site since buried wastes remain, there is no longer a definitive threat to human health and the environment from the landfill contents and contaminated groundwater. All initially identified threats have been addressed, and additional remedial response measures are not needed to treat the residual low concentrations of contaminants in the groundwater, as the concentrations of COPCs and other VOCs are less than the MCLs in the alluvium beneath the landfill. The results of the 2009 inspection at the SFL site did not reveal any threats to HH & E, and the landfill is functionally stable in 2009. (Appendix C: C-1).

The DA-FR, EPA-7, and KDHE have determined that no further response actions under CERCLA are appropriate at the SFL site and that no remediation-related activities are anticipated into the future for protection of HH & E or to address degradation of the Kansas River alluvial aquifer. The alluvial aquifer has been restored for beneficial use as a drinking water source with only traces of VOCs and is no longer being degraded by leachate from the buried waste at the SFL site.

Ongoing CERCLA activities at the SFL site will continue to be performed by the DA-FR in coordination with the EPA-7 and the KDHE. These long-term management (LTM) and care activities will involve: site access and land use institutional controls; annual inspections and as needed repairs of the landfill vegetative soil cover and the bank stabilization structure; groundwater monitoring until formally terminated, and CERCLA five-year reviews.

The DA-FR responses to the KDHE comments on the draft final RACR (dated December 4, 2009) are included in Appendix B: B-1. The approval letter from the EPA-7 Remedial Project Manager on the revised draft RACR was received on November 4, 2009. Subsequently, several comment letters as follows, were submitted to the DA-FR and are included in Appendix B: B-1. The EPA-7 letter and e-mail, dated December 23, 2009, state that the DA-FR has addressed most of the EPA-7's comments and concerns, and request that the ongoing maintenance activities and groundwater monitoring program continue, to ensure the protection of human health and the environment. The KDHE letter dated December 29, 2009, states that the draft final RACR was reviewed, and no comments were generated. The EPA-7 site attorney submitted comments via e-mail on January 26, 2010. The DA-FR responses to these comments are included in Appendix B: B-1 along with the approval e-mail (with two final comments addressed by the DA-FR) from the EPA-7 attorney on February 9, 2010.

The index to the documents in the CERCLA Administrative Record for the SFL site is included in Appendix B: B-2.

## 7.0 CERTIFICATION STATEMENT

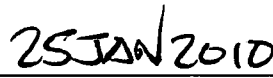
Lead Agency and Support Agency Acceptance of the RACR  
**Fort Riley Army Installation**  
**Southwest Funston Landfill (SFL) (OU001)**

The DA-FR certifies that this Remedial Action Completion Report summarizes the completion of remedial action objectives for the SFL (OU001), the groundwater has attained cleanup standards (the MCL standards) for all chemicals of concern, and no further response actions under CERCLA are necessary. The SFL (OU001) is eligible for "site completion" status under CERCLA and is a valid candidate for deletion from the NPL.

Approved by:



Kevin P. Brown  
COL, IN  
Garrison Commander  
U.S. Department of Army, Fort Riley, KS




Date

**Lead Agency and Support Agency Acceptance of the RACR  
Fort Riley Army Installation  
Southwest Funston Landfill (SFL) (OU001)**

The USEPA, Region VII, with concurrence by the State of Kansas acting through KDHE, BER, has determined that the remedial action under CERCLA has been completed at the SFL (OU001), the remedial action objectives have been met, the groundwater has attained cleanup standards (the MCL standards) for all chemicals of concern, and no further response actions under CERCLA are necessary. The SFL (OU001) is eligible for "site completion" status under CERCLA and is a valid candidate for deletion from the NPL.

Approved by:

  
\_\_\_\_\_  
Cecilia Tapia  
Superfund Division Director  
U.S. Environmental Protection Agency, Region VII

Date 2/18/10



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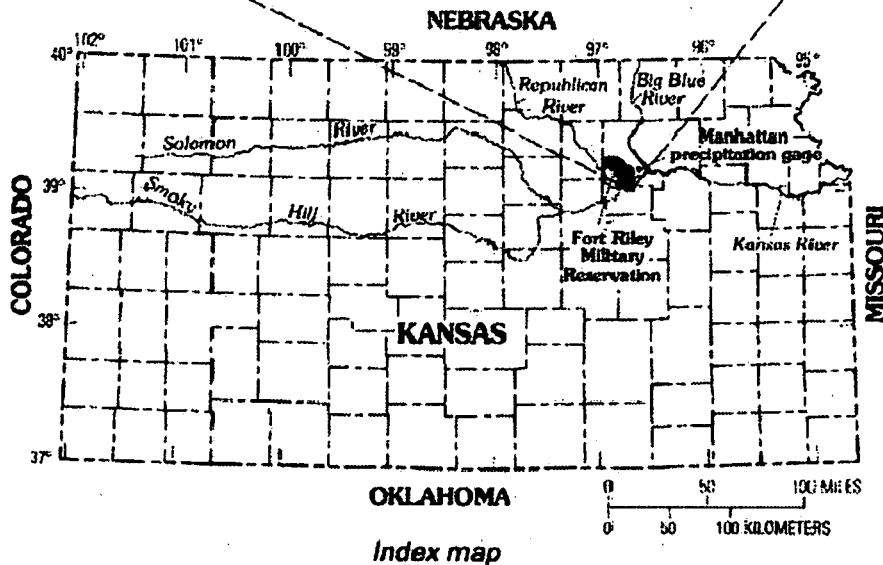
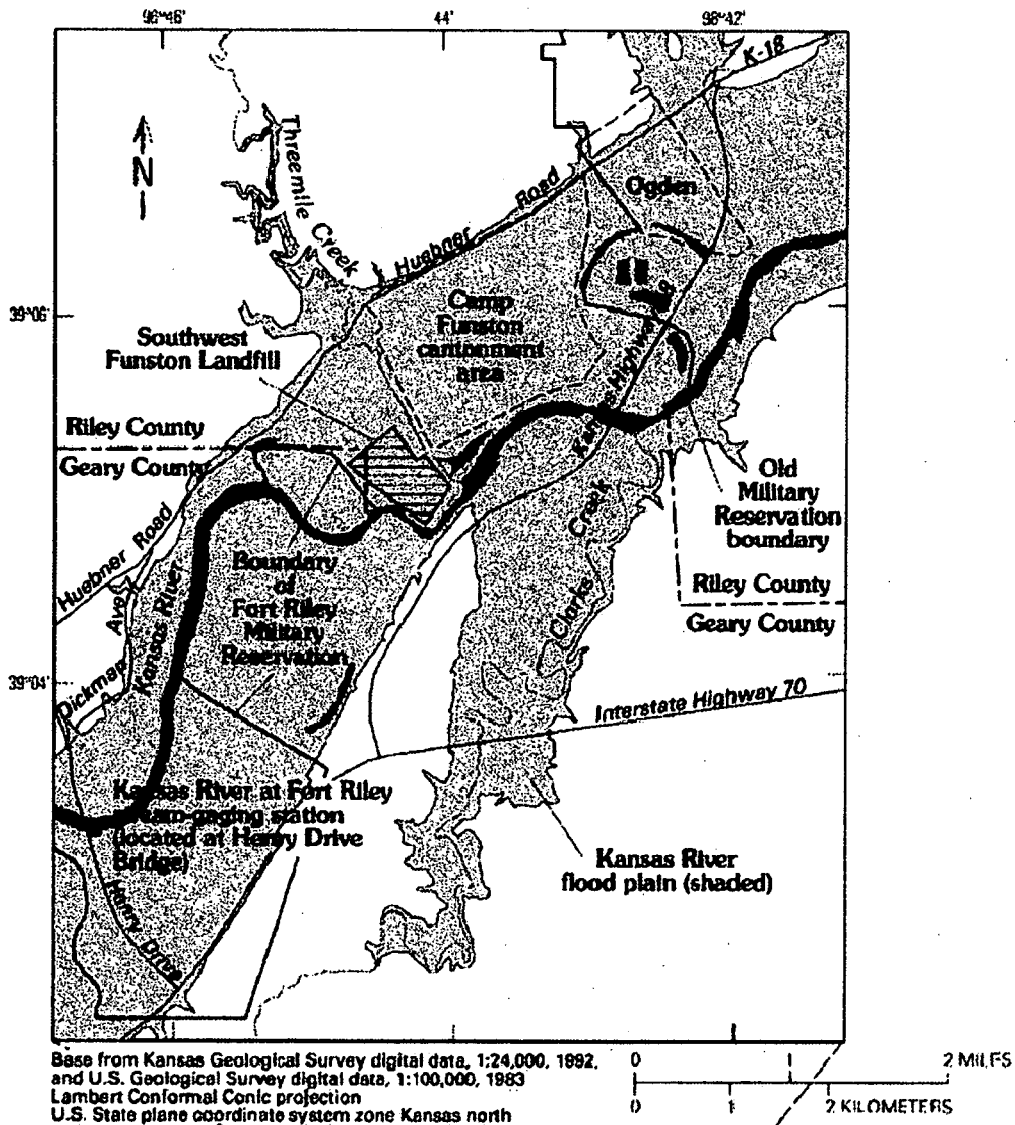
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**APPENDIX A**

- A-1: Location of Southwest Funston Landfill (Figure 1-1), (CTI, 2009a and 2009c)
- A-2: Monitoring Well Locations (Figure 1-2), (CTI, 2009a and 2009c)
- A-3a: Maximum Quantity of Municipal and Industrial Wastes Calculation (DA-FR, LAW, 1994a)
- A-3b: Observed Conditions Along Landfill Bank, Field Reconnaissance, September 1992 (Figure 2-8), (LAW, 1993)
- A-3-c: Bank Stabilization Project (Figure), (USACE-KCD, 1997a)
- A-4a: 2008 Wells With Detected Compounds (Figure 3-1), (CTI, 2008a) and 2009 Wells With Detected Compounds (Figures 3-1 (April and August 2009)), (CTI, 2009c)
- A-4b: Field Sample Results 2009 (Tables 1 (April 1-2, 2009)) and Table 1-4 (August 2009)), (CTI, 2009a and 2009c)
- A-5: Summary of Yearly Stream Stage and Well Static Water Levels, August 2009 Groundwater Sampling Event (Table 2-1), (CTI, 2009c)
- A-6: U.S. Geological Survey (USGS) Potentiometric Surface Maps (2005-2009)
- A-7: Monitoring Well Pump Adjustment and Repair Summary-April 2009 (Table 1-6), (CTI, 2009c)
- A-8: Monitoring Wells Detections, Trend Graphs (1992-2009), (DA-FR)
- A-9: 2009 Statistical Evaluation Outputs (CTI, 2009c)



**C.T. and Associates, Inc.**

3101 Broadway, Suite 460  
 Kansas City, MO 64111  
 www.cticompanies.com



**Figure 1-1**  
**Location of Southwest Funston Landfill**  
**Fort Riley, Kansas**

Date: September 2009

Project Number: 095010008



**Southwest Funston Landfill  
Fort Riley, Kansas  
Maximum Quantity of Municipal and Industrial Waste**

Surface Area of Landfill (Areas Calculated Using Digital Ortho)

1350 by 785	1,059,750 sq. ft.
1350 by 900	1,215,000 sq. ft.
2400 by 800	<u>1,920,000 sq. ft.</u>

4,147,500 sq. ft.

Average Depth of Fill	<u>16 ft</u>
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Gross Landfill Volume	66,360,000 cu. ft.
	<u>27 cu.ft./cu. yds.</u>

2,457,778 cu.yds.

15% Adjustment for Bulk Walls between Trenches	<u>85%</u>
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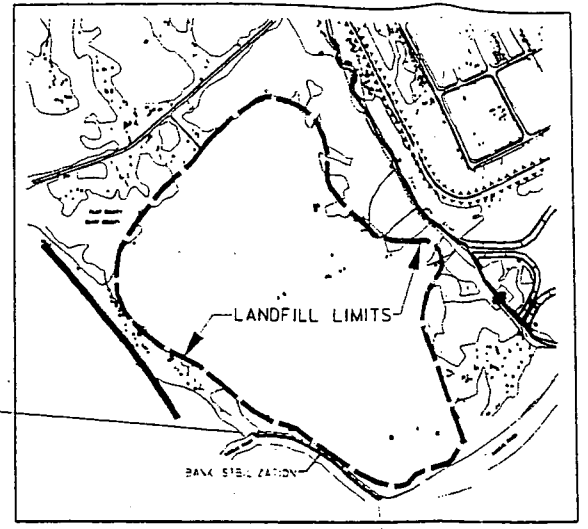
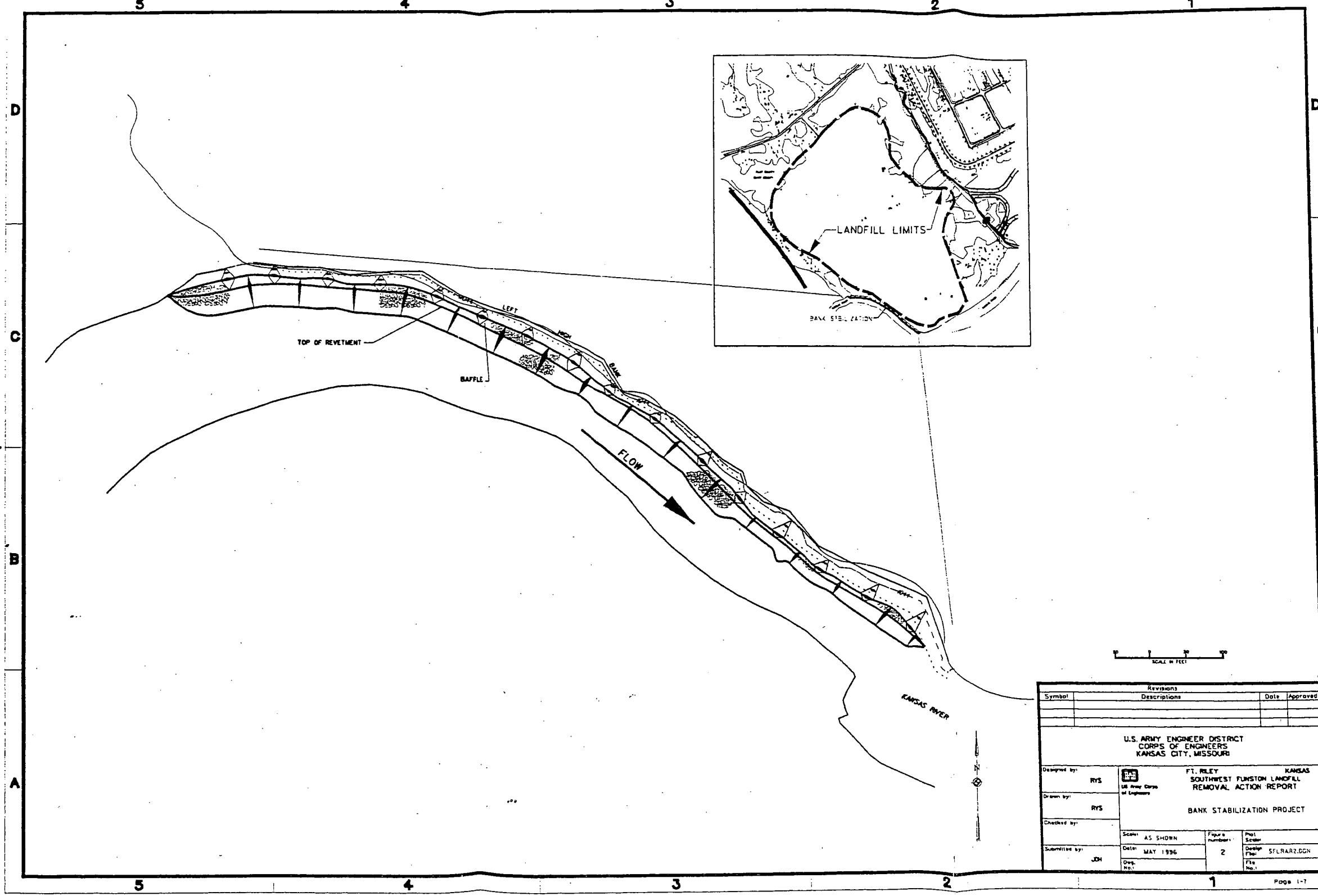
Net Landfill Volume	2,089,111 cu.yds.
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Source: Fort Riley IRP Team 2008 and Law, 1994a



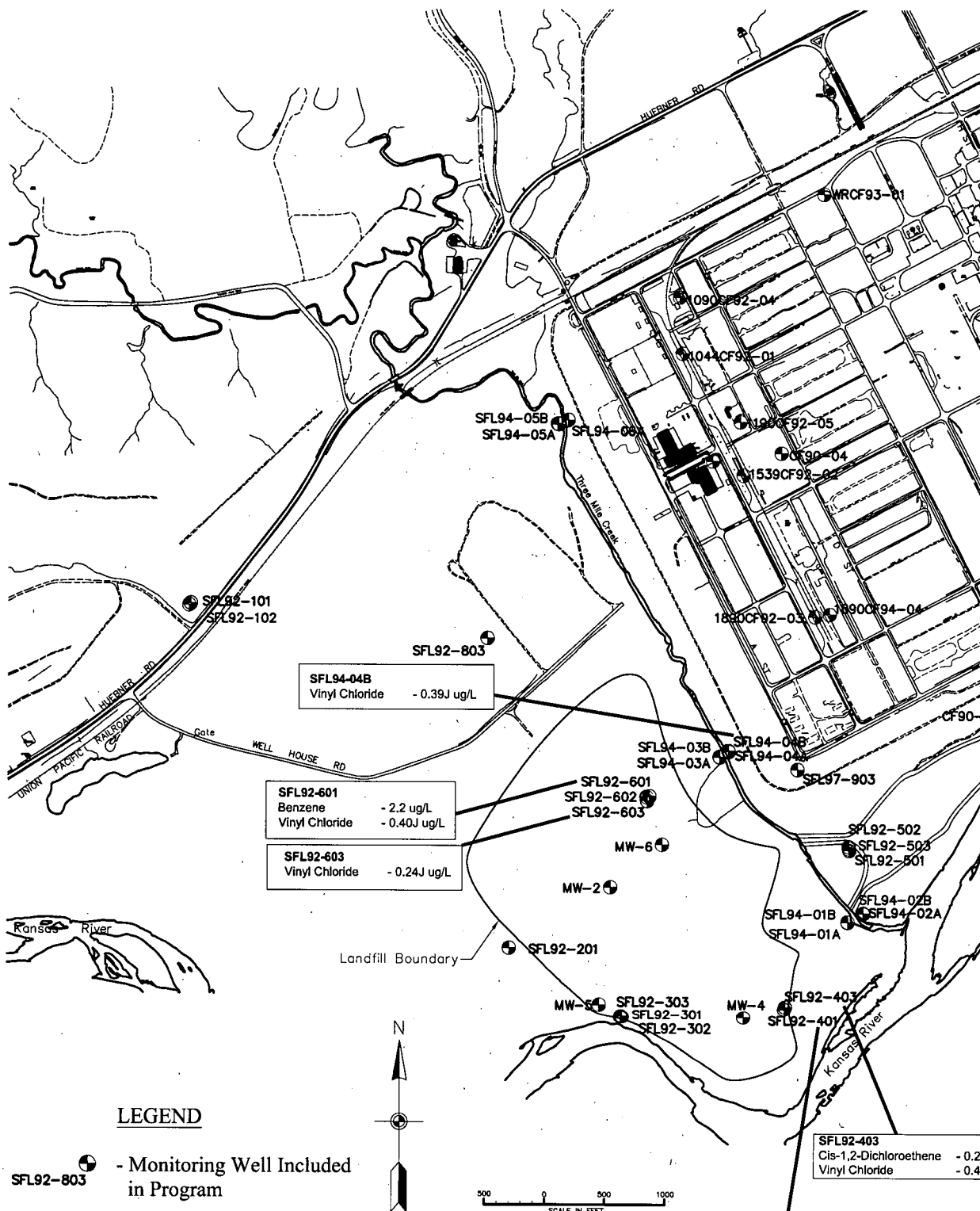


VALUE ENGINEERING PAYS



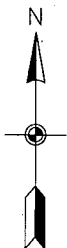
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<b>U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS KANSAS CITY, MISSOURI</b>			
Designed by:	RYS	FT. RILEY SOUTHWEST FUNSTON LANDFILL REMOVAL ACTION REPORT	KANSAS
Drawn by:	RYS	BANK STABILIZATION PROJECT	
Checked by:		Scale: AS SHOWN	Fig. number: 2
Submitted by:	JDH	Date: MAY 1996	Design File: SFLR2RZ.DGN





**LEGEND**

- Monitoring Well Included in Program
- Monitoring Well Not Used



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 3101 Broadway, Suite 460  
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**Figure 3-1**  
**2009 Wells with Detected Compounds of Concern**  
**Fort Riley, Kansas**

Date: June 2009

Project Number: 095010008



**Table 1**  
**Detected Compounds**  
**2009 Groundwater Sampling Event**  
**Southwest Funston Landfill**  
**Fort Riley, Kansas**

Parameter	Units	SFL94-04B	SFL92-303	SFL92-401	SFL92-403	SFL92-601	SFL92-603
1,2,4-Trimethylbenzene	µg/L	0.057UJ	0.057UJ	0.057UJ	0.057UJ	8.1	0.057UJ
1,3,5-Trimethylbenzene	µg/L	0.070UJ	0.070UJ	0.070UJ	0.070UJ	0.080J	0.070UJ
1,4-Dichlorobenzene	µg/L	0.13UJ	0.15J	0.58J	0.32J	2.8	0.30J
1,1-Dichloroethane	µg/L	0.092UJ	0.092UJ	0.092UJ	0.092UJ	0.38J	0.092UJ
cis-1,2-Dichloroethene	µg/L	0.074UJ	0.074UJ	0.25J	0.22J	0.074UJ	0.074UJ
1,2-Dichloroethene (Total)	µg/L	0.16UJ	0.16UJ	0.25J	0.22J	0.16UJ	0.16UJ
Acetone	µg/L	2.5UJ	2.5UJ	2.5UJ	2.5UJ	6.3J	2.5UJ
Benzene	µg/L	0.088UJ	0.088UJ	0.088UJ	0.088UJ	2.2	0.088UJ
Chlorobenzene	µg/L	0.11UJ	0.11UJ	0.68J	0.46J	0.39J	0.12J
Chloroethane	µg/L	0.13UJ	0.13UJ	0.13UJ	0.13UJ	0.82J	0.13UJ
Chloromethane	µg/L	0.18J	0.12UJ	0.21J	0.12UJ	0.41J	0.12UJ
Isopropylbenzene	µg/L	0.076	0.076	0.076	0.076	1.8	0.076
Isopropyl Ether	µg/L	0.056UJ	0.056UJ	0.056UJ	0.056UJ	0.28J	0.056UJ
n-Butylbenzene	µg/L	0.064UJ	0.064UJ	0.064UJ	0.064UJ	0.37J	0.064UJ
sec-Butylbenzene	µg/L	0.061UJ	0.061UJ	0.061UJ	0.061UJ	0.35J	0.061UJ
tert-Butylbenzene	µg/L	0.057UJ	0.057UJ	0.057UJ	0.057UJ	0.080J	0.057UJ
Naphthalene	µg/L	0.20UJ	0.20UJ	0.20UJ	0.20UJ	12	0.20UJ
MTBE	µg/L	0.11UJ	0.11UJ	0.11UJ	0.11UJ	0.24J	0.11UJ
2-Butanone (MEK)	µg/L	0.27UJ	0.27UJ	0.27UJ	0.27UJ	0.50J	0.27UJ
Styrene	µg/L	0.036UJ	0.036UJ	0.036UJ	0.036UJ	0.060J	0.036UJ
Toluene	µg/L	0.22UJ	0.22UJ	0.22UJ	0.22UJ	0.23J	0.22UJ
m&p Xylenes	µg/L	0.12UJ	0.12UJ	0.12UJ	0.12UJ	1.3J	0.12UJ
O-Xylene	µg/L	0.077UJ	0.077UJ	0.077UJ	0.077UJ	0.97J	0.077UJ
Total Xylenes	µg/L	0.20UJ	0.20UJ	0.20UJ	0.20UJ	2.3J	0.20UJ
Vinyl Chloride	µg/L	0.39J	0.17UJ	0.44J	0.44J	0.40J	0.24J

**Bold type indicates volatile organic compound was detected above the method detection limit (MDL).**

**J - Estimated: The analyte was detected at a concentration greater than the MDL but less than the method reporting limit.**

**U - The analyte was not detected at a concentration greater than the MDL.**

Note: Samples were received outside the acceptable 2-6 °C range at 9.6 °C. Action taken was to qualify all reported volatile organic data as estimated with a J code. The detected sample concentrations may be biased low, and the undetected sample detection limits may also be biased low. The groundwater collection temperatures ranged from 11.46 - 15.4 °C so it is not unusual that the sample temperatures did not achieve 2-6 °C by the time the laboratory received them. As the sample temperatures exceeded the regulatory acceptable range, they were qualified as estimated. However, the data should be considered usable and valid due to the elevated groundwater collection temperatures did not have sufficient time in the cooler to reach the regulatory temperature range.

**Table 1-4**  
**Detected Compounds**  
**August 2009 Groundwater Sampling Event**  
**Southwest Funston Landfill**  
**Fort Riley, Kansas**

Parameter	Units	MCL	KDHE RSK	Tap Water PRG	SFL92-401	SFL92-403	SFL92-601	SFL92-603	SFL94-04B
1,2,4- Trimethylbenzene	µg/L	NA	17	150	0.057U	0.057U	<b>4.4</b>	0.057U	0.057U
1,4 Dichlorobenzene	µg/L	NA	75	0.43	<b>0.40J</b>	<b>0.20J</b>	<b>3.5</b>	<b>0.22J</b>	0.13U
1,1-Dichloroethane	µg/L	NA	1,300	2.4	0.092U	0.092U	<b>0.41J</b>	0.092U	0.092U
cis-1,2-Dichloroethene	µg/L	70	70	370	0.074U	0.074U	<b>0.38J</b>	0.074U	0.074U
Dichlorodifluoromethane	µg/L	NA	570	390	0.13U	0.13U	<b>0.36J</b>	0.13U	0.13U
1,2-Dichloroethene (Total)	µg/L	NA	100	330	0.16U	0.16U	<b>0.38J</b>	0.16U	0.16U
Benzene	µg/L	5	5	0.41	0.088U	0.088U	<b>1.6</b>	0.088U	0.088U
Chlorobenzene	µg/L	100	100	91	<b>0.43J</b>	<b>0.23J</b>	<b>0.31J</b>	0.11U	0.11U
Chloroethane	µg/L	NA	89	NA	0.13U	0.13U	<b>1.1</b>	0.13U	0.13U
Isopropylbenzene	µg/L	NA	NA	NA	0.076U	0.076U	<b>1.5</b>	0.076U	0.076U
Isopropyl Ether	µg/L	NA	NA	NA	0.056U	0.056U	<b>0.20J</b>	0.056U	0.056U
sec-Butylbenzene	µg/L	NA	80	NA	0.061U	0.061U	<b>0.38J</b>	0.061U	0.061U
tert-Butylbenzene	µg/L	NA	NA	NA	0.057U	0.057U	<b>0.070J</b>	0.057U	0.057U
n-Propylbenzene	µg/L	NA	80	NA	0.15U	0.15U	<b>0.42J</b>	0.15U	0.15U
Napthalene	µg/L	NA	9	NA	0.20U	0.20U	<b>8.8</b>	0.20U	0.20U
MTBE	µg/L	NA	20	12	0.11U	0.11U	<b>0.22J</b>	0.11U	0.11U
2-Butanone (MEK)	µg/L	NA	2,800	7,100	0.27U	0.27U	<b>1.0J</b>	0.27U	0.27U
m&p Xylenes	µg/L	NA	NA	NA	0.12U	0.12U	<b>1.0J</b>	0.12U	0.12U
O-Xylene	µg/L	NA	NA	1,400	0.077U	0.077U	<b>0.80J</b>	0.077U	0.077U
Total Xylenes	µg/L	10,000	10,000	200	0.20U	0.20U	<b>1.8J</b>	0.20U	0.20U
Vinyl Chloride	µg/L	2	2	0.016	<b>0.19J</b>	<b>0.30J</b>	<b>0.59J</b>	<b>0.21J</b>	<b>0.30J</b>

Bold type indicates volatile organic compound was detected above the method detection limit (MDL).

J- Estimated: The analyte was detected at a concentration greater than the MDL but less than the method reporting limit.

U - The analyte was not detected at a concentration greater than the MDL



**Table 2-1**  
**Summary of Yearly Stream Stage and Well Static Water Levels**  
**2009 Groundwater Sampling Event**  
**Southwest Funston Landfill**  
**Fort Riley, Kansas**

Year	KRHBD		TMCM		SFL94-06A		SFL92-301	
	Days Measured	Yearly Average Stage (msl)	Days Measured	Yearly Average Stage (msl)	Days Measured	Yearly Average SWL (msl)	Days Measured	Yearly Average SWL (msl)
1999	362	1040.77	330	1030.66		NA		NA
2000	365	1038.58	319	1036.60	314	1031.80		NA
2001	350	1039.52	360	1036.77		NA	363	1031.68
2002	361	1037.90	364	1036.58	360	1031.14	364	1030.40
2003	350	1037.73	340	1036.76	344	1030.47	353	1030.21
2004	364	1038.31	366	1036.93	366	1030.93	363	1030.61
2005	338	1037.77	352	1036.85	360	1031.56	357	1030.75
2006	350	1036.72	349	1036.93	345	1030.88	348	1029.92
2007	354	1038.37	364	1036.98	362	1033.00	261	1031.79
2008	337	1039.26	351	1037.05	363	1033.2	360	1033.92
2009	120	1038.39	120	1037.11	120	1033.72	111	1031.64

KRHBD - Kansas River Henry Drive Bridge

TMCM - Three Mile Creek - Middle

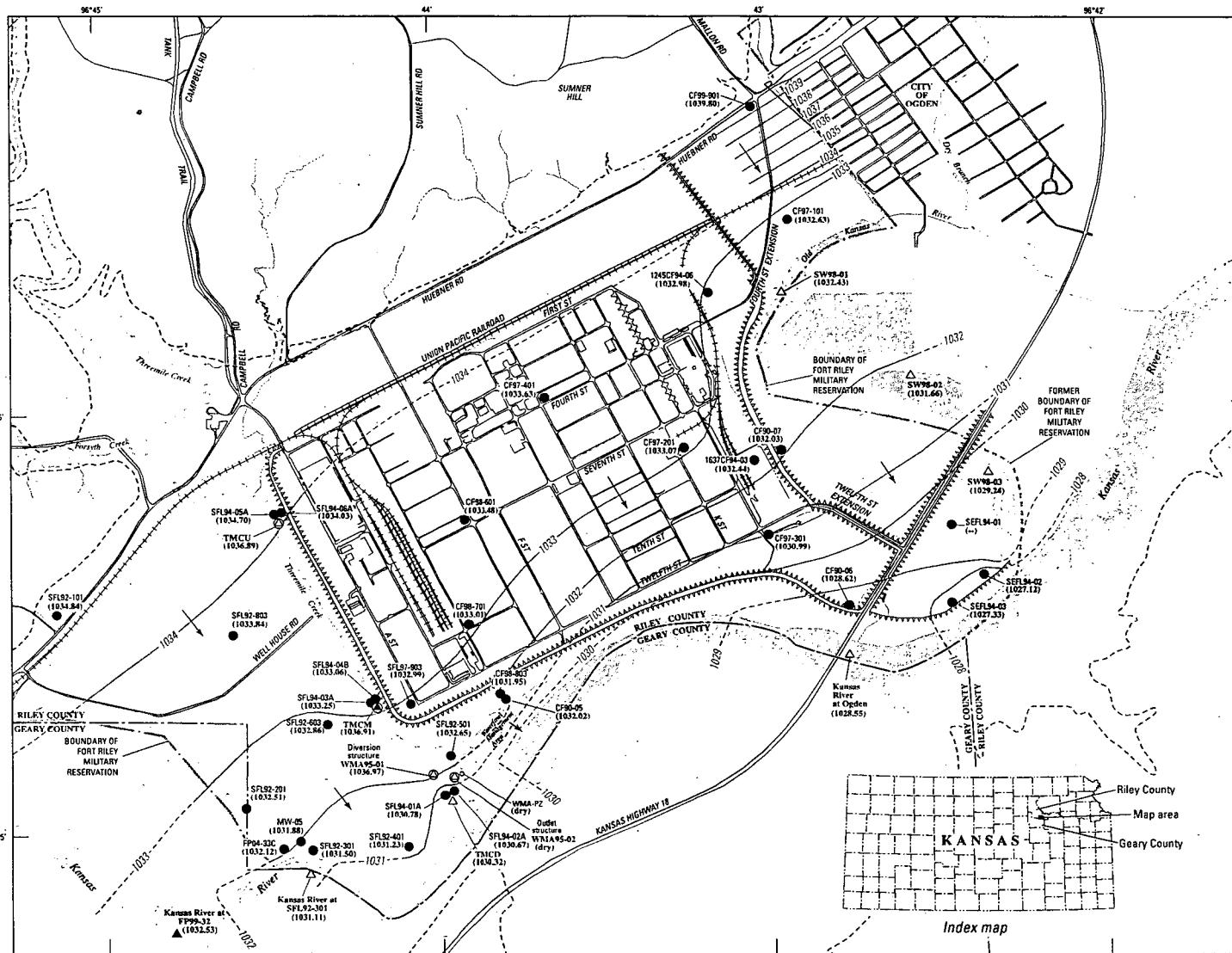
msl - mean sea level

SWL - static water level

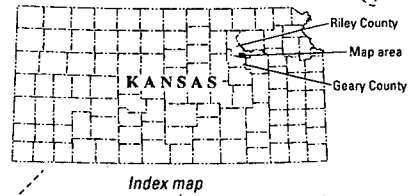
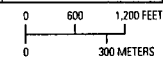
By Cristi Hansen

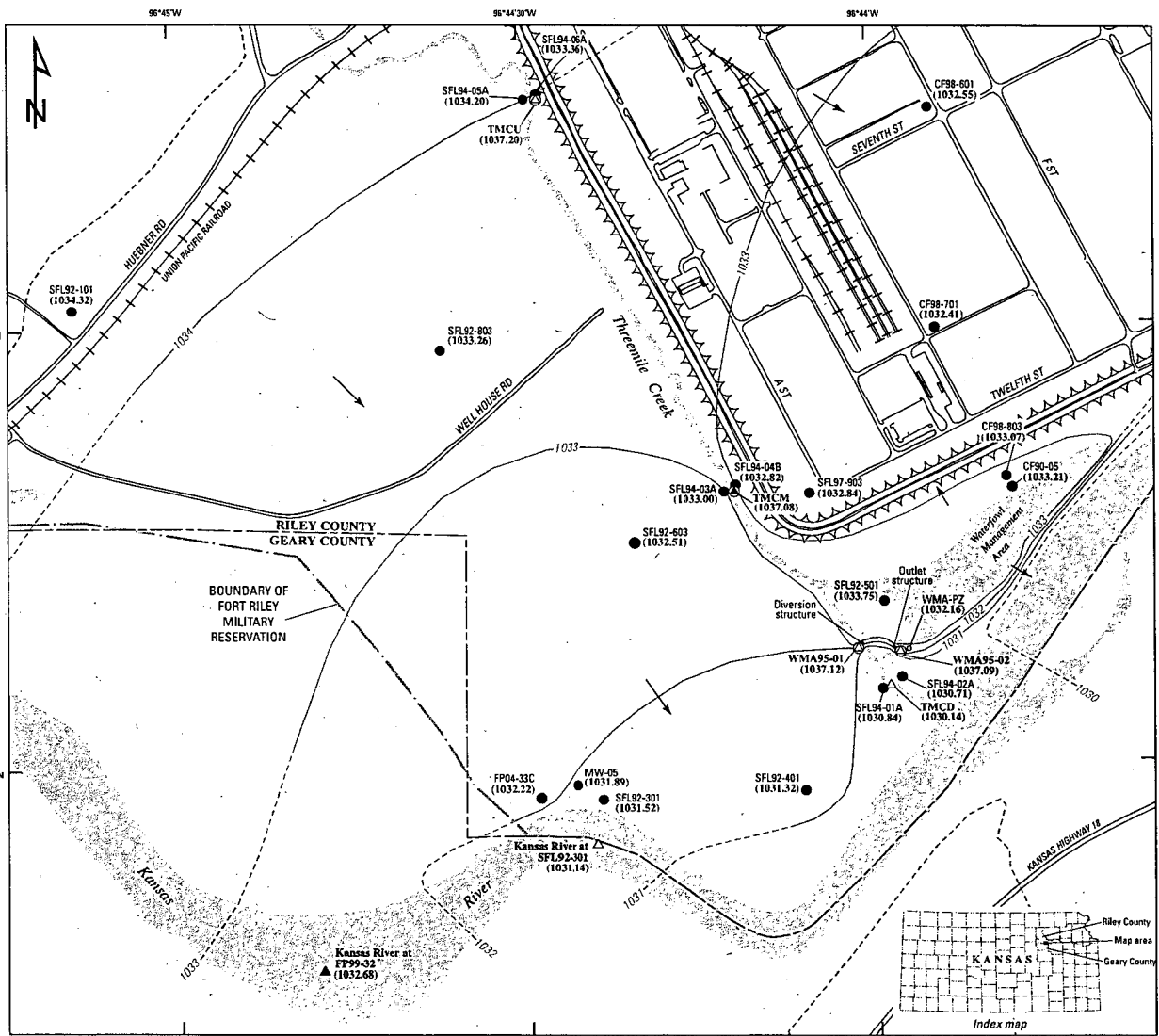
**EXPLANATION**

- Perennial surface-water body
- Intermittent stream
- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval is 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Valley boundary
- Levee
- Approximate direction of groundwater flow
- Observation well—Upper number is well identifier. Lower number is altitude of water surface, in feet; (—) indicates well not measured. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station—Upper number is site identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Surface-water measurement site—Upper number is site identifier. Lower number is altitude of water surface, in feet; (dry) indicates no water at this site. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station or surface-water measurement site not contoured—Site included for information purposes. Not contoured because of poor connection between surface water and groundwater at this site. Solid triangles indicate stream-gaging station; open triangles indicate surface-water measurement site
- Piezometer—Upper number is PZ identifier. Lower number is altitude of water surface, in feet; (dry) indicates no water in piezometer. Datum is North American Vertical Datum of 1988 (NAVD 88)



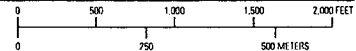
Base from U.S. Army Corps of Engineers digital data 1:4,800, 1985  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Standard parallels 38°43' and 39°47', origin 98°20'20"  
Horizontal coordinate information referenced to the North American Datum of 1983 (NAD 83)





Base from U.S. Army Corps of Engineers digital data 1:4,800, 1985  
 State Plane Coordinate System, Kansas north  
 Lambert Conformal Conic projection  
 Standard parallels 38°43' and 39°47', origin 98°30'20"

Horizontal coordinate information referenced to the North American Datum of 1983 (NAD 83)



U.S. Geological Survey  
 Administrative Report

Prepared for the  
 U.S. Army, Fort Riley, Kansas

Lawrence, Kansas  
 May 15, 2009

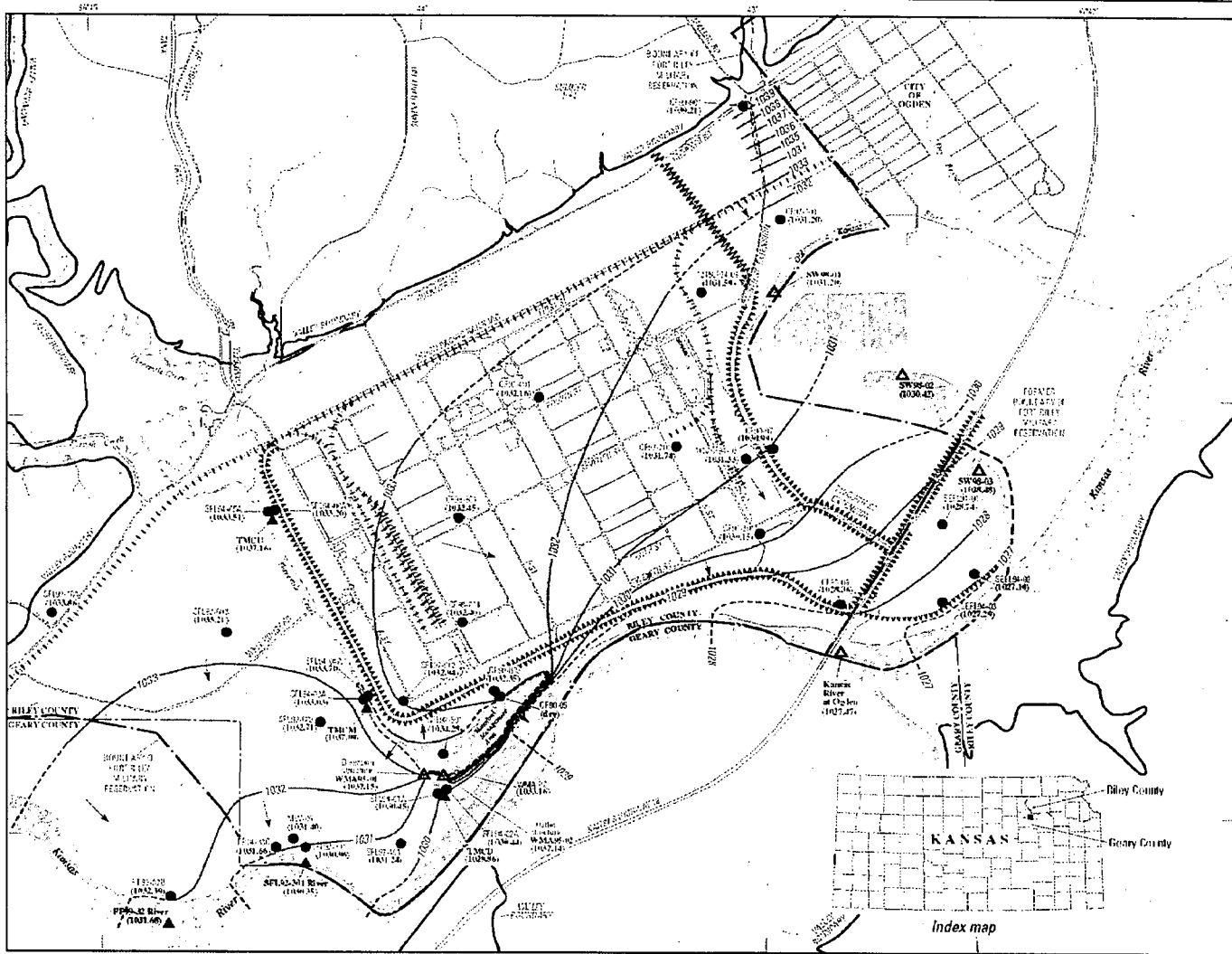
Potentiometric surface (water table) in  
 alluvium for March 31, 2009, Southwest  
 Funston Landfill Area, Fort Riley, Kansas.

By Cristi Hansen

**EXPLANATION**

- Perennial surface-water body**
- Potentiometric contour**—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval is 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Valley boundary**
- Levee**
- Approximate direction of ground-water flow**
- Observation well**—Upper number is well identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station**—Upper number is site identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Surface-water measurement site**—Upper number is site identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station or surface-water measurement site not contoured**—Site included for information purposes. Not contoured because of poor connection between surface and ground water at this site. Solid triangles indicate stream-gaging station; open triangles indicate surface-water measurement site
- Piezometer**—Upper number is PZ identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)

Data available in the U.S. Geological Survey National Water Information System (<http://water.data.usgs.gov/nwis>)



Derived from a series of piezometer logs from 4/2002 thru 2/2008  
 Data from Geology Division, Kansas Dept. of Geology  
 Date of 25 March 2008  
 Contour interval 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)

U.S. Geological Survey  
 Lawrence, Kansas 66049



Potentiometric surface (water table) in  
 alluvium for March 25, 2008, Camp Funston  
 Area, Fort Riley, Kansas.

By Cristi Hansen  
 April 2008

**EXPLANATION**

- Perennial surface-water body
- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Levee
- Intermittent stream
- Approximate direction of ground-water flow
- Observation well—Upper number is well identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station—Upper number is site identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Surface-water measurement site—Upper number is site identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Piezometer—Upper number is PZ identifier. Lower number is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- No measurement

and Associates, Inc.  
 3101 Broadway, Suite 460  
 Kansas City, MO 64111  
 www.cticompanies.com



**Figure 2-2**  
**Potentiometric Surface in Alluvium March 25, 2008**  
 Fort Riley, Kansas

Date: June 2008

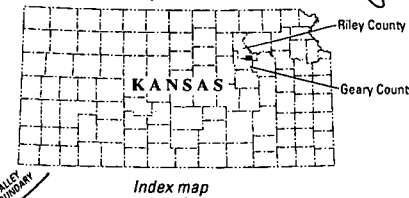
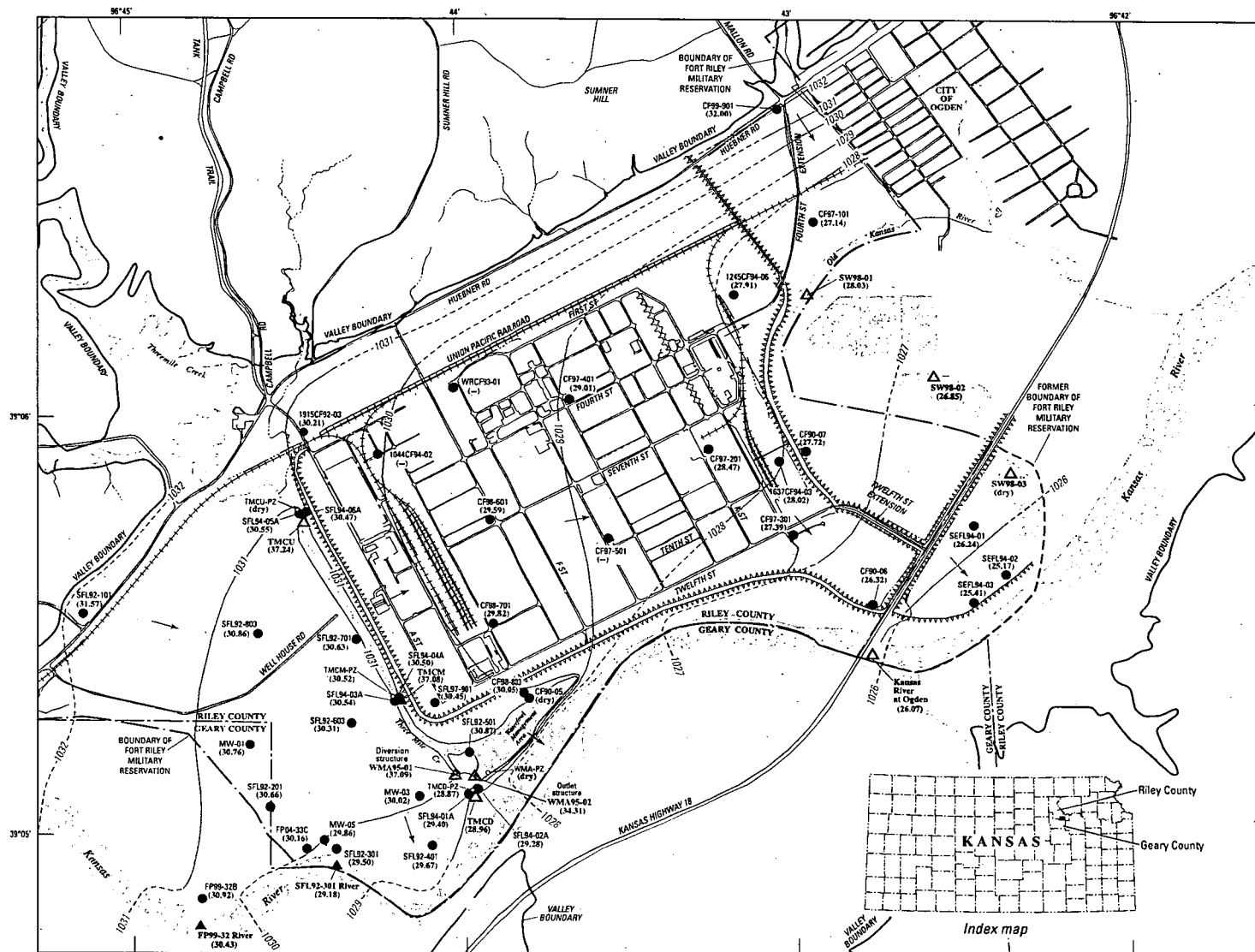
Project Number: 075010071.06

Potentiometric surface (water table) in  
alluvium for March 27–28, 2007, Camp Funston  
Area, Fort Riley, Kansas.

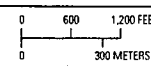
By Cristi Hansen  
April 2007

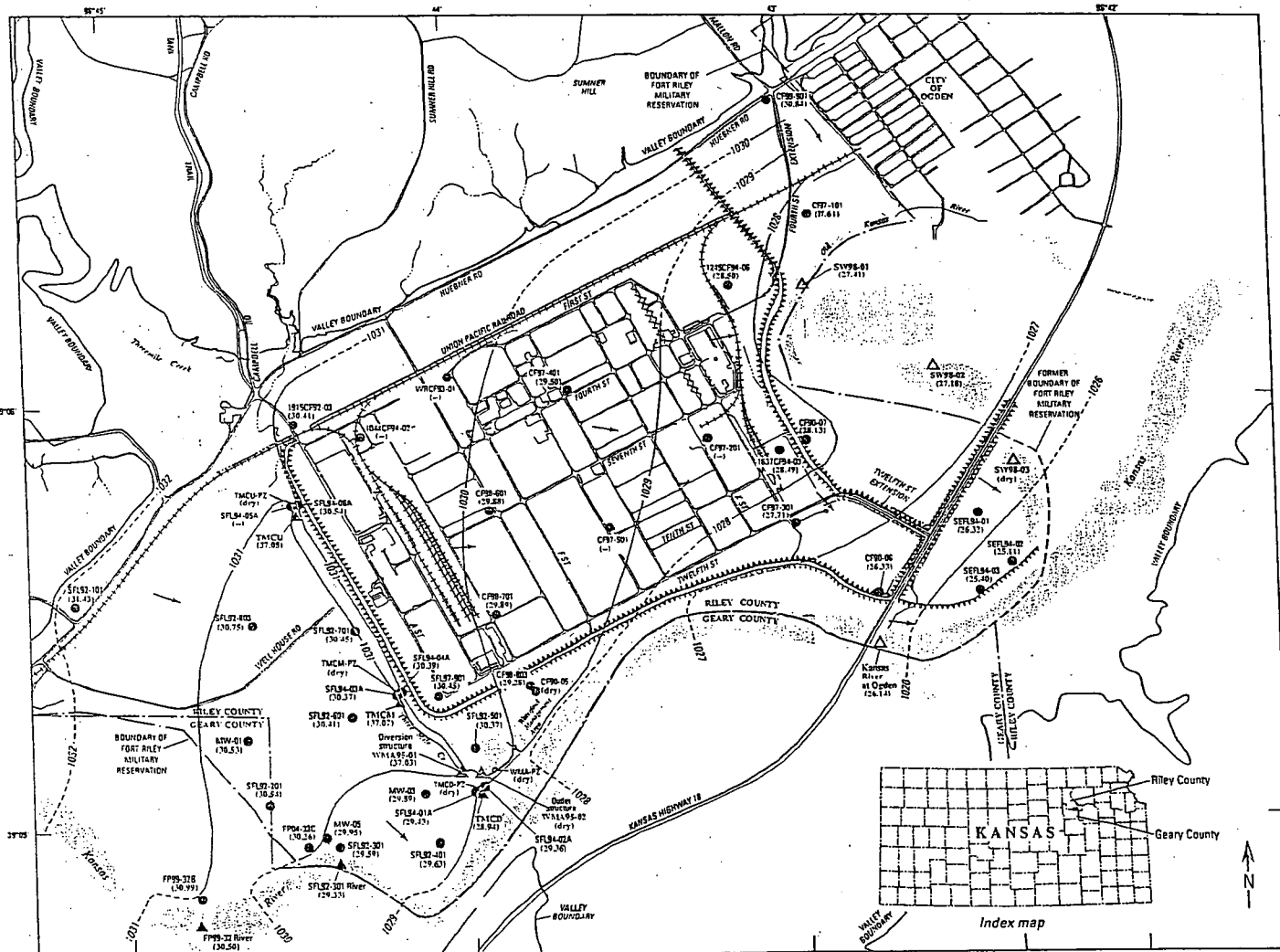
**EXPLANATION**

- Perennial surface-water body
- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Levee
- Intermittent stream
- Approximate direction of ground-water flow
- Observation well—Upper number is well identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Stream-gaging station—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Surface-water measurement site—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- Piezometer—Upper number is PZ identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
- No measurement




Base from U.S. Army Corps of Engineers digital data 1:4,800, 1985  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Standard parallels, 38°43' and 38°47', origin 98°30'20"  
Horizontal coordinate information referenced to the North American Datum of 1983 (NA83)





U.S. Geological Survey  
Lawrence, Kansas 66049













science for a changing world

Potentiometric surface (water table) in alluvium for September 14-15, 2006, Camp Funston Area, Fort Riley, Kansas.

By Crista Hansen  
October 2006

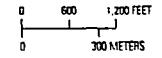
**EXPLANATION**

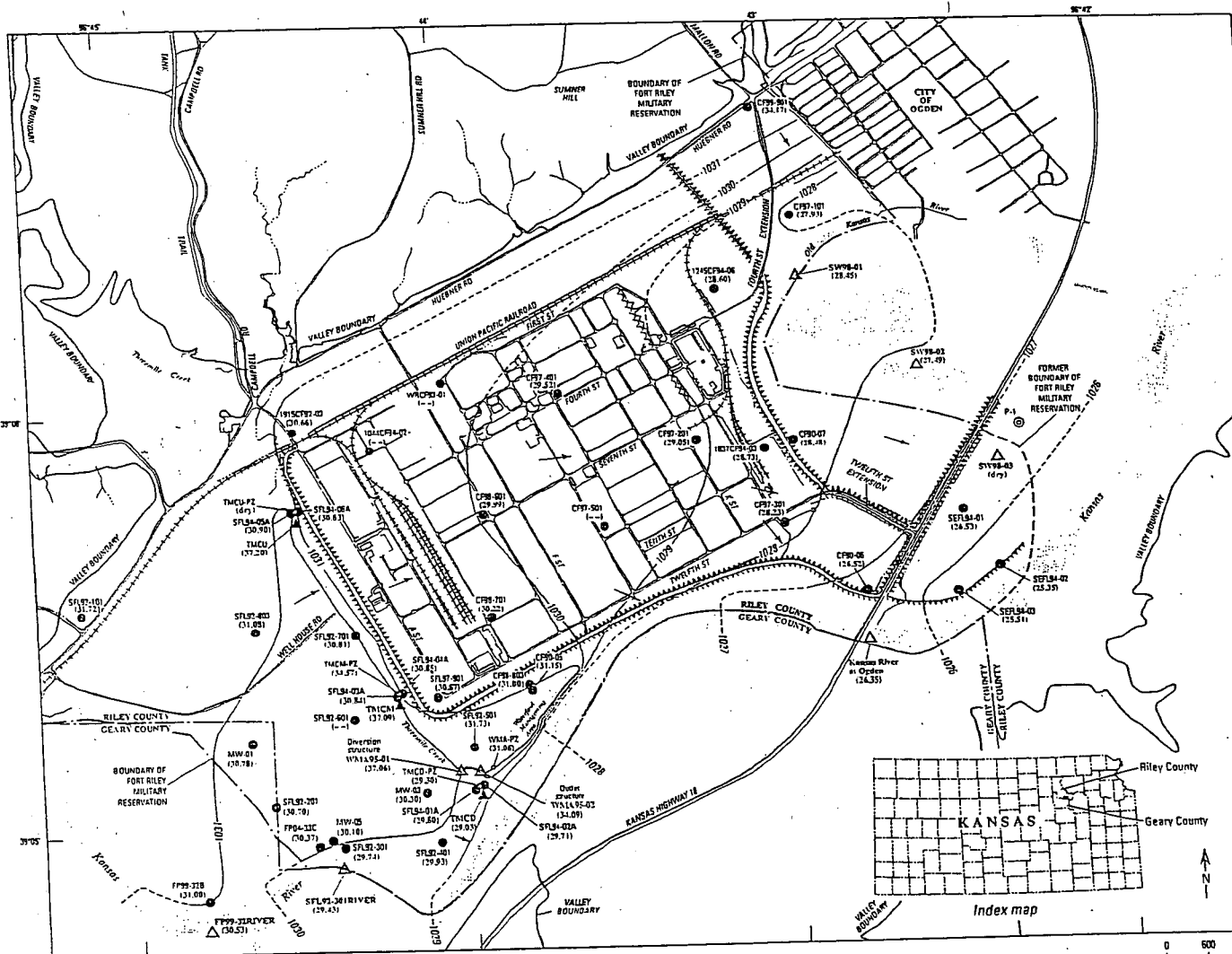
-  Perennial surface-water body
-  1007 --- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is North American Vertical Datum of 1988 (NAVD 88)
-  Levee
-  Intermittent stream
-  Approximate direction of ground-water flow
-  SFLR-01 (131.43) Observation well—Upper number is well identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
-  TMCN-1 (177.07) Stream-gauging station—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
-  S1198-01 (169) Surface-water measurement site—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
-  TMCU-P2 (dry) Piezometer—Upper number is PZ identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1988 (NAVD 88)
-  (-) No measurement

**Figure 2-3**  
September 2006 Potentiometric Surface Map, Southwest Funston Landfill/Camp Funston Area Groundwater (Map prepared by U. S. Geological Survey Water Resources Division)

Base from U.S. Army Corps of Engineers digital data 1:4,000, 1985  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Standard parallels 38° 43' and 39° 17', origin 98° 20' 30"

Horizontal coordinate information referenced to the North American Datum of 1983 (NAVD 83)





U.S. Geological Survey  
Lawrence, Kansas 66049



Potentiometric surface (water table) in alluvium for March 29, 2006, Camp Funston Area, Fort Riley, Kansas.

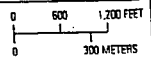
By Cristl Hansen  
May 2006

**EXPLANATION**

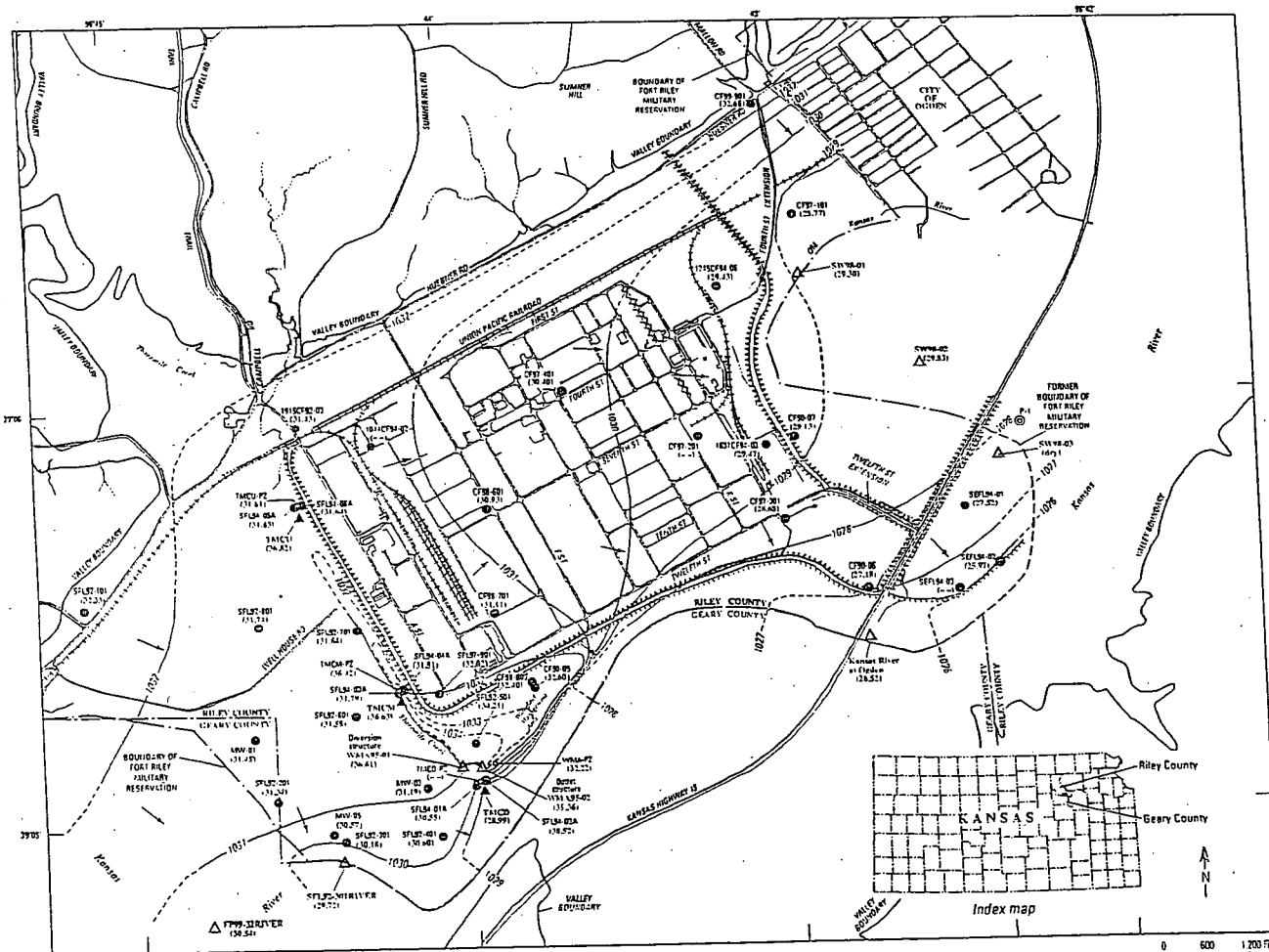
- Perennial surface-water body
- 1026 --- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is sea level
- Levee
- Intermittent stream
- Approximate direction of ground-water flow
- P-1 Private supply well
- SFL84-01 (124.53) Observation well—Upper number is well identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- TMCU4 (134.09) Stream-gaging station—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- S198-02 (27.49) Surface-water measurement site—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- TMCU PZ (d77) Piezometer—Upper number is PZ identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- (-- --) No measurement

Figure 2-2  
March 2006 Potentiometric Surface Map, Southwest Funston Landfill/Camp Funston Area Groundwater (Map prepared by U. S. Geological Survey Water Resources Division)

Base from U.S. Army Corps of Engineers digital data 1:100,000, 1985  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Standard parallels 36°43' and 36°47', origin 98°30' 30"







U.S. Geological Survey  
Lawrence, Kansas 66049



Potentiometric Surface (water table) in  
alluvium for September 27, 2005, Camp Funston  
Area, Fort Riley, Kansas.

By Crist Hansen  
September 2005

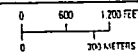
**EXPLANATION**

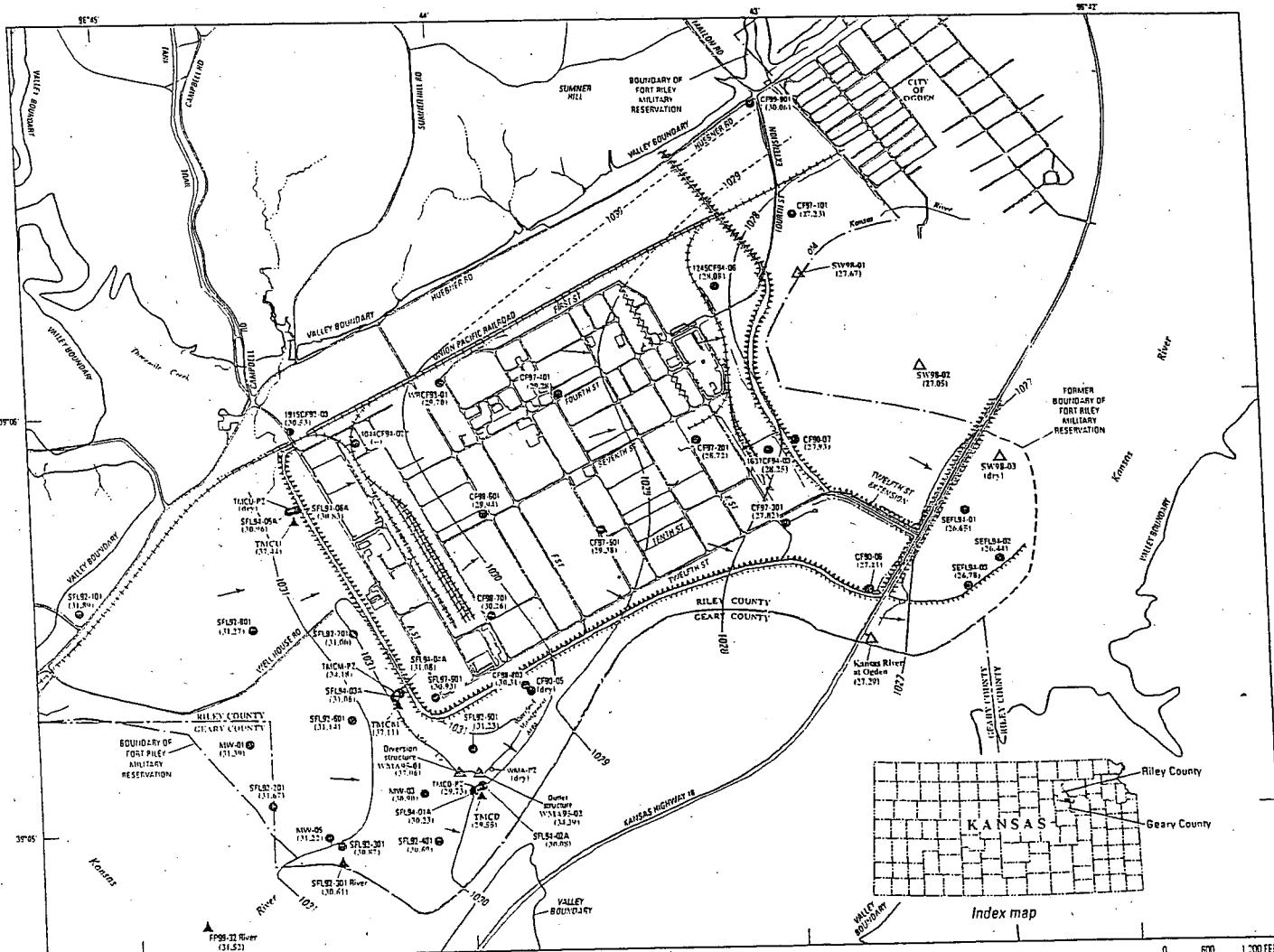
- Perennial surface-water body
- 1022 --- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is sea level
- Levee
- Intermittent stream
- Approximate direction of ground-water flow
- Private supply well
- SEFLM-01 (25.91) Observation well—Upper number is well identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- TACH1 (24.63) Stream-gaging station—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- S198-01 (29.26) Surface-water measurement site—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- TACH PZ (21.43) Piezometer—Upper number is PZ identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is sea level
- No measurement

Figure 2-3

September 2005 Potentiometric Surface Map, Southwest Funston Landfill/Camp Funston Area Groundwater (Map prepared by U. S. Geological Survey Water Resources Division)

Base from U.S. Army Corps of Engineers digital data 1:400,000, 1995  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Standard parallels 38°12' and 39°17', origin 95°20' W





U.S. Geological Survey  
Lawrence, Kansas 66049



Potentiometric surface (water table) in  
alluvium for March 28-29, 2005, Camp Funston  
Area, Fort Riley, Kansas.

By Cristi Hansen  
May 2005

**EXPLANATION**

- Perennial surface-water body
- (02)--- Potentiometric contour—Shows altitude at which water would have stood in tightly cased wells. Dashed where approximately located. Contour interval 1 foot. Datum is North American Vertical Datum of 1985 (NAVD 85)
- Levee
- Intermittent stream
- Approximate direction of ground-water flow
- SFLR-01 (26.65) ● Observation well—Upper number is well identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1985 (NAVD 85)
- TACH-01 (17.11) ▲ Stream-gaging station—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1985 (NAVD 85)
- SWR-03 (16.9) ▲ Surface-water measurement site—Upper number is site identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1985 (NAVD 85)
- TACH-PZ (16.7) ○ Piezometer—Upper number is PZ identifier. Lower number plus 1,000 is altitude of water surface, in feet. Datum is North American Vertical Datum of 1985 (NAVD 85)
- (-)- No measurement

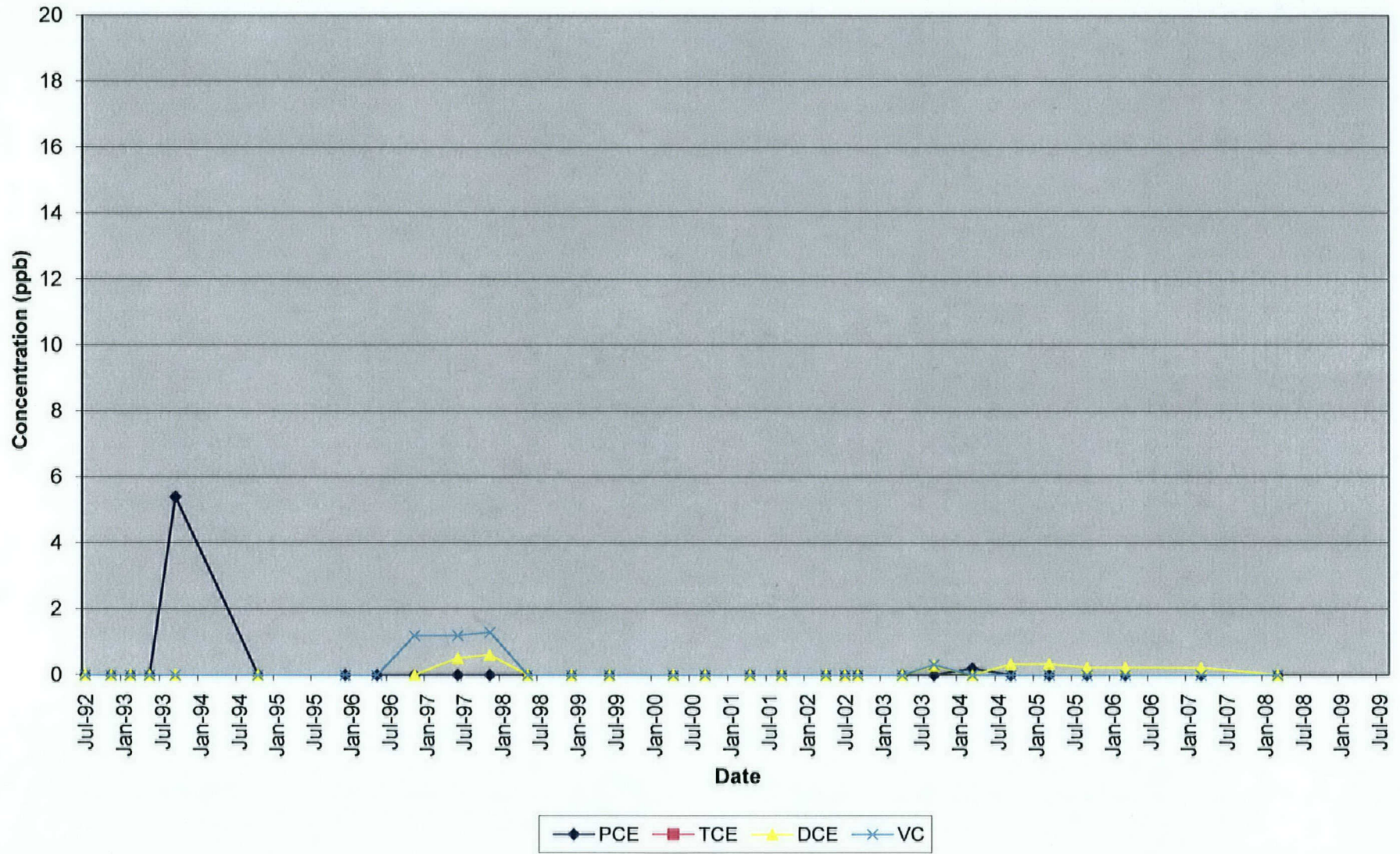
Figure 2-2  
March 2005 Potentiometric Surface Map, Southwest Funston  
Landfill/Camp Funston Area Groundwater (Map prepared by U. S.  
Geological Survey Water Resources Division)

Base from U.S. Army, Corps of Engineers digital data 1:8000, 1985  
State Plane Coordinate System, Kansas north  
Lambert Conformal Conic projection  
Spheroid parameters 38° 02' and 39° 03' origin 91° 20' 20"  
Horizontal coordinates information referenced to  
the North American Datum of 1983 (NAD 83)

**TABLE 1-6**  
**Monitoring Well Pump Adjustment and Repair Summary - April 2009**  
**August 2009 Groundwater Sampling Event**  
**Southwest Funston Landfill**  
**Fort Riley, Kansas**

Well I.D.	Depth to Water (feet)	Well Depth (feet)	Screen Length (feet)	Initial Pump Inlet Depth (feet)	Modified Inlet Depth (feet)	NOTES
SFL92-303	20.14	60.53	10	54.8	56	Original 8' pump had an air leak at the discharge housing, replaced with rebuilt 4' QED T1100 pump supplied by Ft. Riley.
SFL92-401	18.79	29.1	10	26.5	24	Adjusted tubing length, no repairs required. Pump is a stainless steel QED T1200.
SFL92-403	18.57	37.93	10	32.7	32.7	No adjustments or repairs were required. Pump is a stainless steel QED T1200.
SFL92-601	22.9	30.72	10	26.5	26.5	Removed a stray 6" piece of tubing from the well, repaired leaks in the air supply tubing and a kink in the pump discharge tubing. QED T1200 pump.
SFL92-603	22.43	68.33	10	57.2	63	Original 8' pump was removed in 2008. Adjusted the tubing length and installed rebuilt 4' QED T1100 pump supplied by Ft. Riley.
SFL97-903	19.02	56.15	10	55.2	51	Adjusted tubing length, no repairs required. QED T1100 Pump.
SFL94-02A	9.17	34.3	10	32.8	29	Adjusted tubing length and repaired leak in the air line. QED T-1100 pump.
SFL94-03A	13.18	23.25	10	22	18	Installed new tubing holder / well cap. QED model T1100 pump.
SFL94-04B	14.83	68.85	10	67.1	64	Adjusted tubing length, no repairs required. QED T1100 Pump.

SFL92-301

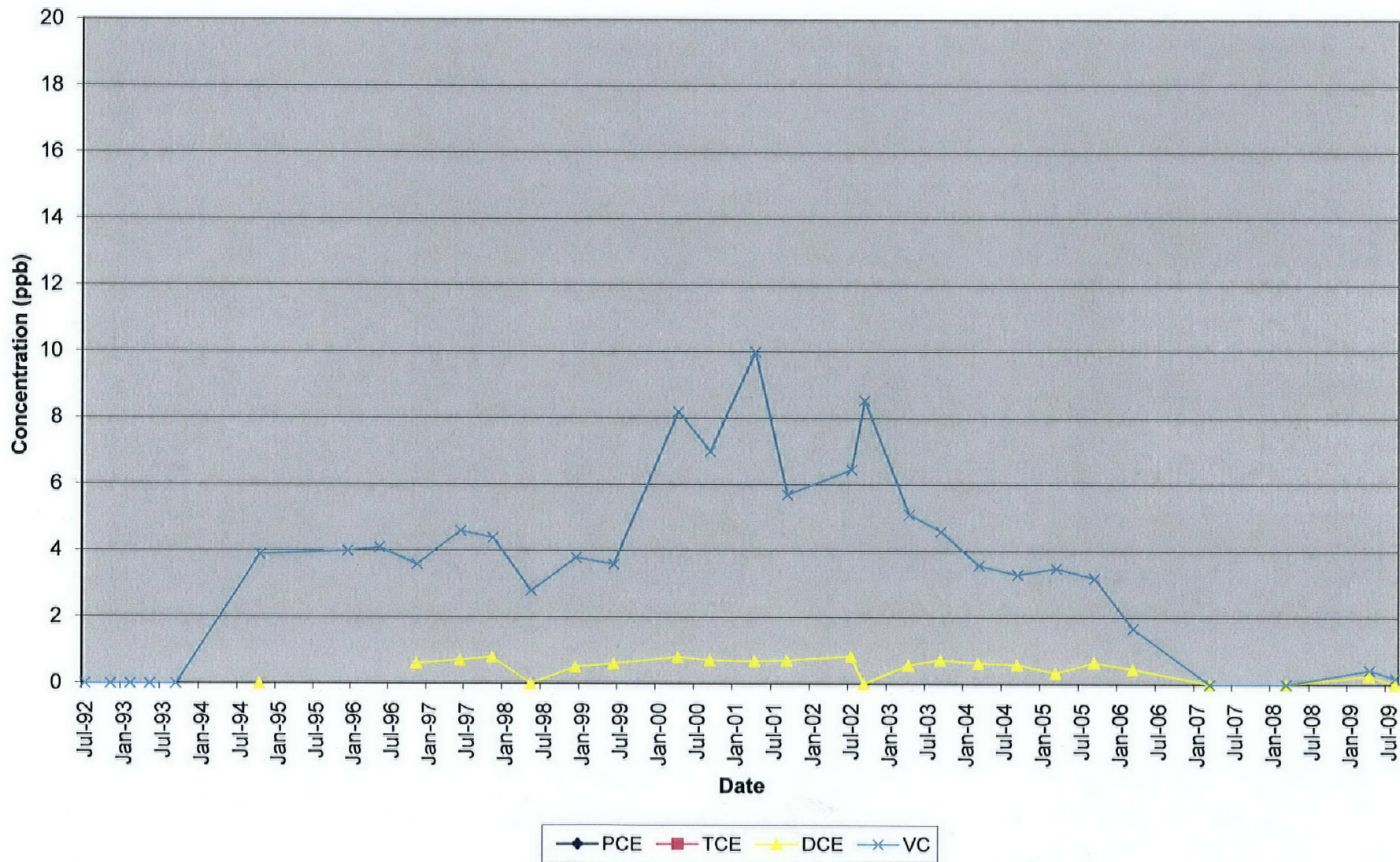


92-301

	PCE	TCE	DCE	VC
Jul-92	0		0	0
Nov-92	0		0	0
Feb-93	0		0	0
May-93	0		0	0
Sep-93	5.4		0	0
Oct-94	0		0	0
Dec-95	0			0
May-96	0			1.2
Nov-96	0		0	1.2
Jun-97	0		0.5	1.2
Nov-97	0		0.6	1.3
May-98	0		0	0
Dec-98	0		0	0
Jun-99	0		0	0
Apr-00	0		0	0
Sep-00	0		0	0
Apr-01	0		0	0
Sep-01	0		0	0
Apr-02	0		0	0
Jul-02	0		0	0
Sep-02	0		0	0
Apr-03	0		0	0
ep-03	0		0.27	0.32
Mar-04	0.2		0	0
Sep-04	0		0.32	0
Mar-05	0		0.33	0
Sep-05	0		0.22	0
Mar-06	0		0.22	0
Mar-07	0		0.21	0
Mar-08	0		0	0
Apr-09				
Aug-09				



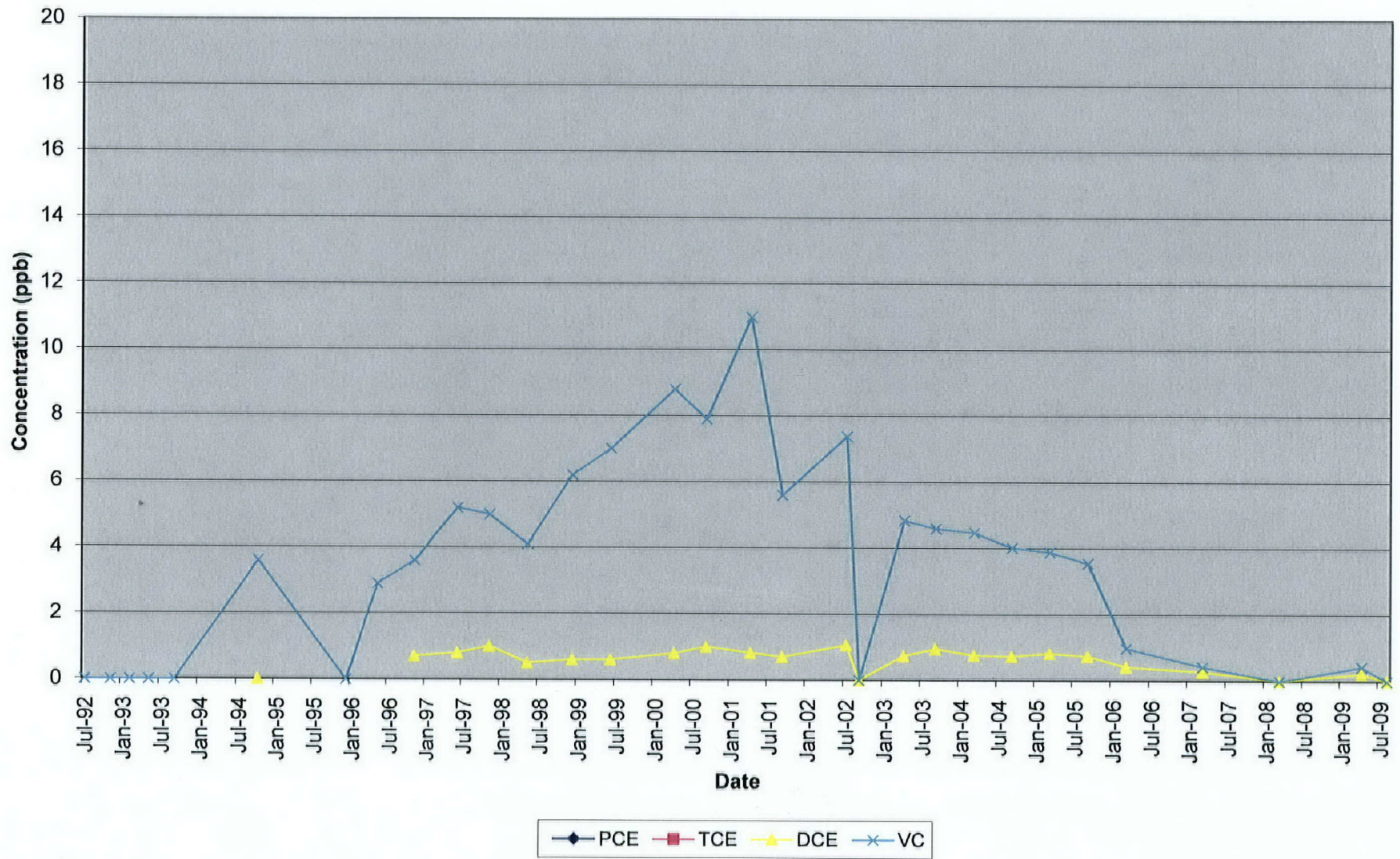
# SFL92-401



JFL92-401	PCE	TCE	DCE	VC
Jul-92				0
Nov-92				0
Feb-93				0
May-93				0
Sep-93				0
Oct-94			0	3.9
Dec-95				4
May-96				4.1
Nov-96			0.6	3.6
Jun-97			0.7	4.6
Nov-97			0.8	4.4
May-98			0	2.8
Dec-98			0.5	3.8
Jun-99			0.6	3.6
Apr-00			0.8	8.2
Sep-00			0.7	7
Apr-01			0.68	10
Sep-01			0.7	5.7
Jul-02			0.83	6.45
Sep-02			0	8.54
Apr-03			0.56	5.11
Sep-03			0.72	4.6
Mar-04			0.62	3.57
Sep-04			0.58	3.3
Mar-05			0.33	3.49
Sep-05			0.64	3.19
Mar-06			0.44	1.68
Mar-07			0	0
Mar-08			0	0
Apr-09			0.25	0.44
Aug-09			0	0.19



SFL92-403

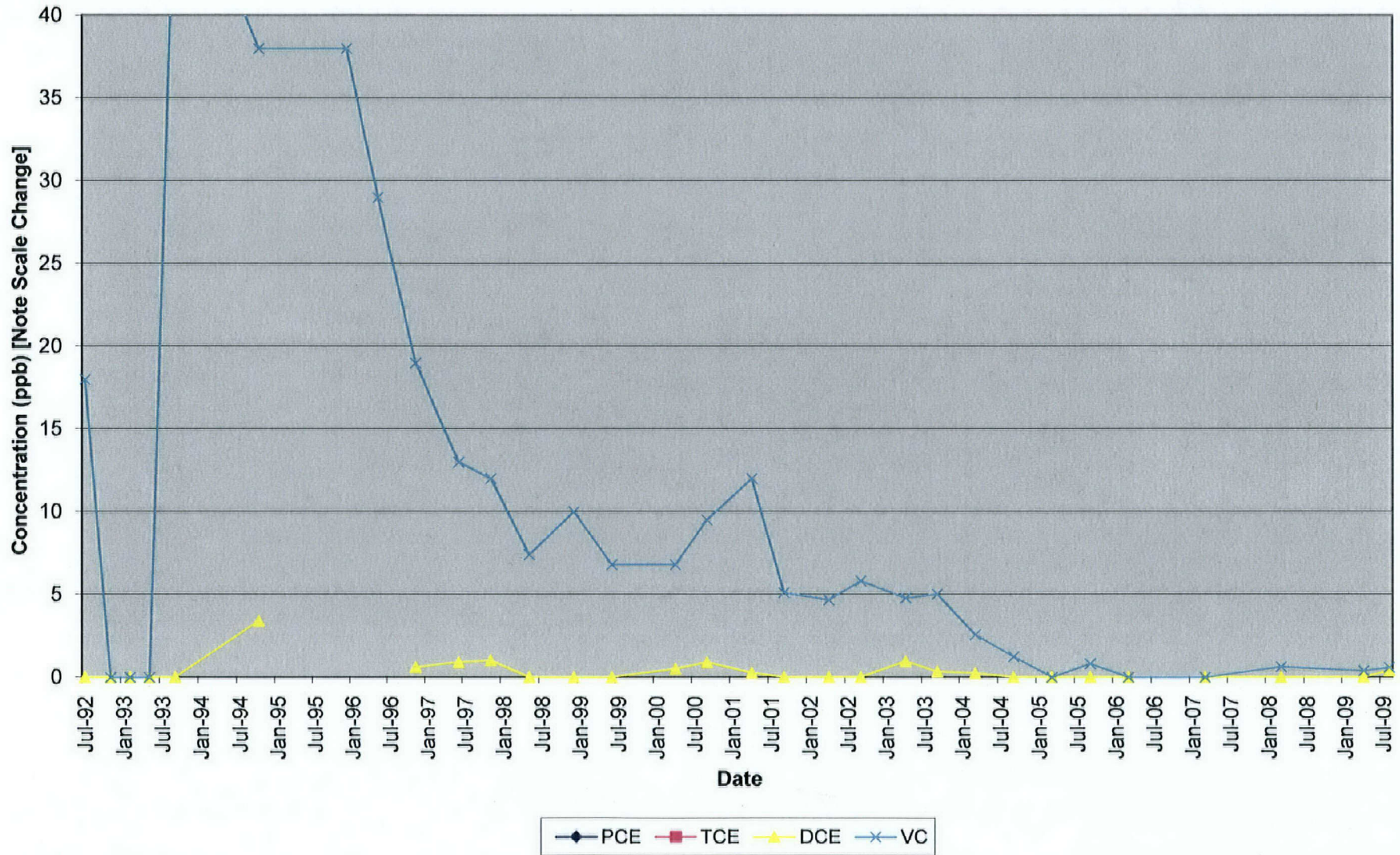




SFL92-403

	PCE	TCE	DCE	VC
Jul-92				0
Nov-92				0
Feb-93				0
May-93				0
Sep-93				0
Oct-94			0	3.6
Dec-95				0
May-96				2.9
Nov-96			0.7	3.6
Jun-97			0.8	5.2
Nov-97			1	5
May-98			0.5	4.1
Dec-98			0.6	6.2
Jun-99			0.6	7
Apr-00			0.8	8.8
Sep-00			1	7.9
Apr-01			0.82	11
Sep-01			0.7	5.6
Jul-02			1.06	7.38
Sep-02			0	0
Apr-03			0.74	4.84
Sep-03			0.95	4.6
Mar-04			0.76	4.48
Sep-04			0.73	4.02
Mar-05			0.82	3.89
Sep-05			0.74	3.55
Mar-06			0.42	0.98
Mar-07			0.27	0.43
Mar-08			0	0
Apr-09			0.22	0.44
Aug-09			0	0

SFL92-601

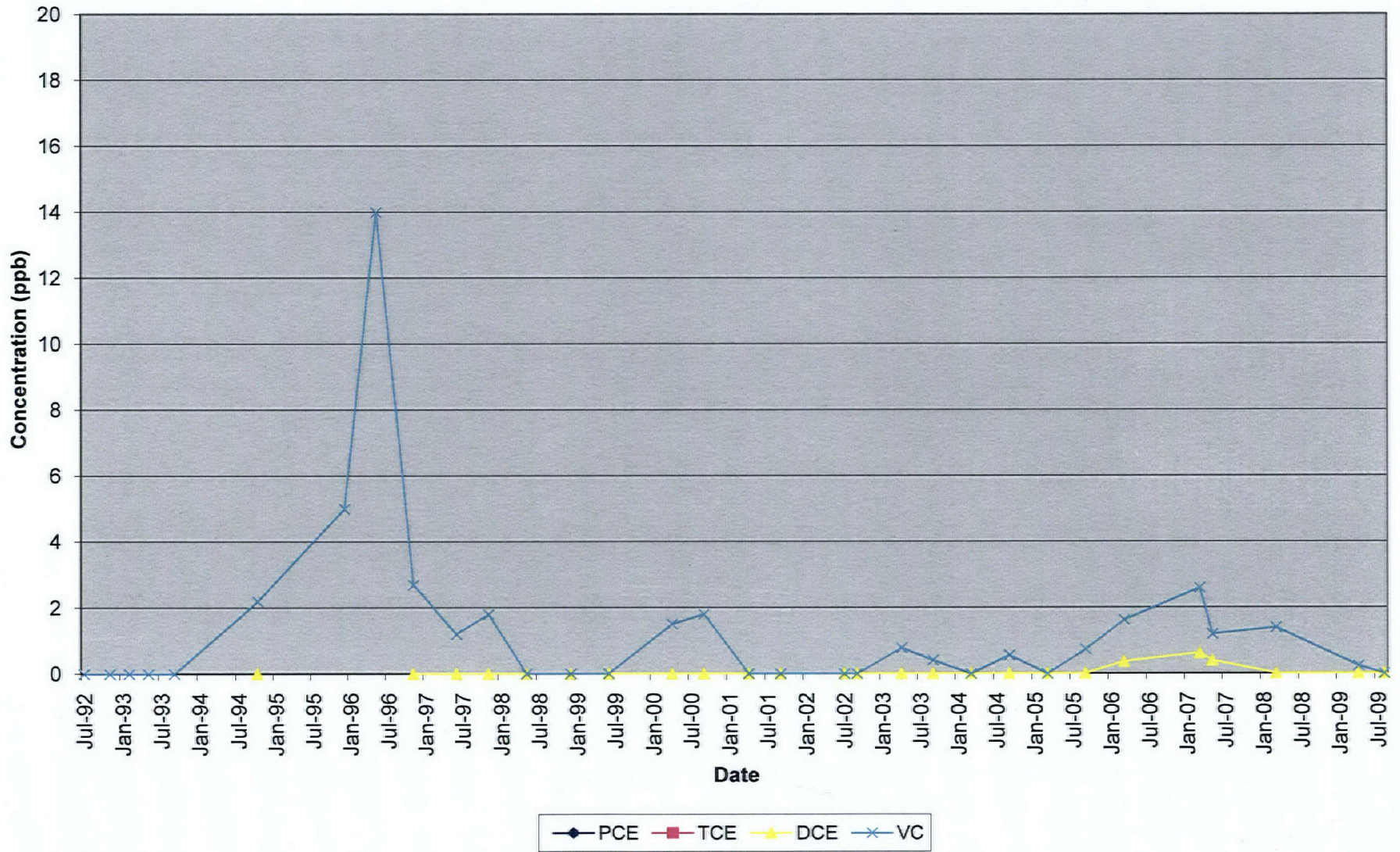


FL92-601

	PCE	TCE	DCE	VC
Jul-92				18
Nov-92				0
Feb-93				0
May-93				0
Sep-93				50
Oct-94			3.4	38
Déc-95				38
May-96				29
Nov-96			0.6	19
Jun-97			0.9	13
Nov-97			1	12
May-98			0	7.4
Dec-98			0	10
Jun-99			0	6.8
Apr-00			0.5	6.8
Sep-00			0.9	9.5
Apr-01			0.26	12
Sep-01			0	5.1
Apr-02			0	4.66
Sep-02			0	5.81
Apr-03			0.95	4.78
Sep-03			0.32	5.01
Mar-04			0.23	2.57
Sep-04			0	1.24
Mar-05			0	0
Sep-05			0	0.82
Mar-06			0	0
Mar-07			0	0
Mar-08			0	0.64
Apr-09			0	0.4
Aug-09			0.38	0.59

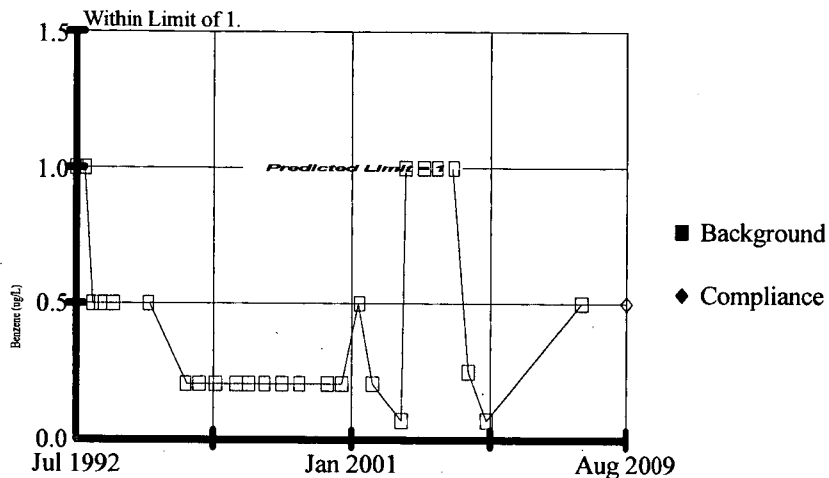


SFL92-603



L92-603	PCE	TCE	DCE	VC
Jul-92				0
Nov-92				0
Feb-93				0
May-93				0
Sep-93				0
Oct-94			0	2.2
Dec-95				5
May-96				14
Nov-96			0	2.7
Jun-97			0	1.2
Nov-97			0	1.8
May-98			0	0
Dec-98			0	0
Jun-99			0	0
Apr-00			0	1.5
Sep-00			0	1.8
Apr-01			0	0
Sep-01			0	0
Jul-02			0	0
Sep-02			0	0
Apr-03			0	0.78
Sep-03			0	0.41
Mar-04			0	0
Sep-04			0	0.56
Mar-05			0	0
Sep-05			0	0.74
Mar-06			0.36	1.63
Mar-07			0.62	2.6
May-07			0.39	1.2
Mar-08			0	1.4
Apr-09			0	0.24
Aug-09			0	0

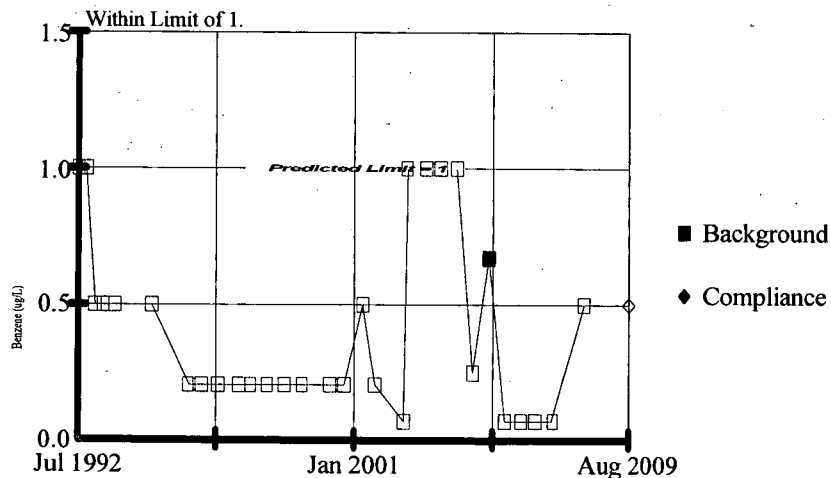
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92303



26 background obs. Testwise alpha = 0.03704. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

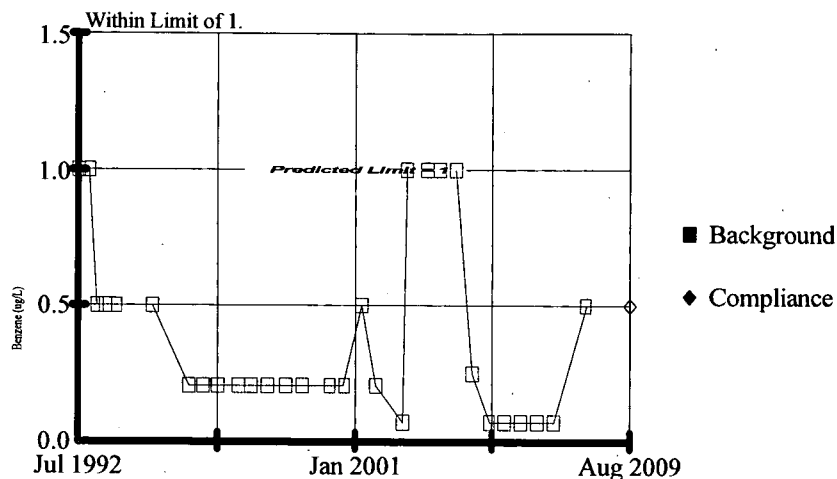
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403



30 background obs. Testwise alpha = 0.03226. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.67%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

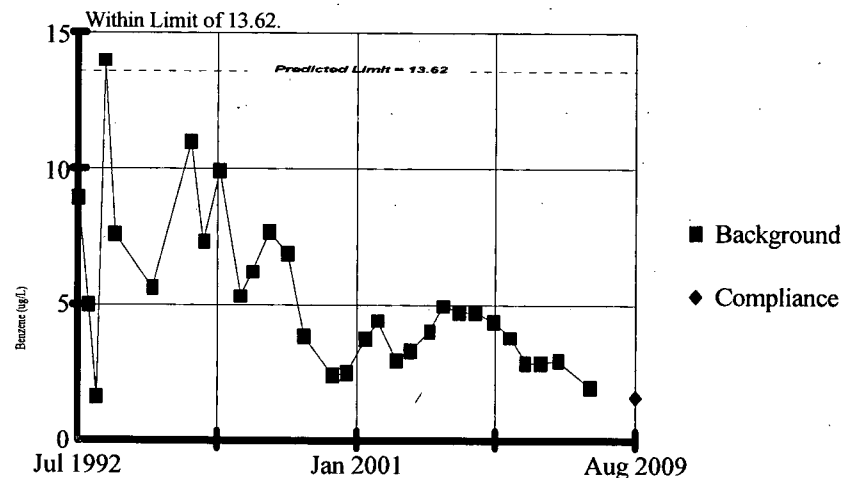
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



30 background obs. Testwise alpha = 0.03226. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

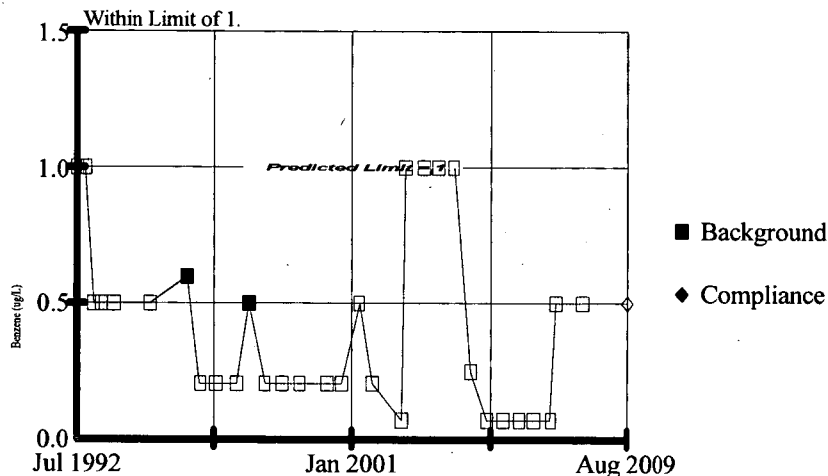
### PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601



Background Data Summary: (based on square root(x) transformed data) Mean=2.213, Std. Dev.=0.591, 0% nds, 30 obs. Normal test: Shapiro Wilk. W Statistic for background data = 0.9584, W Quantile = 0.927 at alpha = 0.05. Testwise alpha = 0.01.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

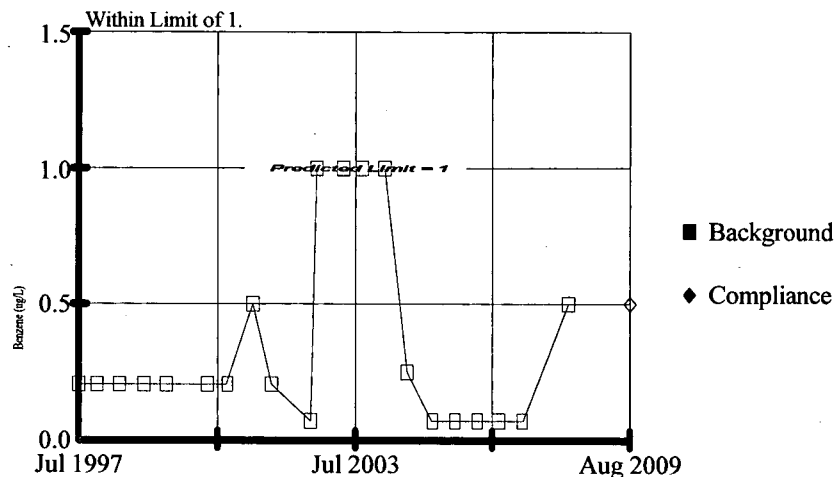
### NON-P AMETRIC INTRA-WELL PREDICTION LIMIT SFL92603



31 background obs. Testwise alpha = 0.03125. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (93.55%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

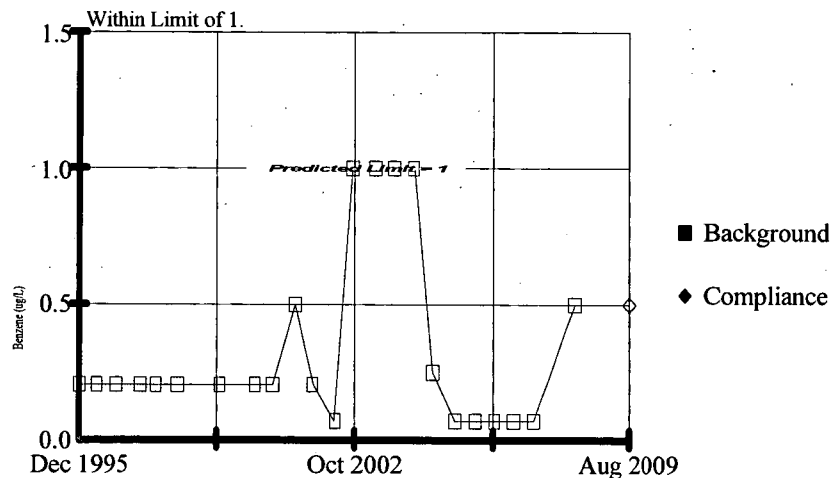
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

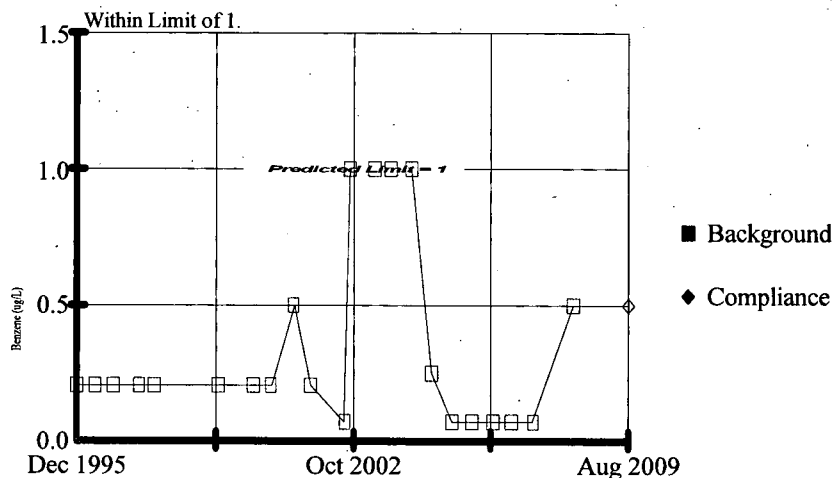
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



23 background obs. Testwise alpha = 0.04167. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

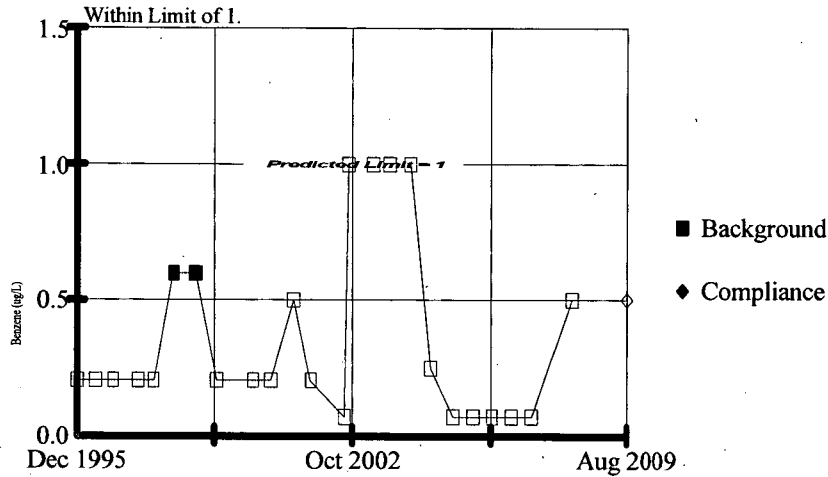
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A



22 background obs. Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

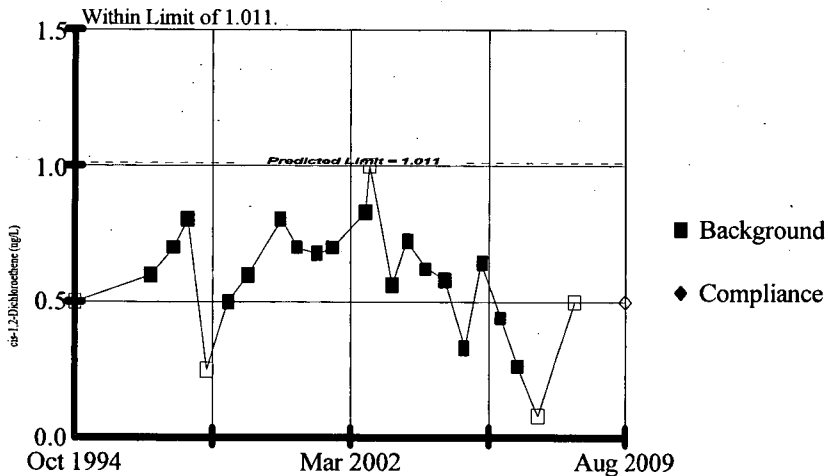
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



24 background obs. Testwise alpha = 0.04. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (91.67%) were in excess of 50% of the data.

Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:27 AM Client: CTI and Associates View: Batch

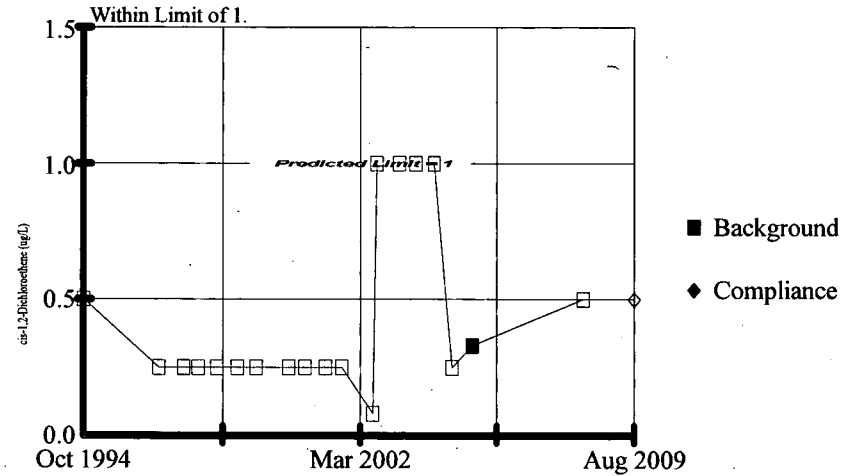
### PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



Background Data Summary: (after Cohen's adjustment) Mean=0.614, Std. Dev=0.155, 21.74% nds, 23 obs. Normality test: Shapiro Wilk. W Statistic for background data = 0.9665, W Quantile = 0.914 at alpha = 0.05. Testwise alpha = 0.01. Hollow symbols indicate censored values.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

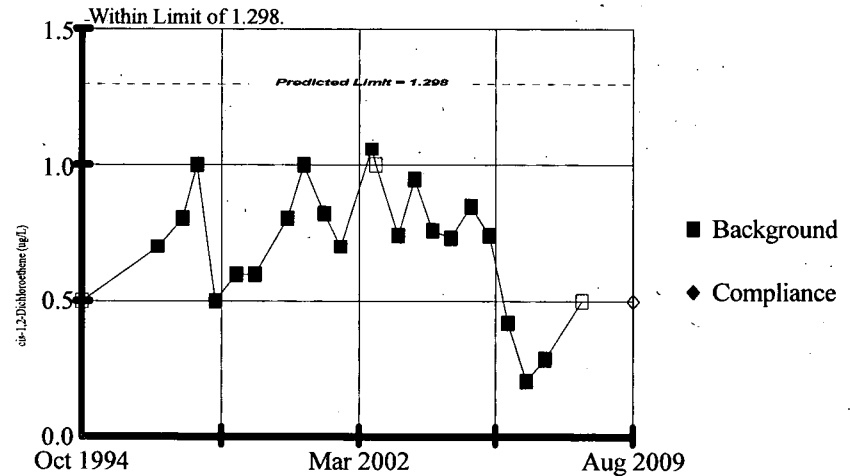
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92303



19 background obs. Testwise alpha = 0.05. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (94.74%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

### PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403

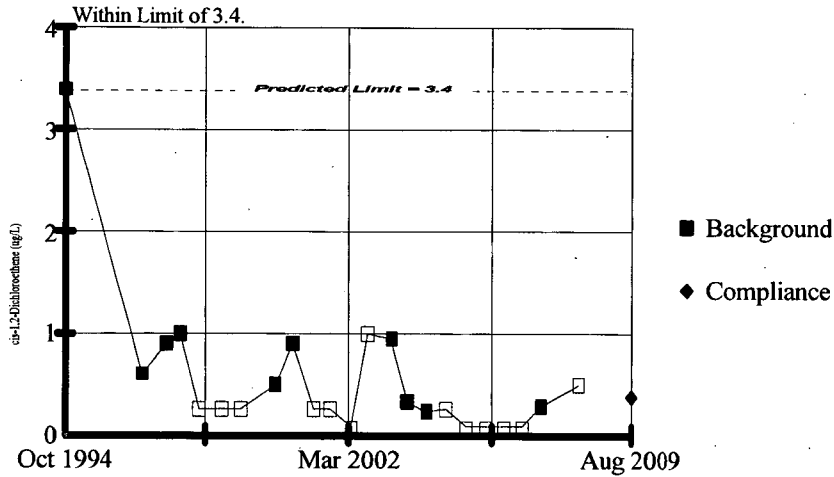


Background Data Summary: Mean=0.707, Std. Dev=0.231, 13.04% nds, 23 obs. Normality test: Shapiro Wilk. W Statistic for background data = 0.9575, W Quantile = 0.914 at alpha = 0.05. Testwise alpha = 0.01. Hollow symbols indicate censored values.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch



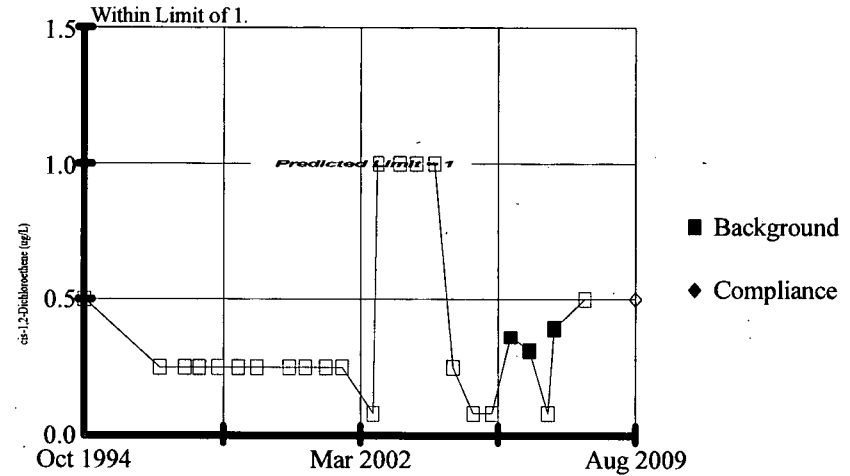
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601



23 background obs. Testwise alpha = 0.04167. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (56.52%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

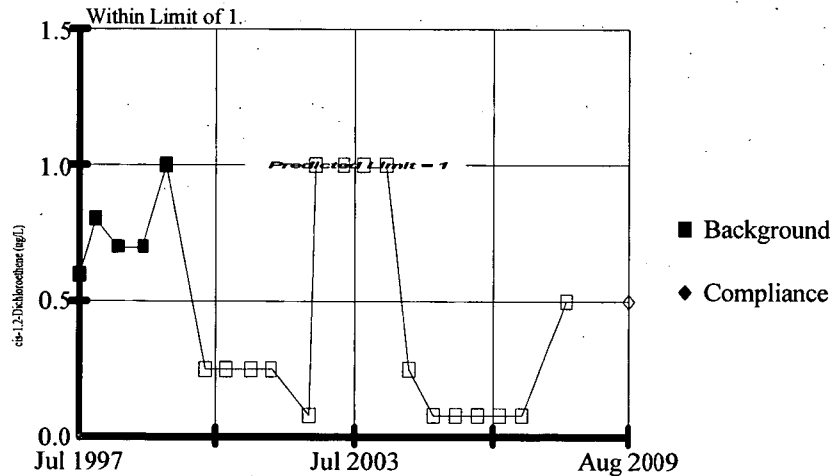
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92603



24 background obs. Testwise alpha = 0.04. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (87.5%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

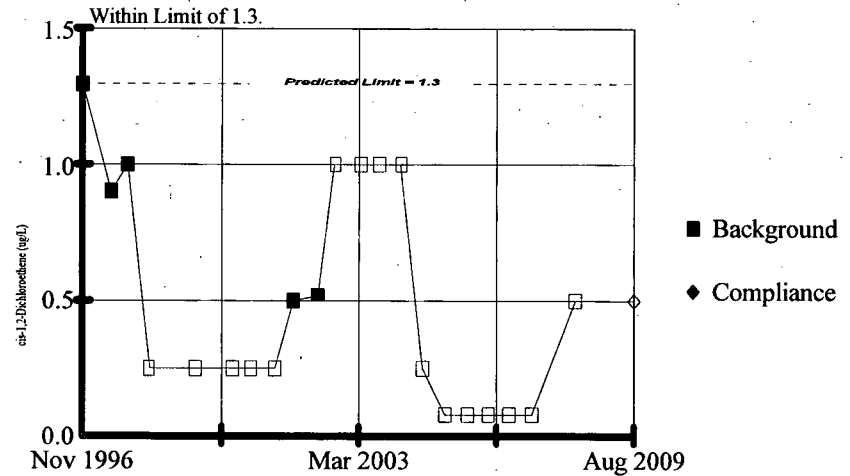
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (76.19%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

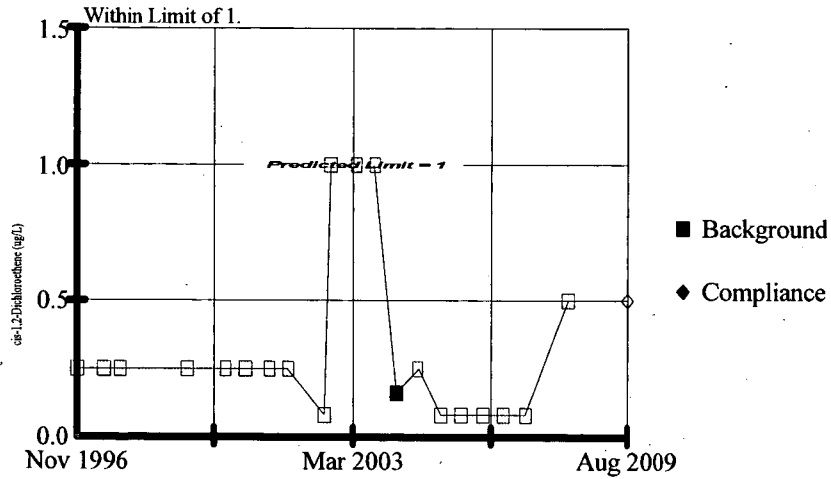
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (76.19%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

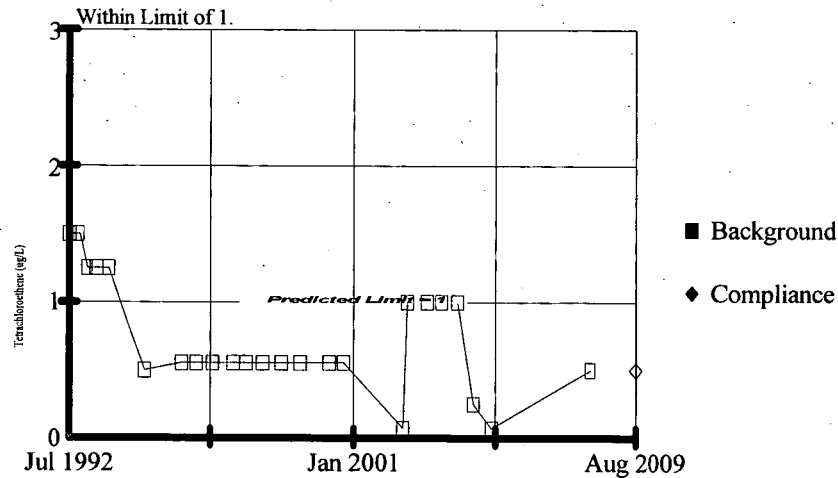
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A



20 background obs. Testwise alpha = 0.04762. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (95%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

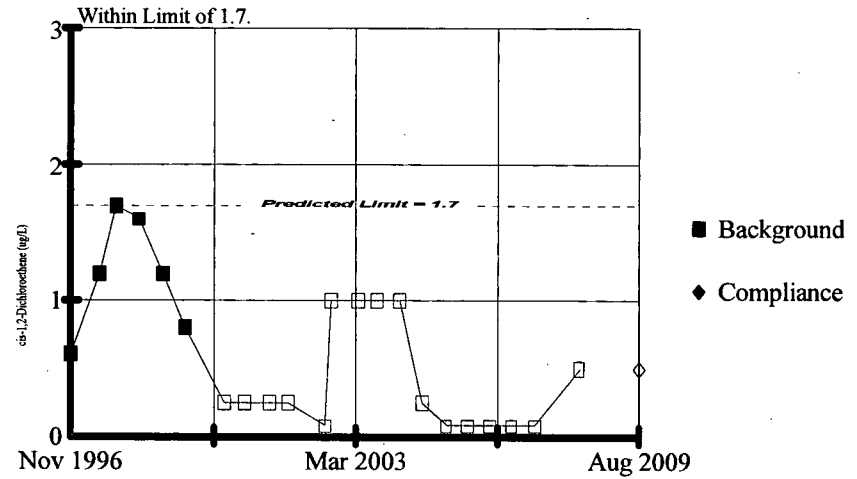
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92303



24 background obs. Testwise alpha = 0.04. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

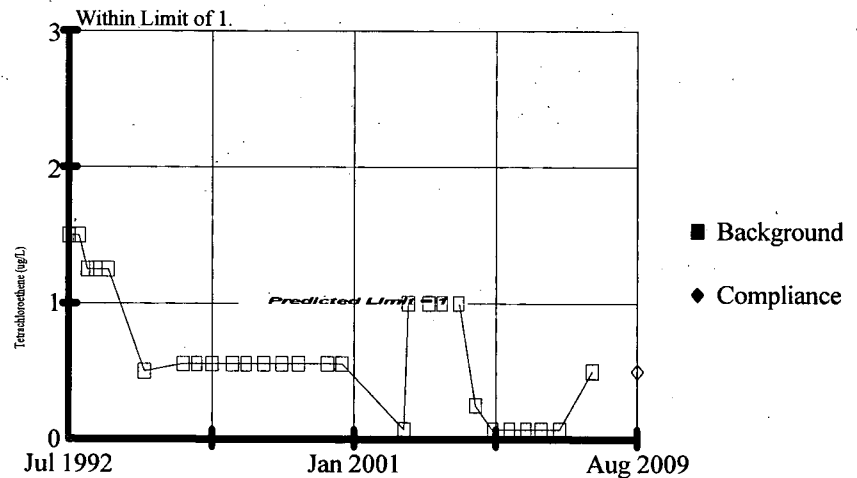
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



22 background obs. Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (72.73%) were in excess of 50% of the data.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

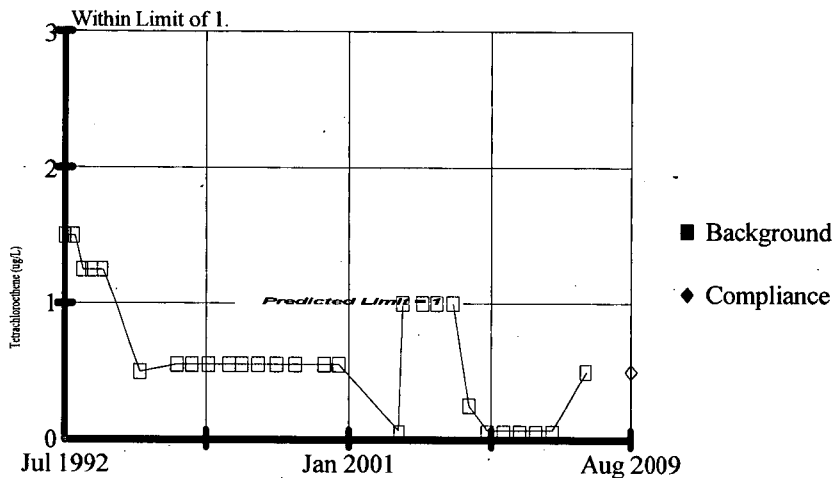
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

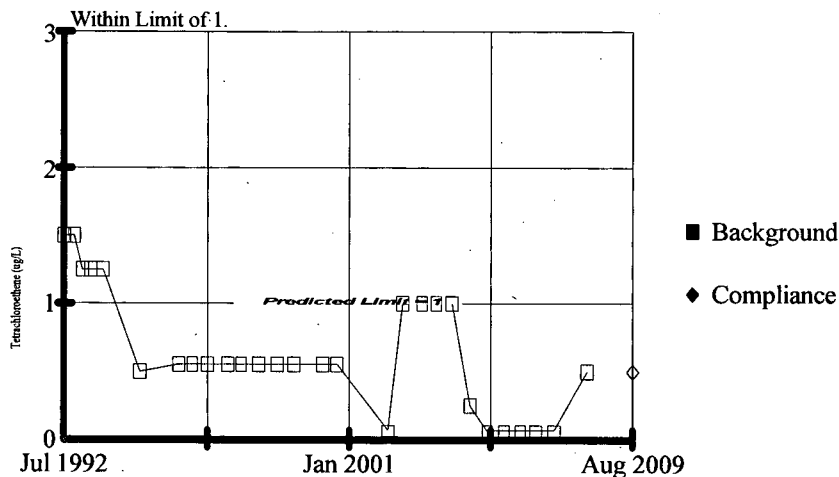
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403



28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601

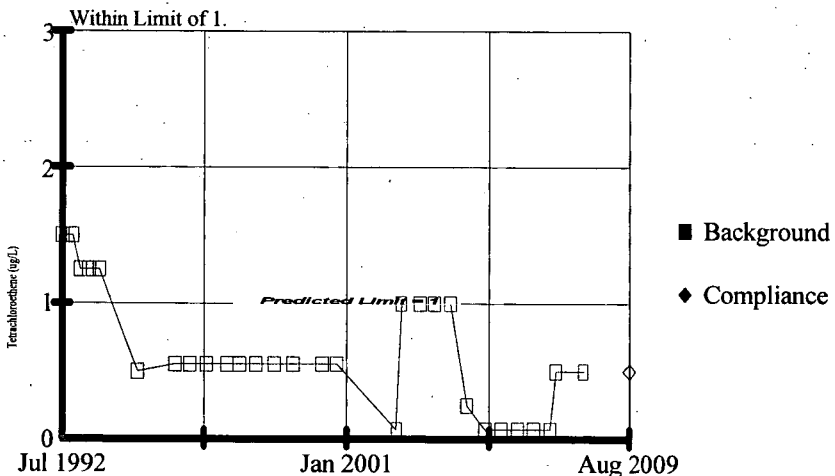


28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:28 AM Client: CTI and Associates View: Batch

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

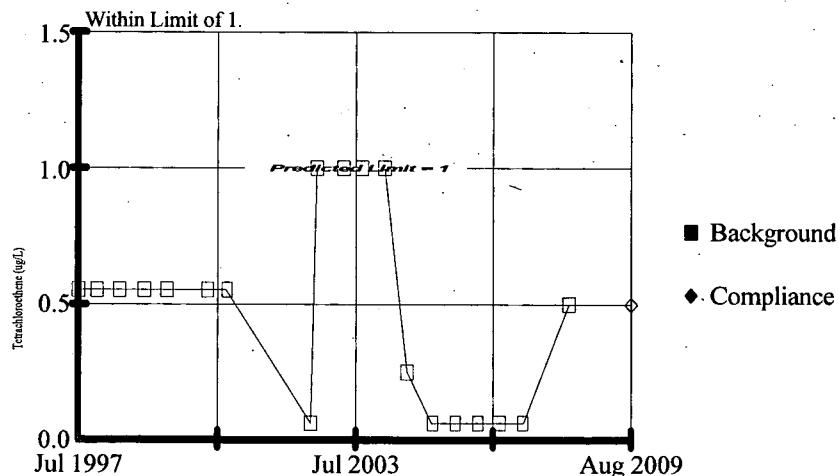
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92603



29 background obs. Testwise alpha = 0.03333. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

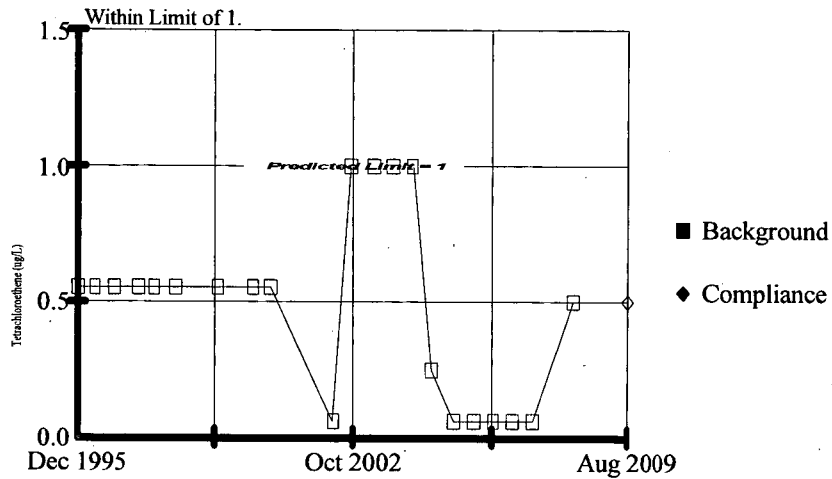
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



19 background obs. Testwise alpha = 0.05. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

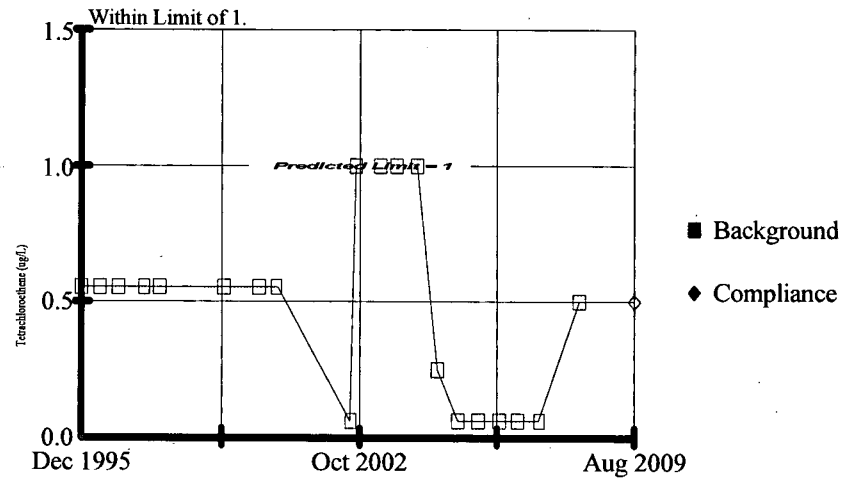
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A

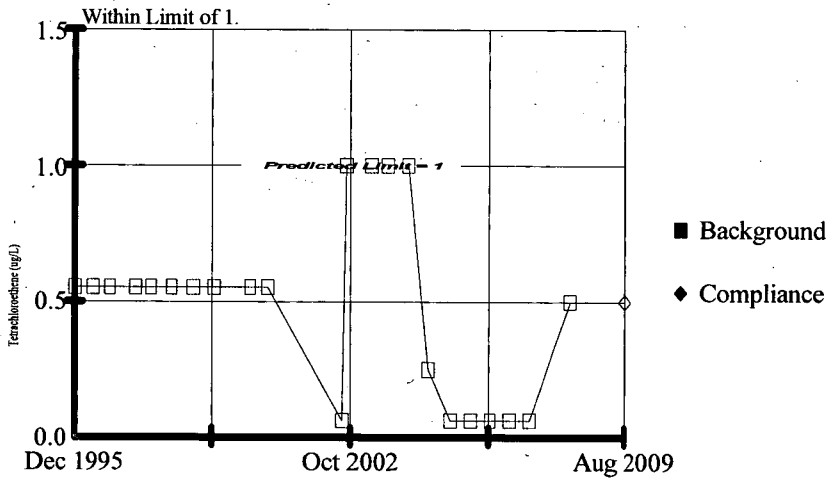


20 background obs. Testwise alpha = 0.04762. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

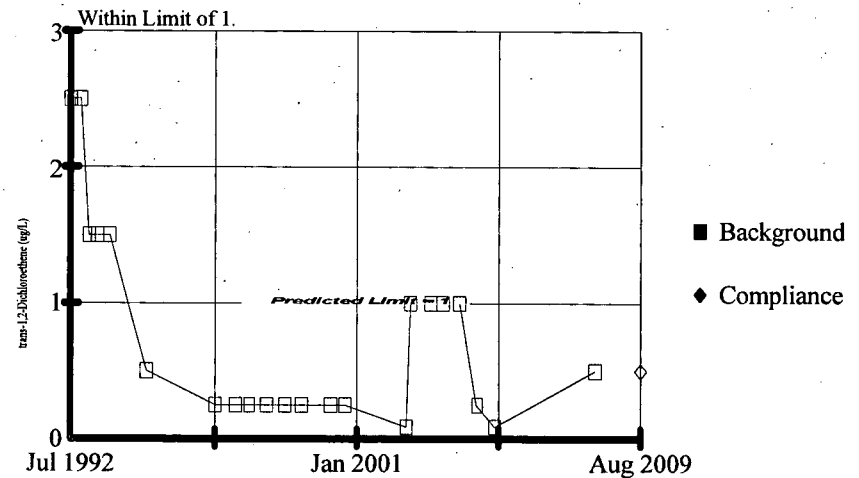
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



22 background obs. Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92303

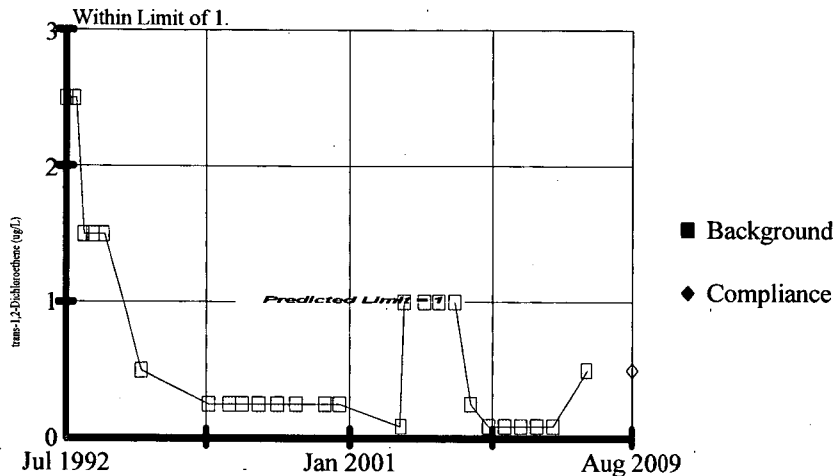


22 background obs. Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

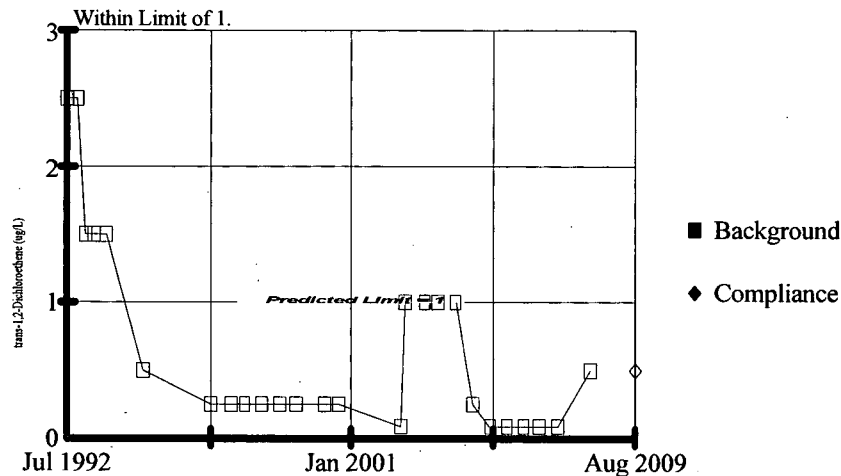
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



26 background obs. Testwise alpha = 0.03704. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

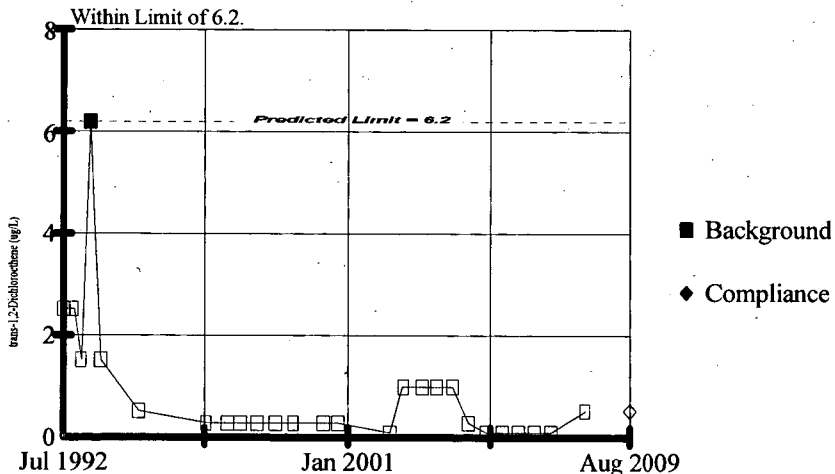
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403



26 background obs. Testwise alpha = 0.03704. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

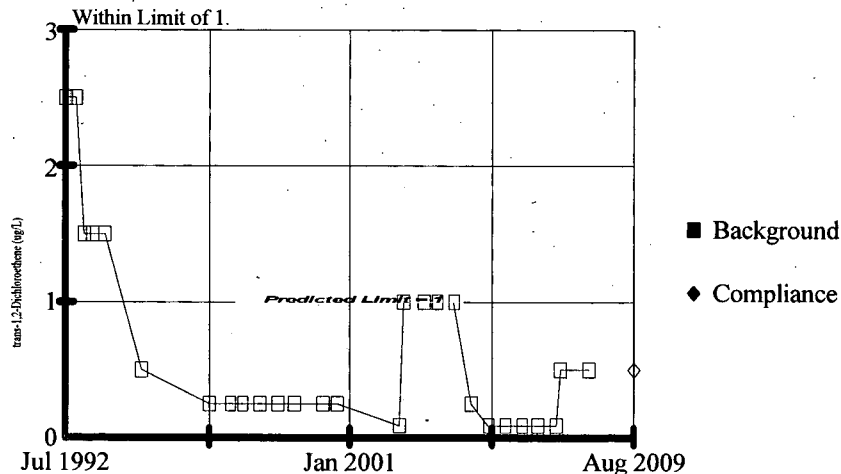
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601



26 background obs. Testwise alpha = 0.03704. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.15%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

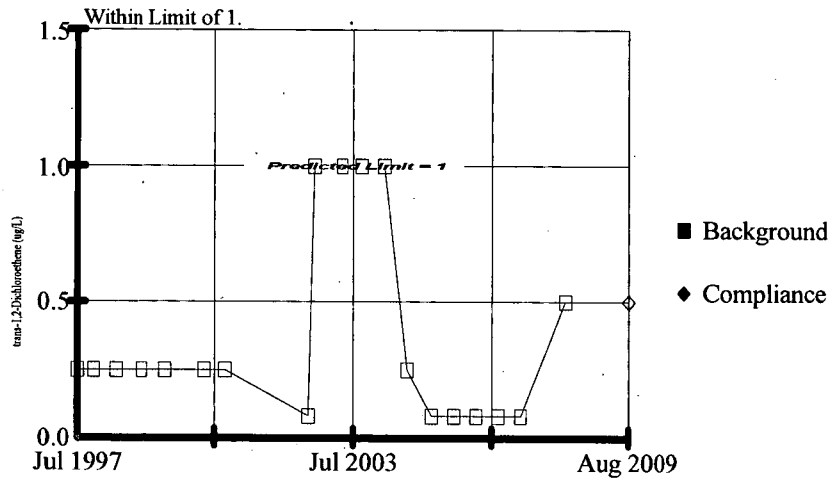
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92603



27 background obs. Testwise alpha = 0.03571. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:29 AM Client: CTI and Associates View: Batch

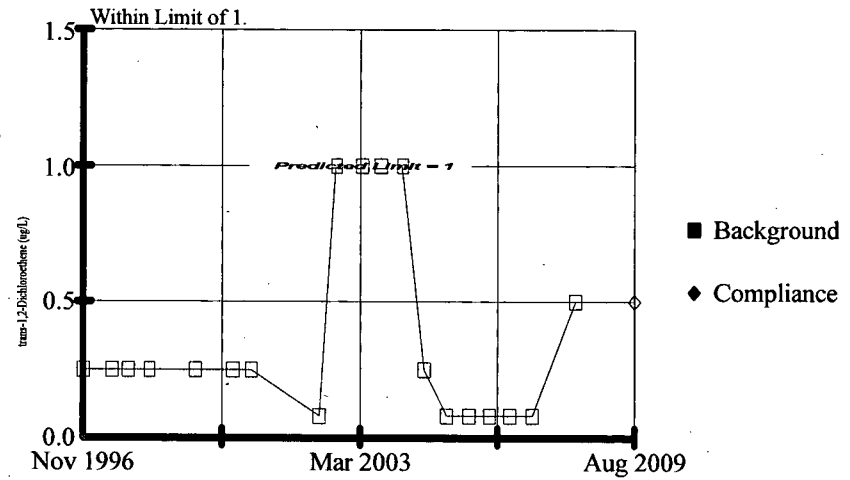
### NON-P AMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



19 background obs. Testwise alpha = 0.05. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

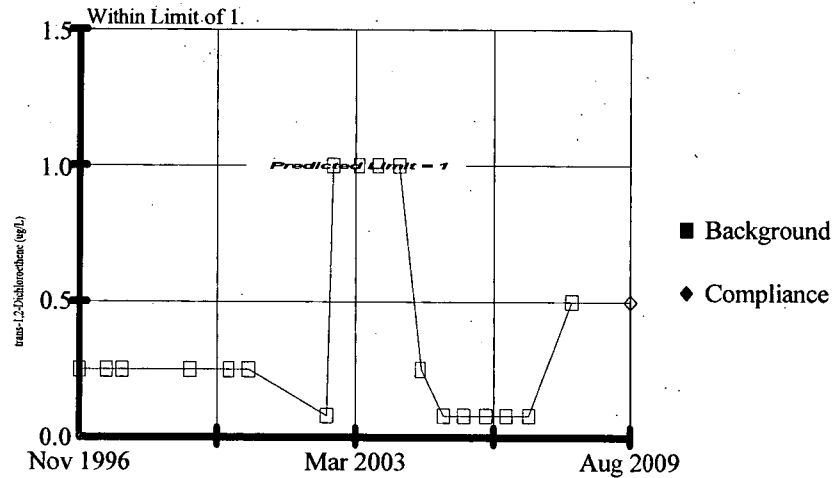
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



19 background obs. Testwise alpha = 0.05. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

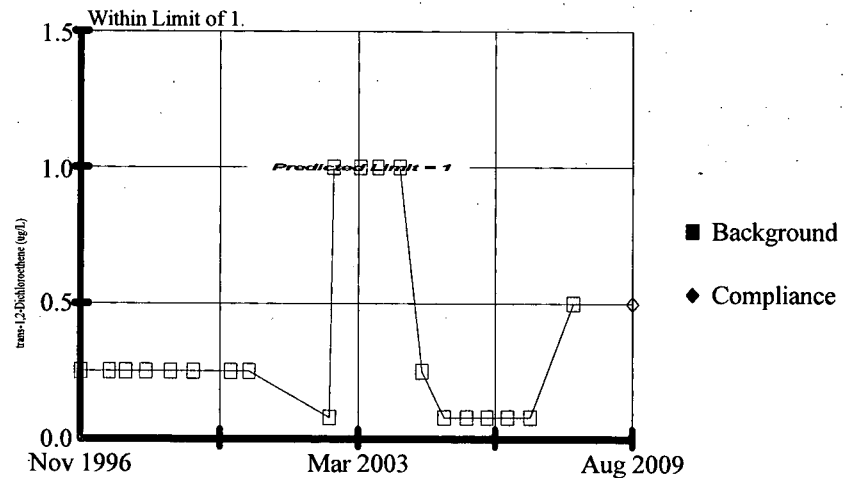
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A



18 background obs. Testwise alpha = 0.05263. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

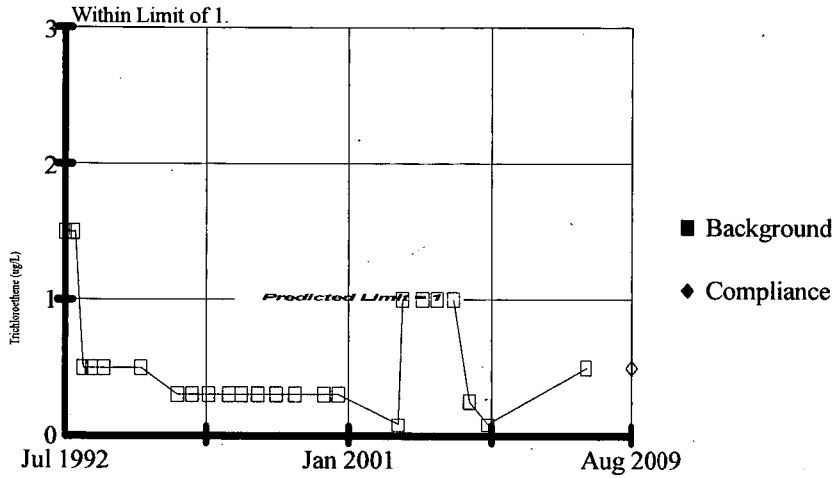
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



20 background obs. Testwise alpha = 0.04762. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

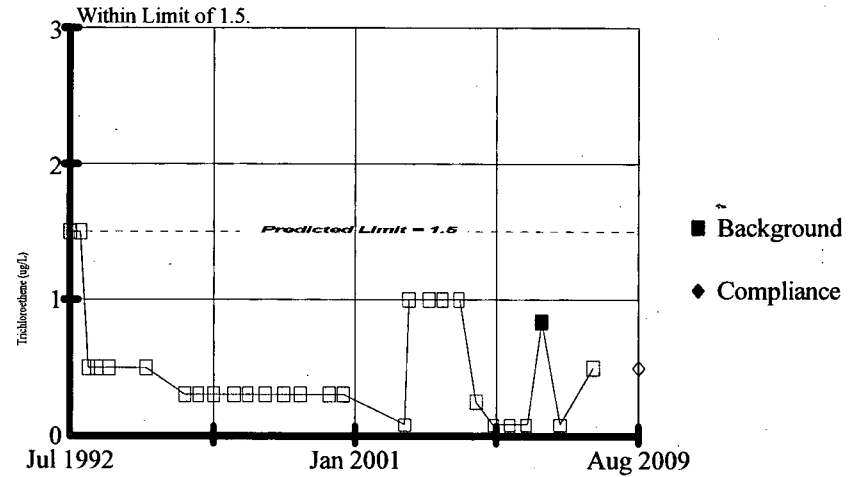
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

### NON-F AMETRIC INTRA-WELL PREDICTION LIMIT SFL92303



24 background obs. Testwise alpha = 0.04. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

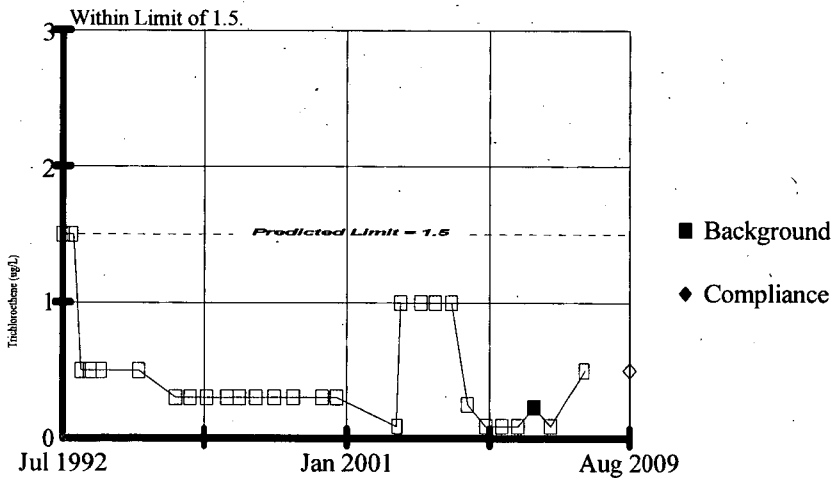
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.43%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

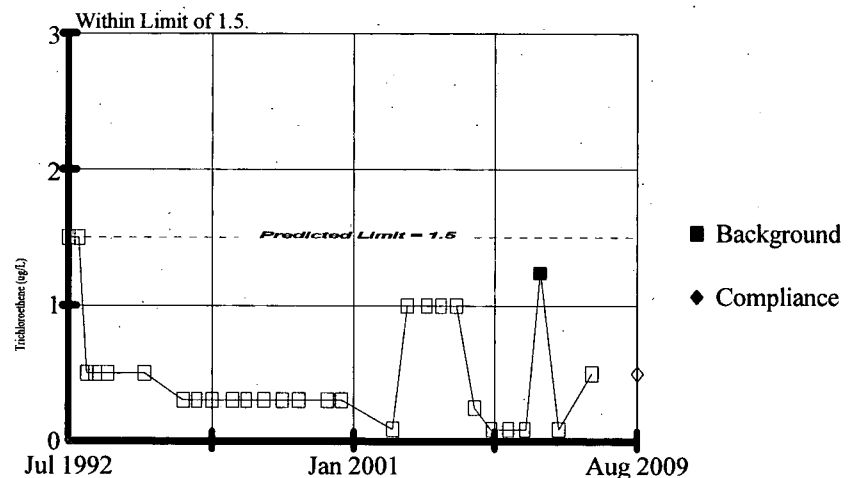
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403



28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.43%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

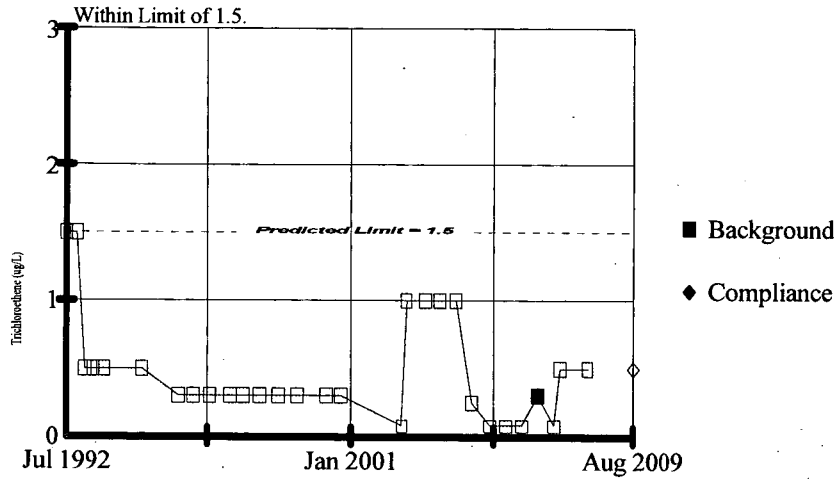
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601



28 background obs. Testwise alpha = 0.03448. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.43%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

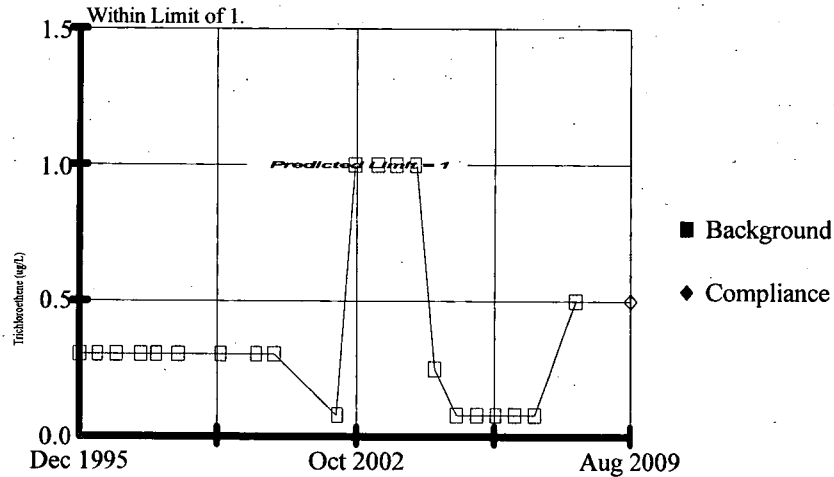
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92603



29 background obs. Testwise alpha = 0.03333. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (96.55%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

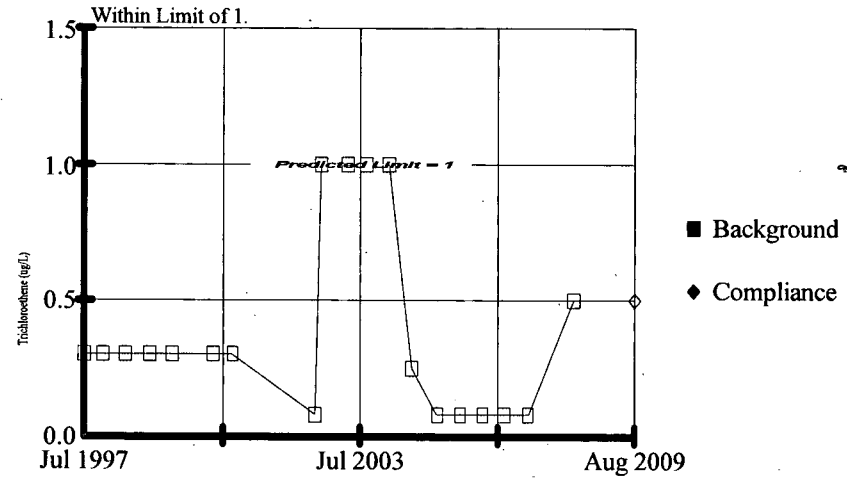
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

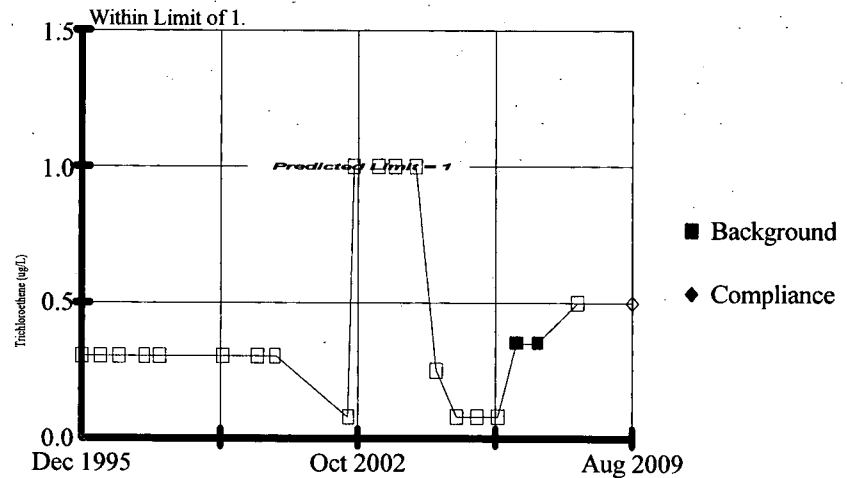
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



19 background obs. Testwise alpha = 0.05. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch

## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A

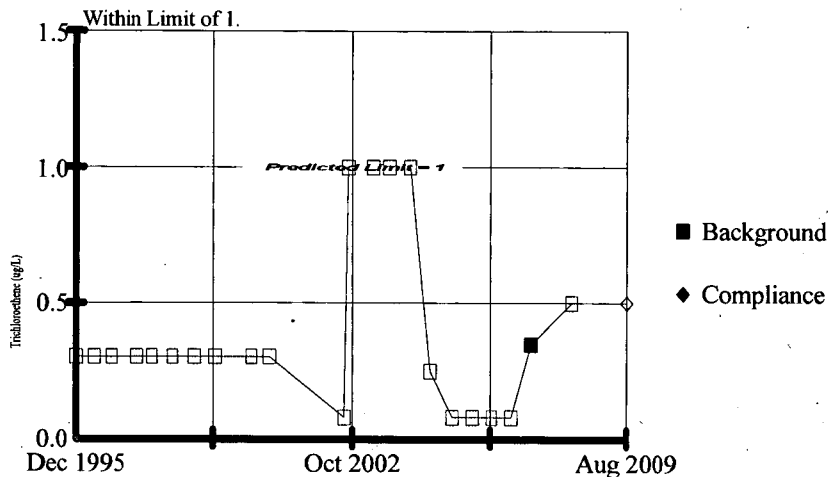


20 background obs. Testwise alpha = 0.04762. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (90%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:30 AM Client: CTI and Associates View: Batch



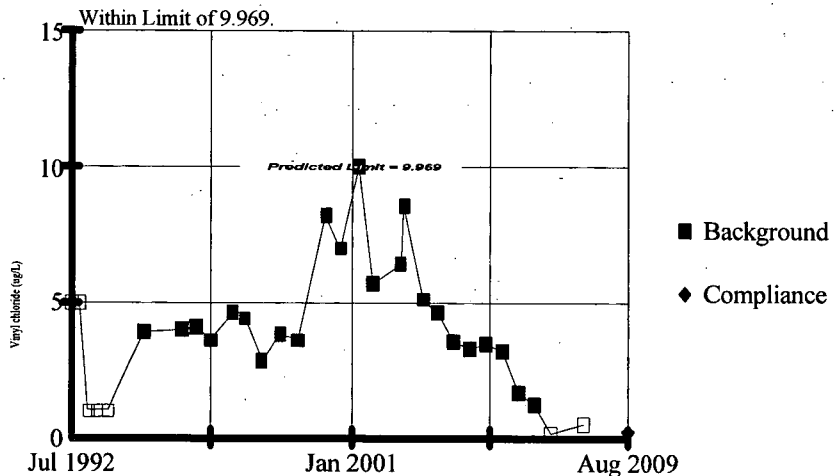
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



22 background obs, Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (95.45%) were in excess of 50% of the data.

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

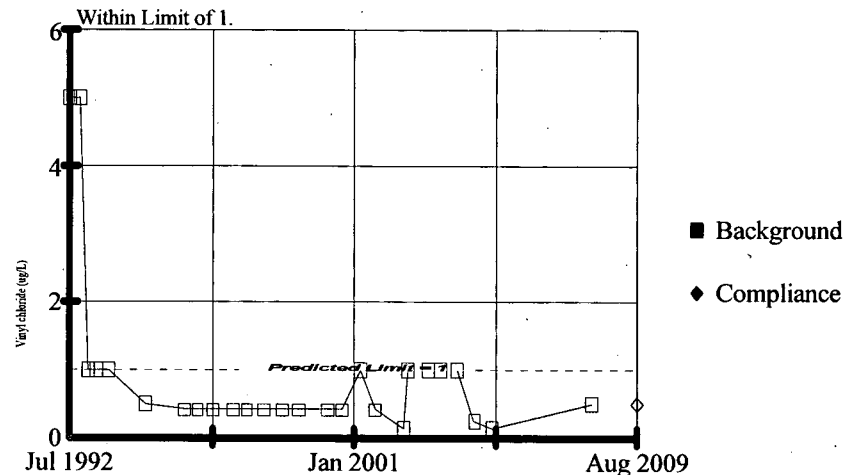
### PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92401



Background Data Summary: (after Cohen's adjustment) Mean=4.634, Std. Dev=2.132, 23.33% nds, 30 obs. Normality test: Sh Wilk. W Statistic for background data = 0.9506, W Quantile = 0.927 at alpha = 0.05. Testwise alpha = 0.01. Hollow symbols indicate censored values.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

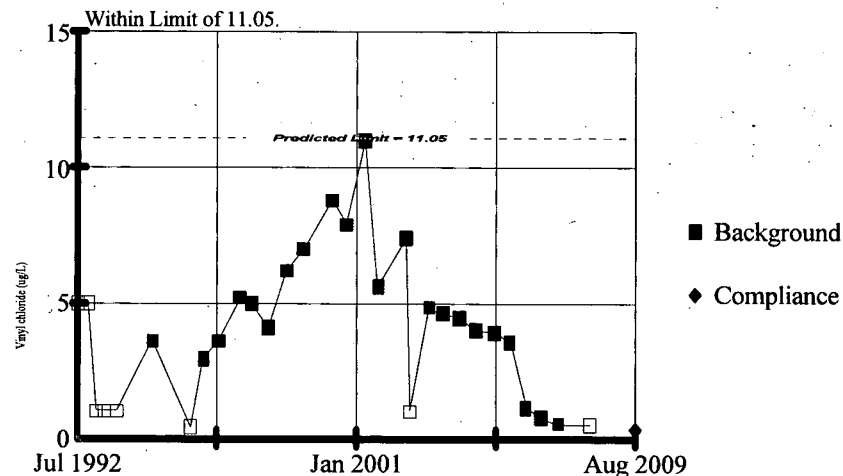
### NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92303



26 background obs, Testwise alpha = 0.03704. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (100%) were in excess of 50% of the data.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

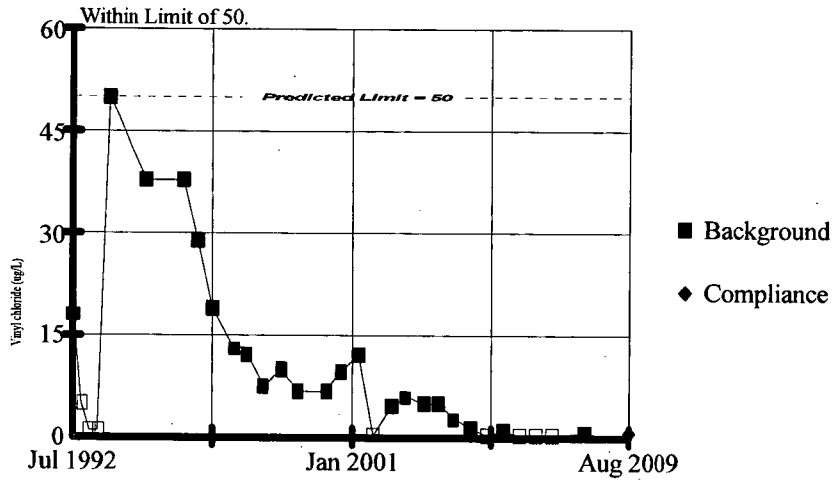
### PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92403



Background Data Summary: (after Cohen's adjustment) Mean=4.78, Std. Dev=2.506, 26.67% nds, 30 obs. Normality test: Sh Wilk. W Statistic for background data = 0.932, W Quantile = 0.927 at alpha = 0.05. Testwise alpha = 0.01. Hollow symbols indicate censored values.

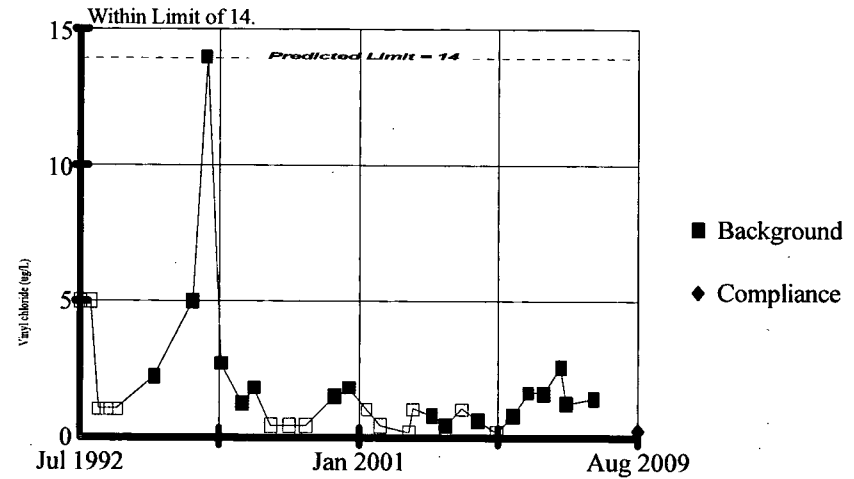
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92601



30 background obs. Testwise alpha = 0.03226. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because required power transformation and adjustment for non-detects are incompatible. NDs = 26.67%.

## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL92603

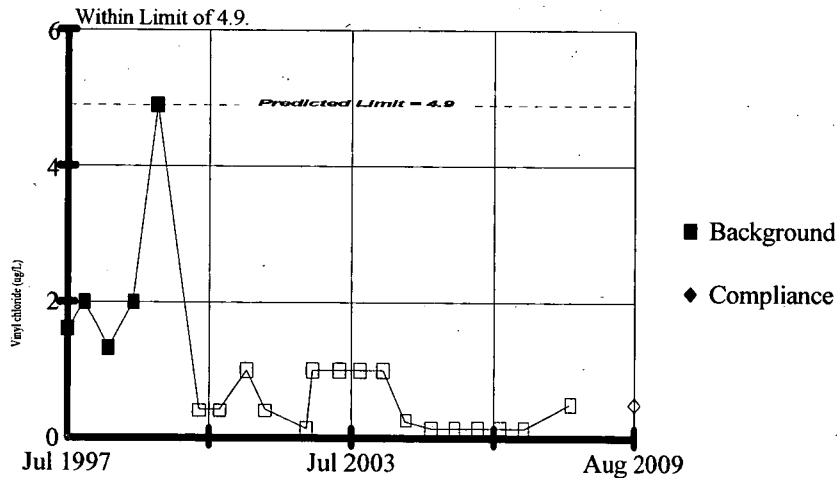


31 background obs. Testwise alpha = 0.03125. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because required power transformation and adjustment for non-detects are incompatible. NDs = 45.16%.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

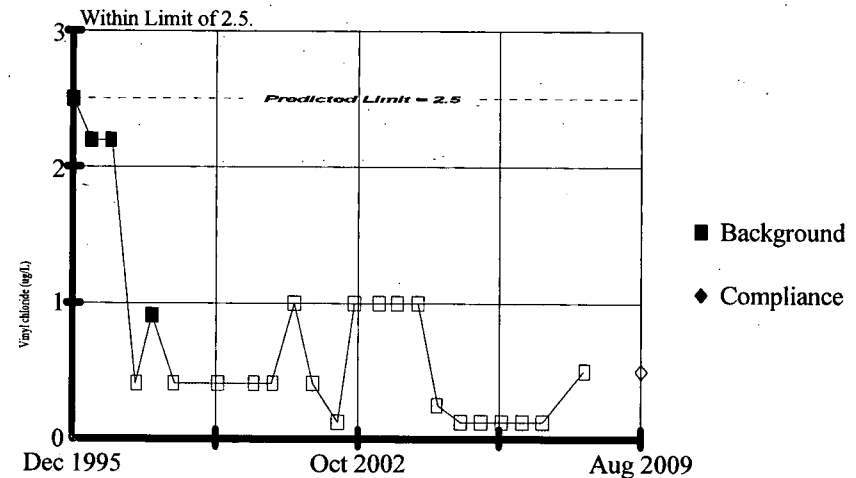
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL97903



21 background obs. Testwise alpha = 0.04545. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (76.19%) were in excess of 50% of the data.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

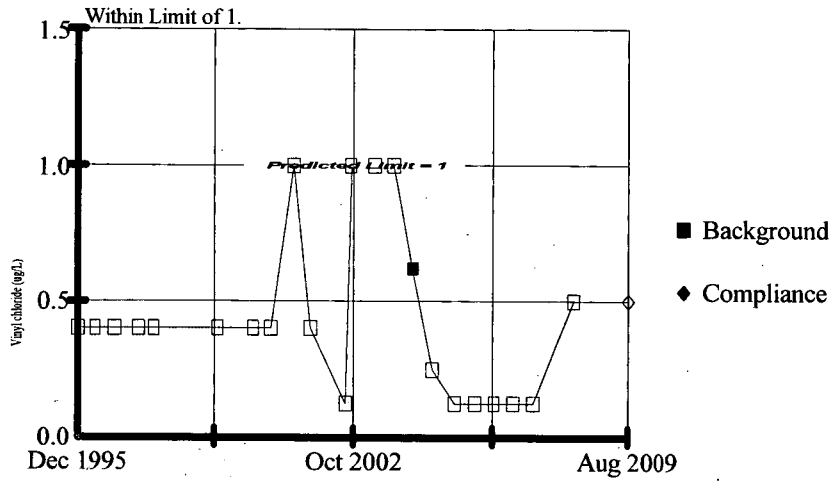
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9402A



23 background obs. Testwise alpha = 0.04167. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (82.61%) were in excess of 50% of the data.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

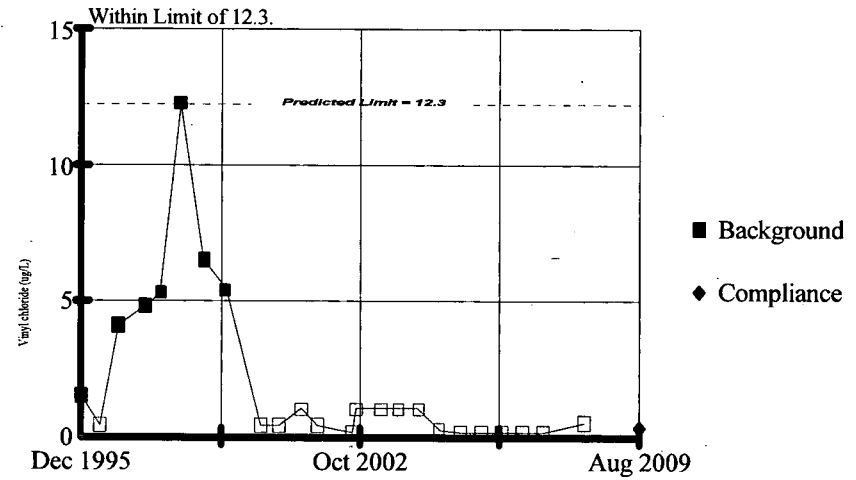
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9403A



22 background obs. Testwise alpha = 0.04348. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (95.45%) were in excess of 50% of the data.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

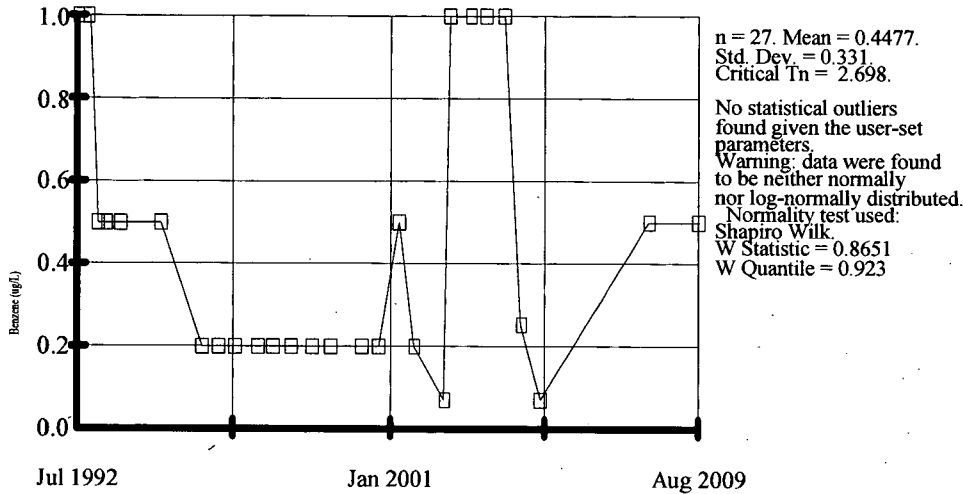
## NON-PARAMETRIC INTRA-WELL PREDICTION LIMIT SFL9404B



24 background obs. Testwise alpha = 0.04. Hollow symbols indicate censored values. Non-P test used in lieu of Parametric Intra-Well Prediction Limit because non-detects (70.83%) were in excess of 50% of the data.

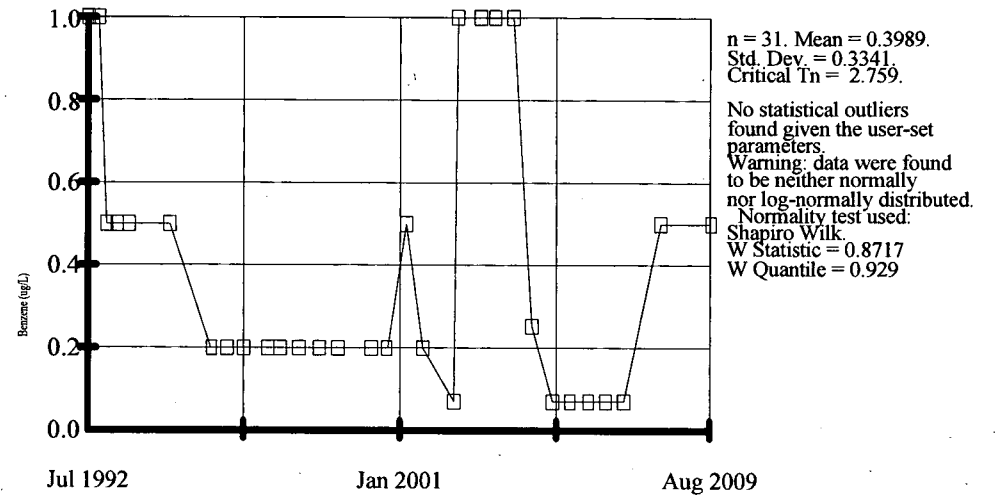
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:31 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92303



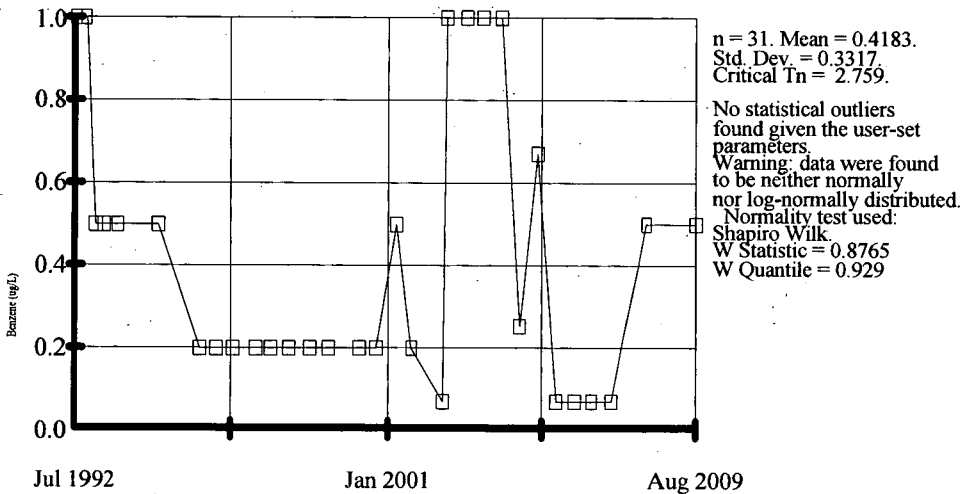
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92401



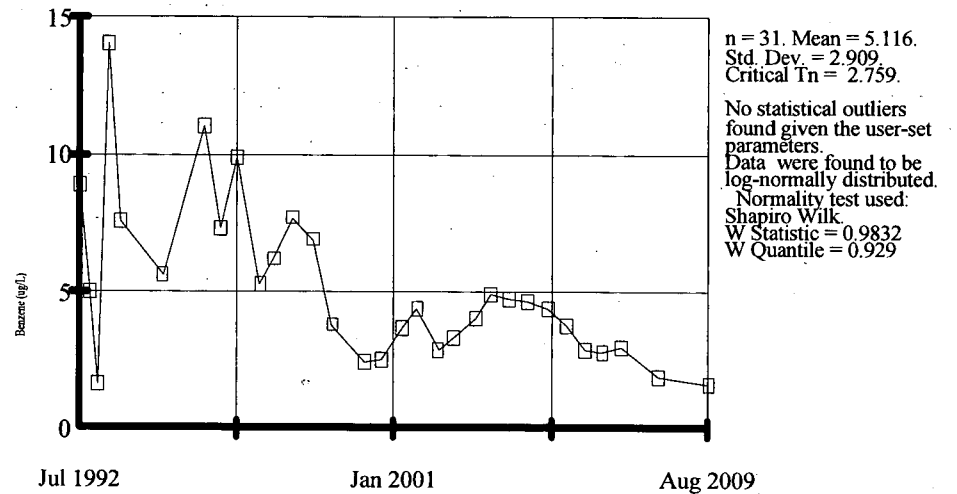
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92403



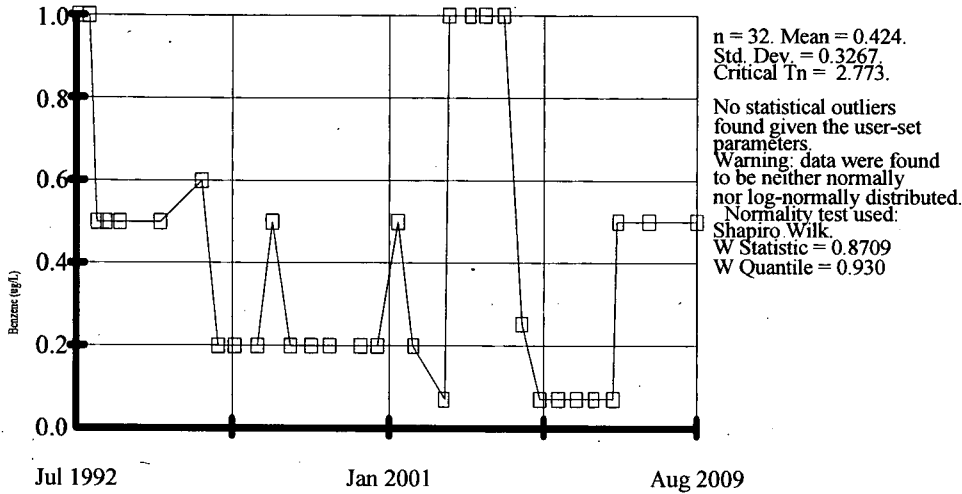
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92601



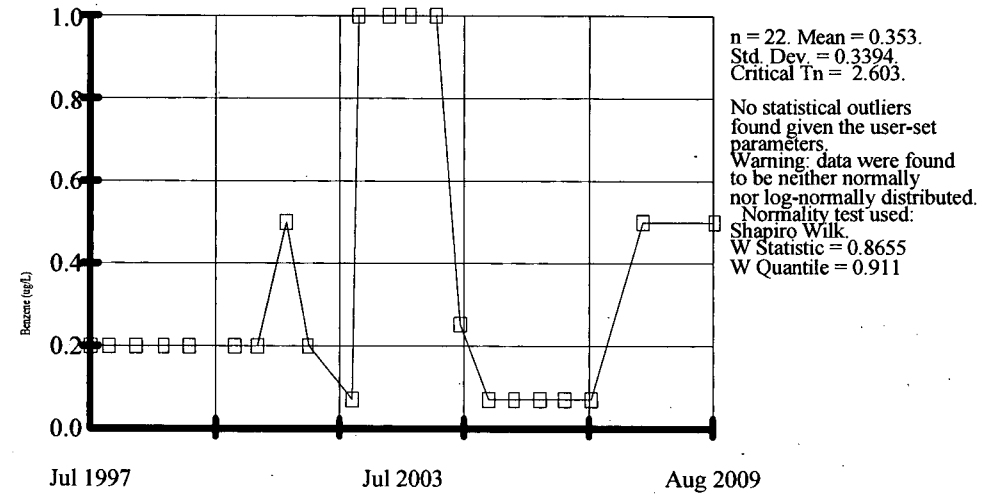
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603



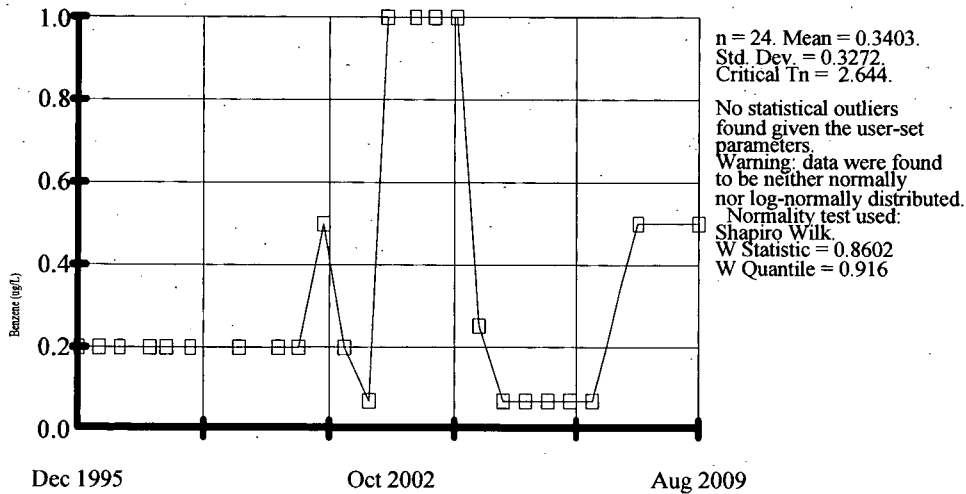
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL97903



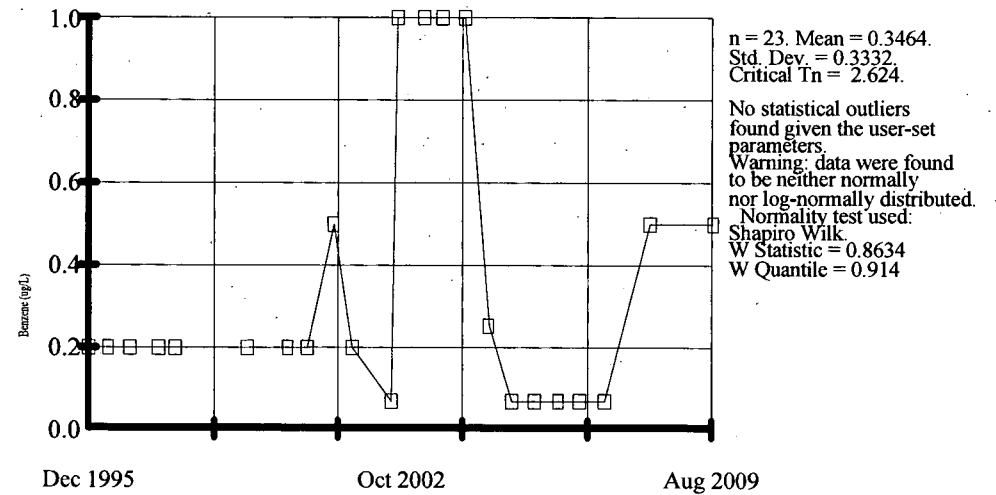
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A



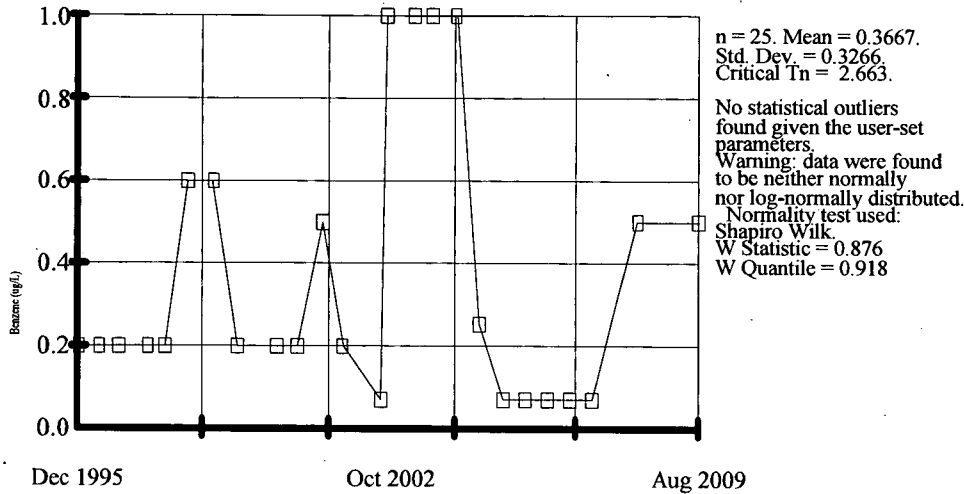
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9403A



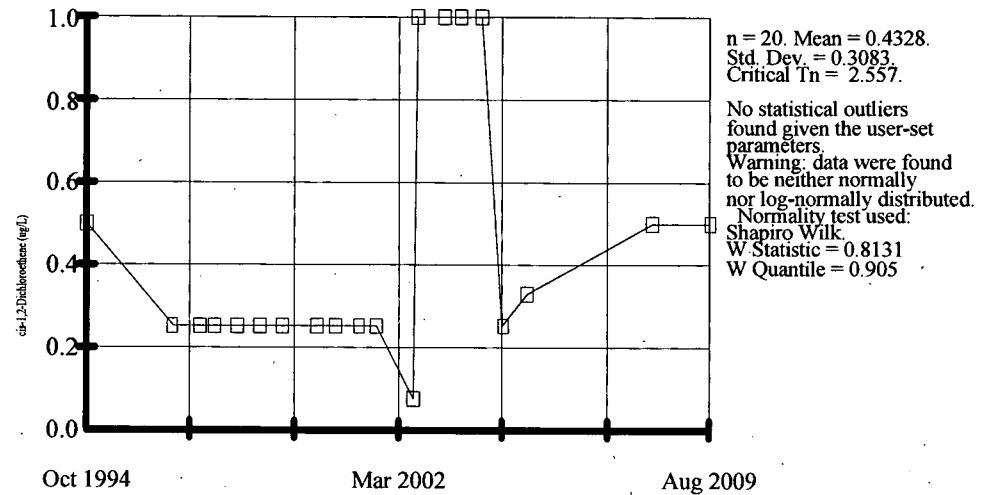
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



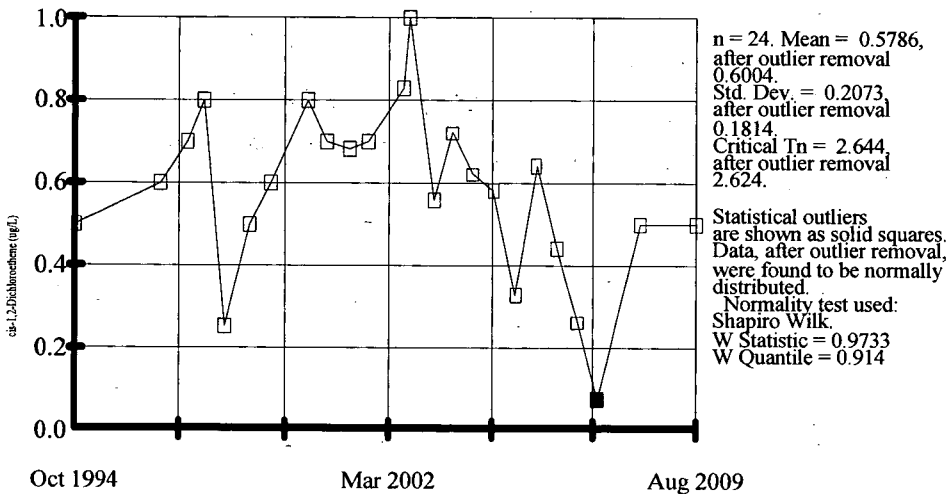
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:11 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92303



Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

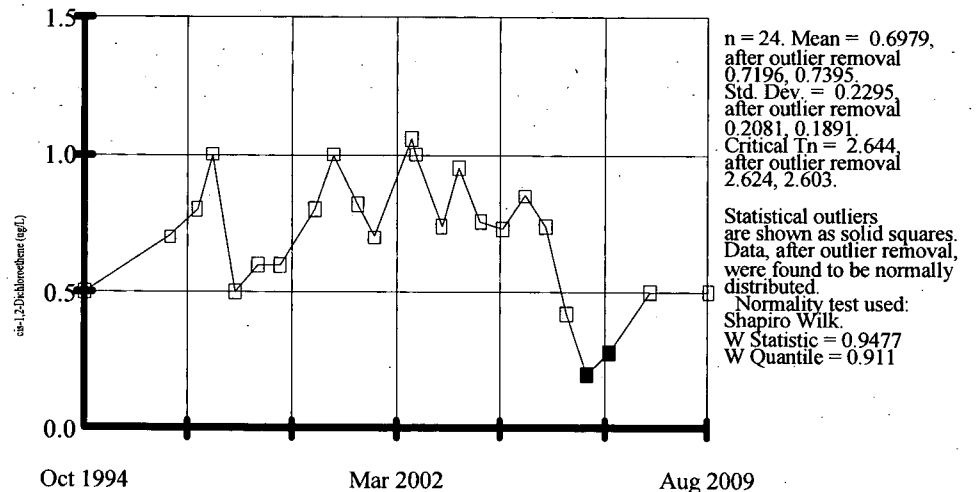
### EPA OUTLIER TEST SFL92401



Oct 1994 Mar 2002 Aug 2009  
Note: EPA guidance directs that statistical outliers should not be removed or altered unless independent evidence error exists.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

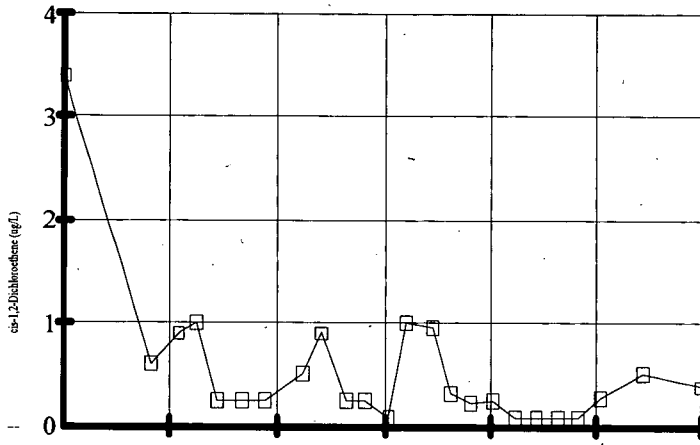
### EPA OUTLIER TEST SFL92403



Oct 1994 Mar 2002 Aug 2009  
Note: EPA guidance directs that statistical outliers should not be removed or altered unless independent evidence error exists.

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92601

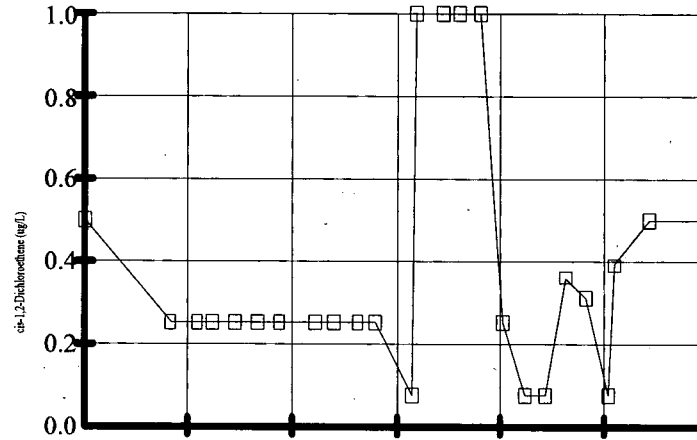


n = 24. Mean = 0.5349.  
Std. Dev. = 0.6871.  
Critical Tn = 2.644.  
No statistical outliers found given the user-set parameters.  
Data were found to be log-normally distributed.  
Normality test used:  
Shapiro Wilk  
W Statistic = 0.9227  
W Quantile = 0.916

Oct 1994 Mar 2002 Aug 2009

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603

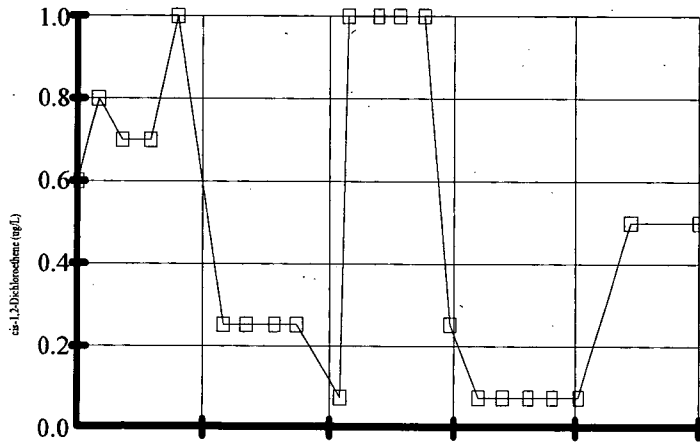


n = 25. Mean = 0.3845.  
Std. Dev. = 0.2988.  
Critical Tn = 2.663.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used:  
Shapiro Wilk  
W Statistic = 0.8684  
W Quantile = 0.918

Oct 1994 Mar 2002 Aug 2009

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL97903

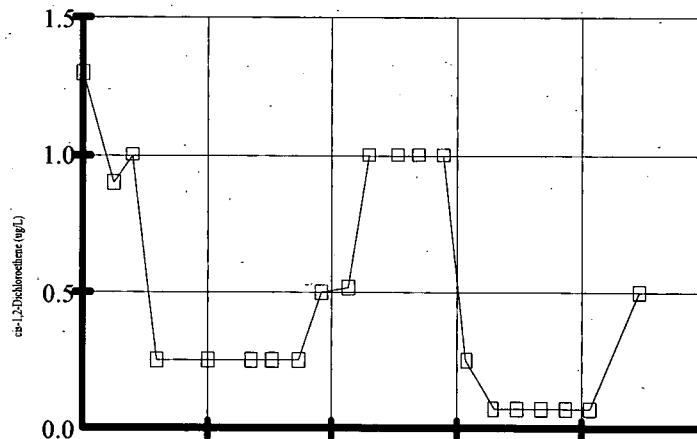


n = 22. Mean = 0.4774.  
Std. Dev. = 0.366.  
Critical Tn = 2.603.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used:  
Shapiro Wilk  
W Statistic = 0.8377  
W Quantile = 0.911

Jul 1997 Jul 2003 Aug 2009

Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A

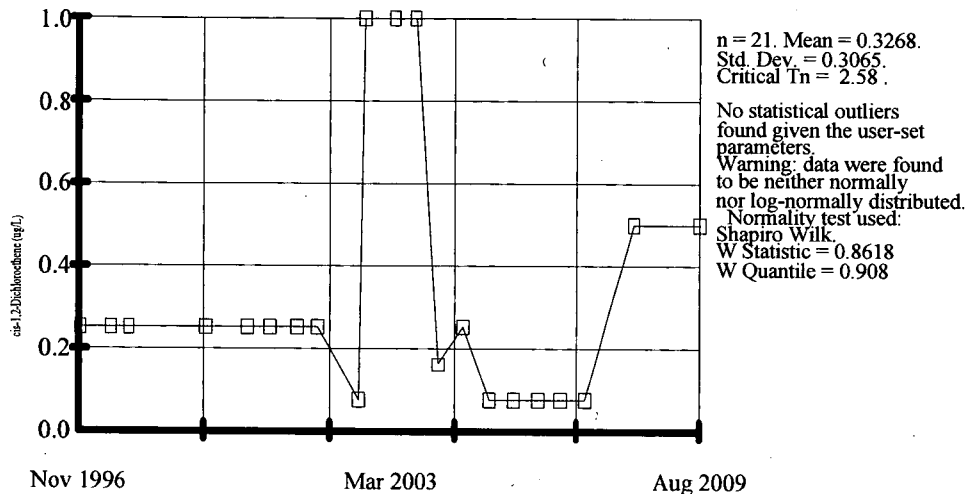


n = 22. Mean = 0.5044.  
Std. Dev. = 0.398.  
Critical Tn = 2.603.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used:  
Shapiro Wilk  
W Statistic = 0.8692  
W Quantile = 0.911

Nov 1996 Mar 2003 Aug 2009

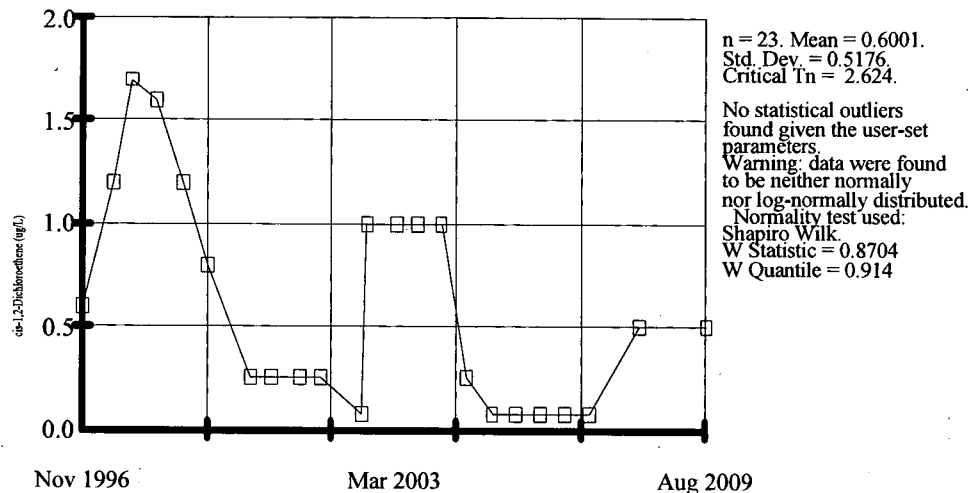
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9403A



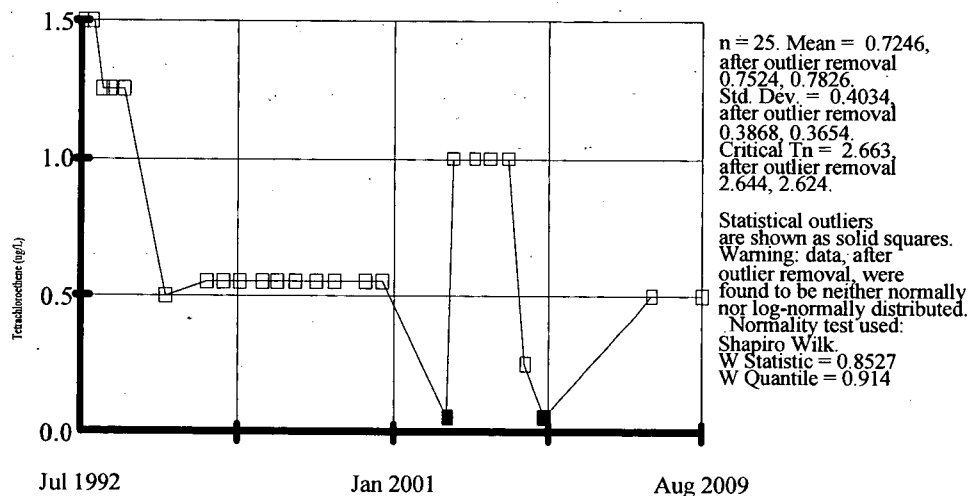
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

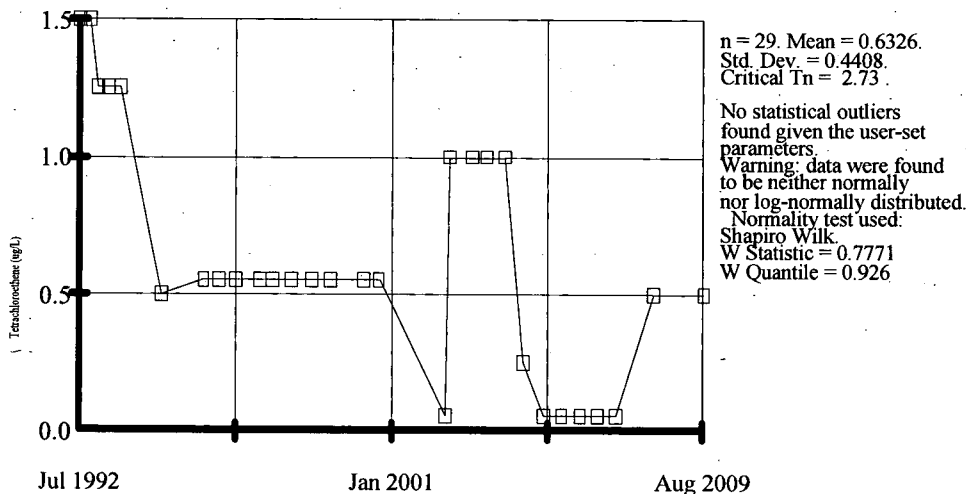
### EPA OUTLIER TEST SFL92303



Note: EPA guidance directs that statistical outliers should not be removed or altered unless independent evidenc error exists.

Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

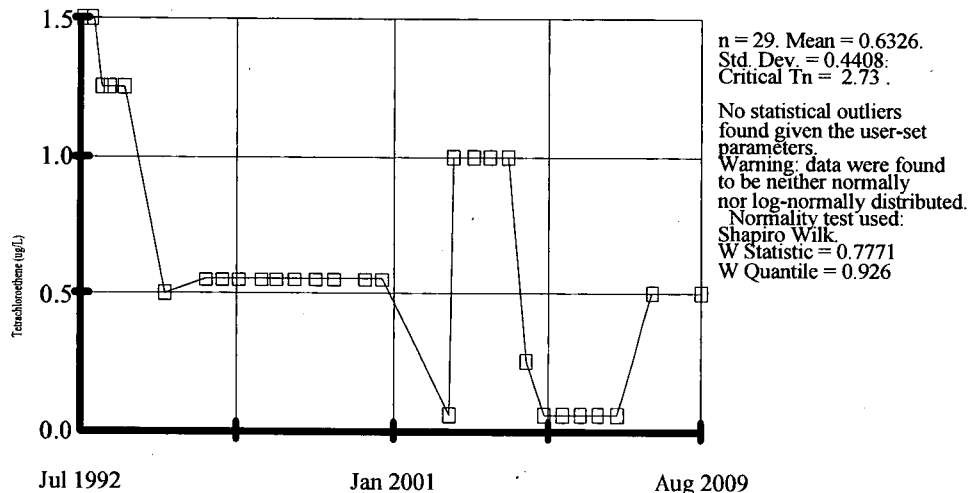
### EPA OUTLIER TEST SFL92401



Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:12 AM Client: CTI and Associates View: Batch

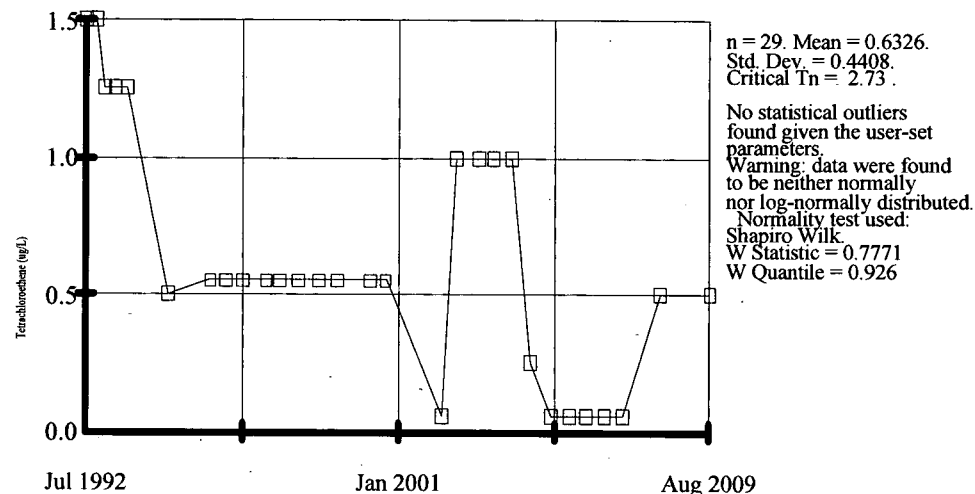


### EPA OUTLIER TEST SFL92403



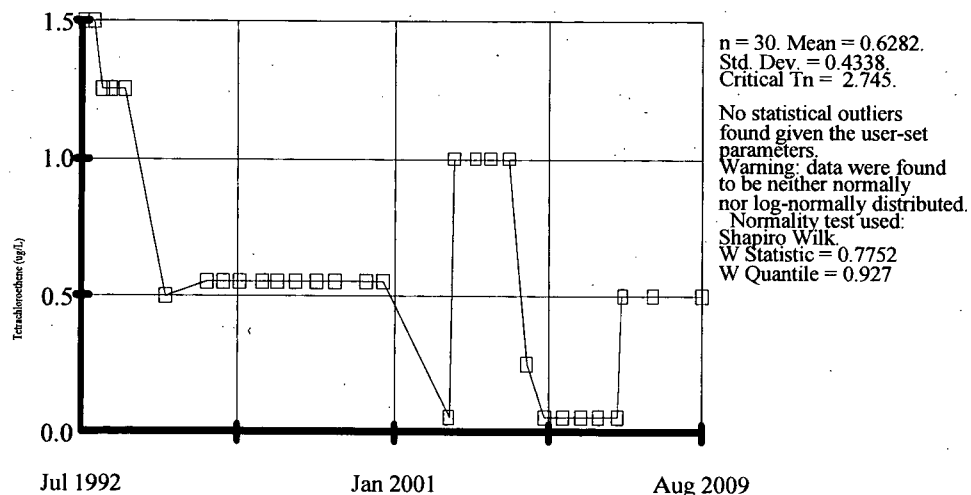
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92601



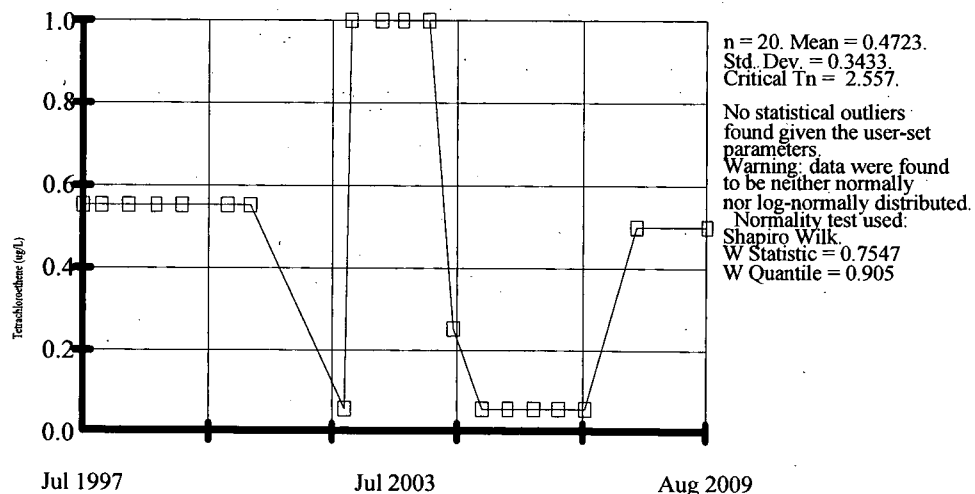
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603



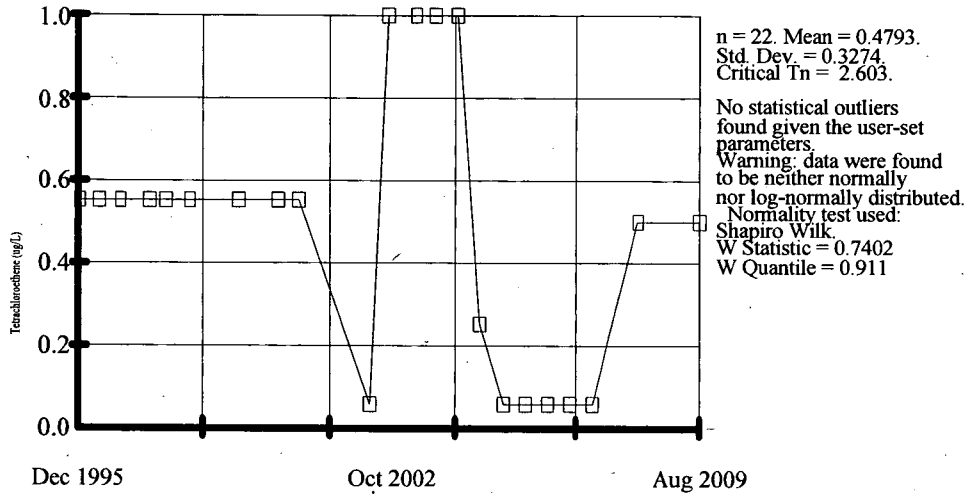
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL97903



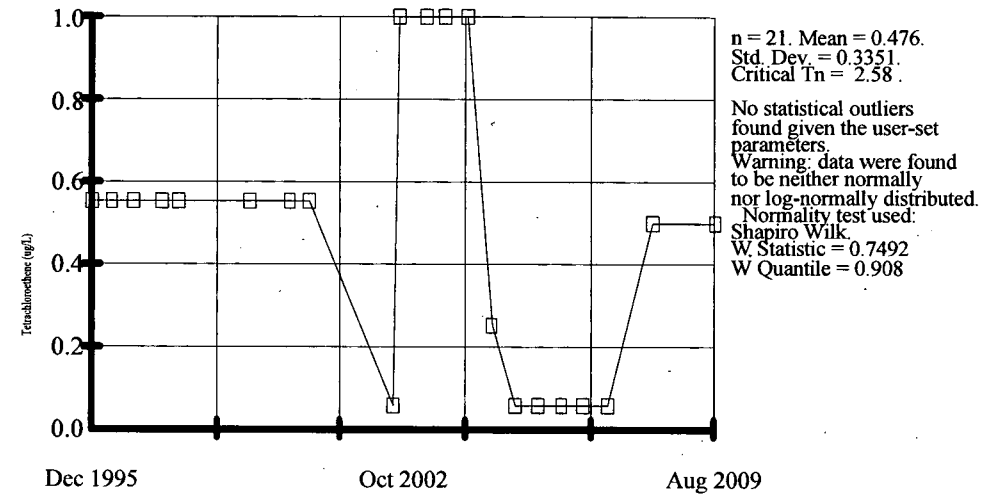
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A



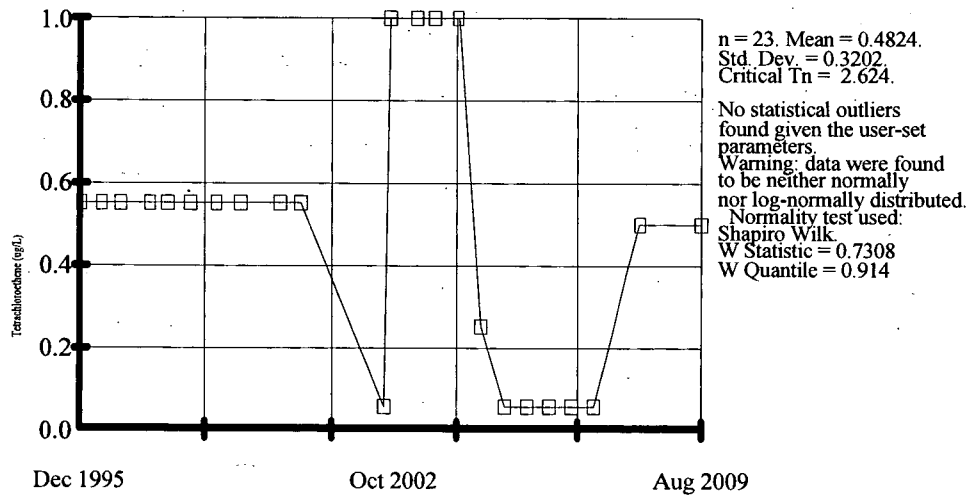
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9403A



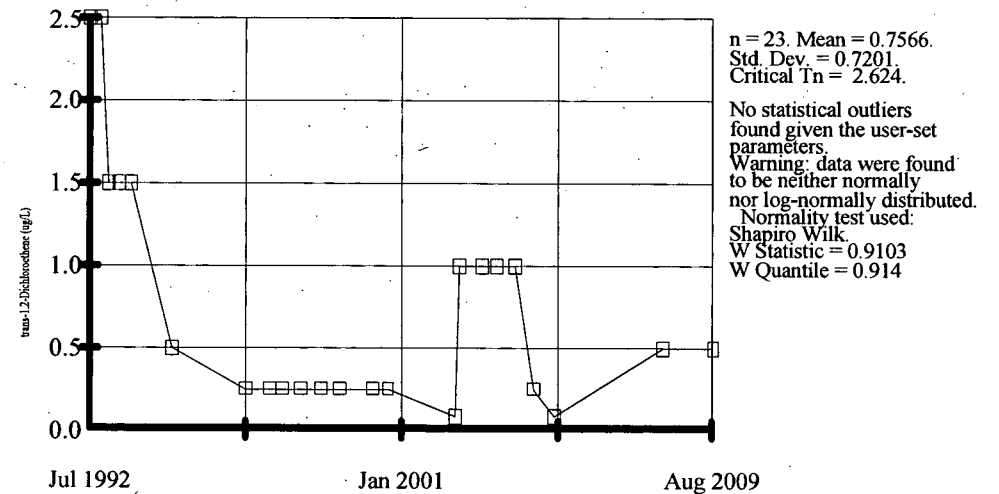
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



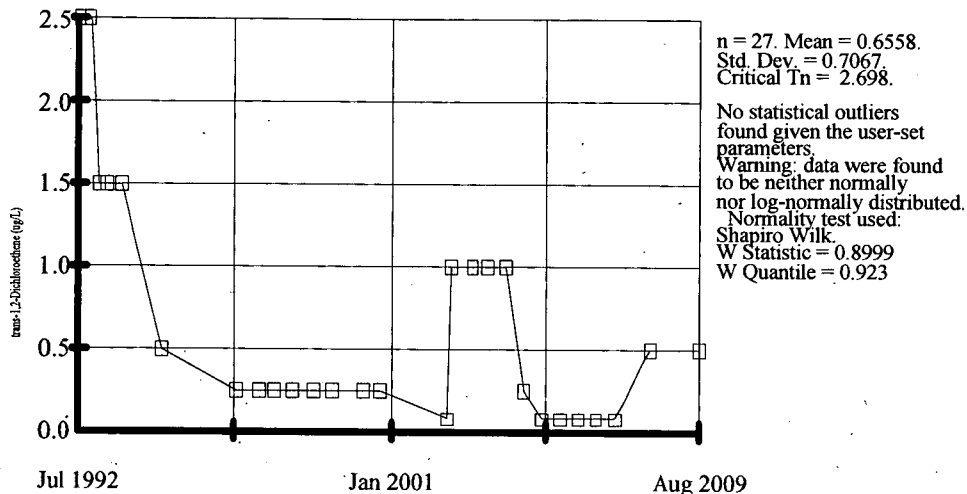
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92303



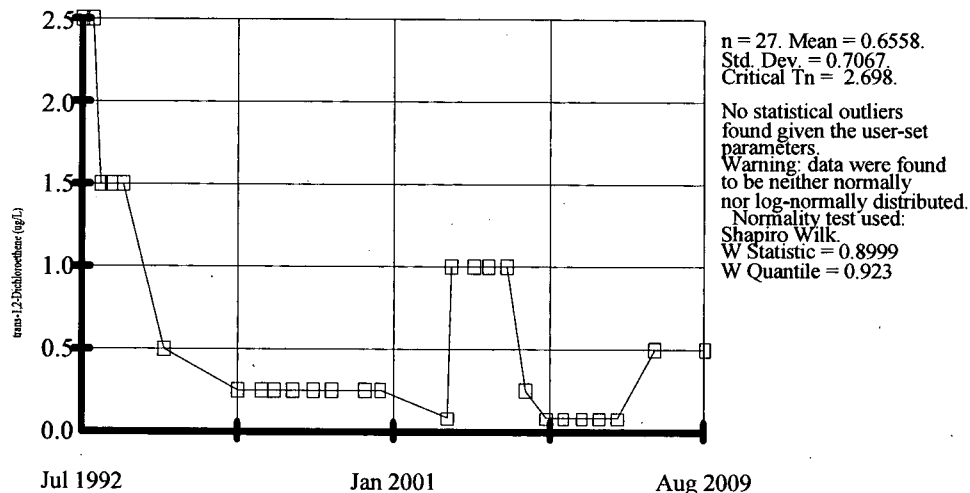
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92401



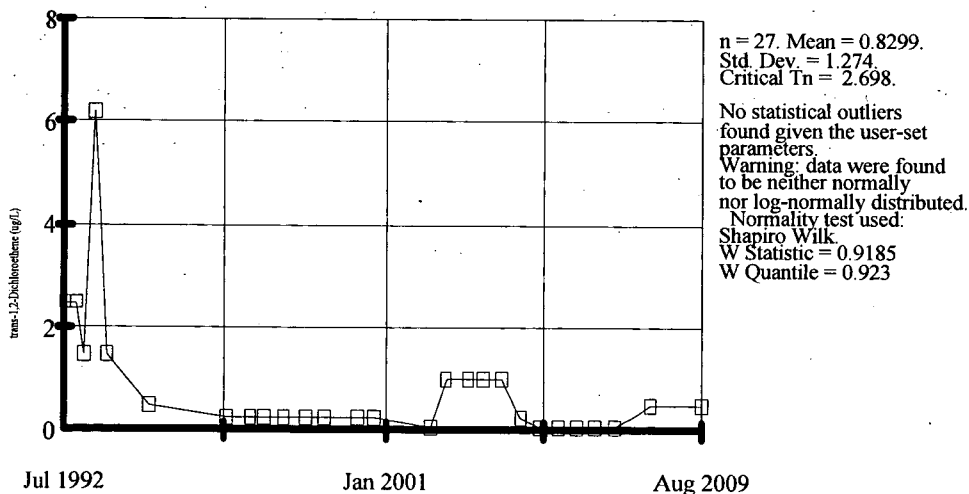
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92403



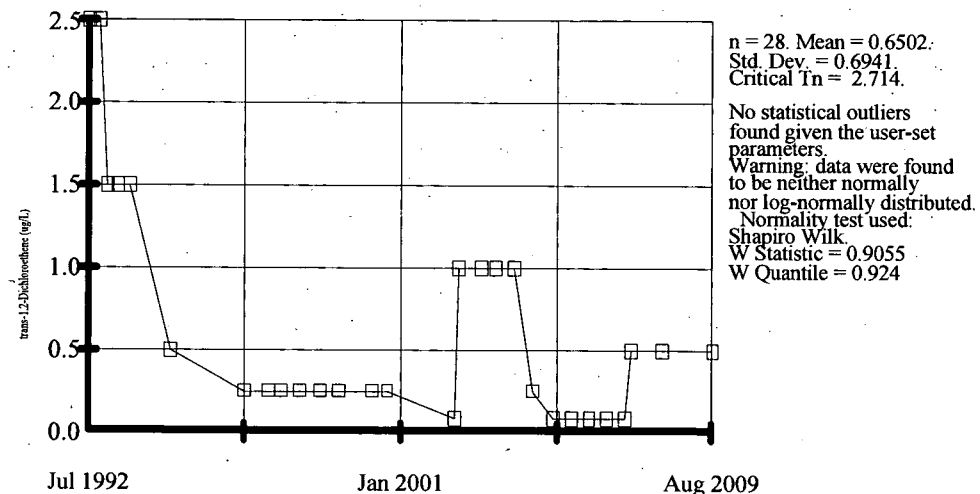
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92601



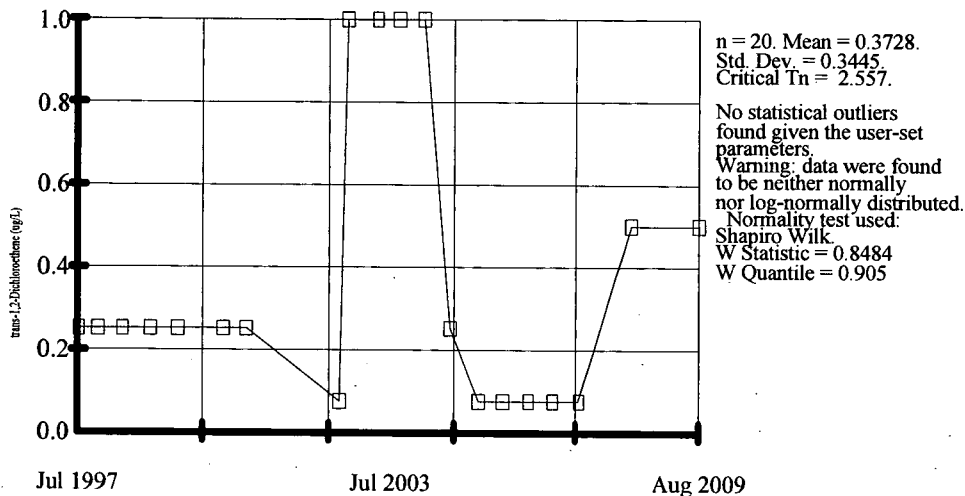
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:13 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603



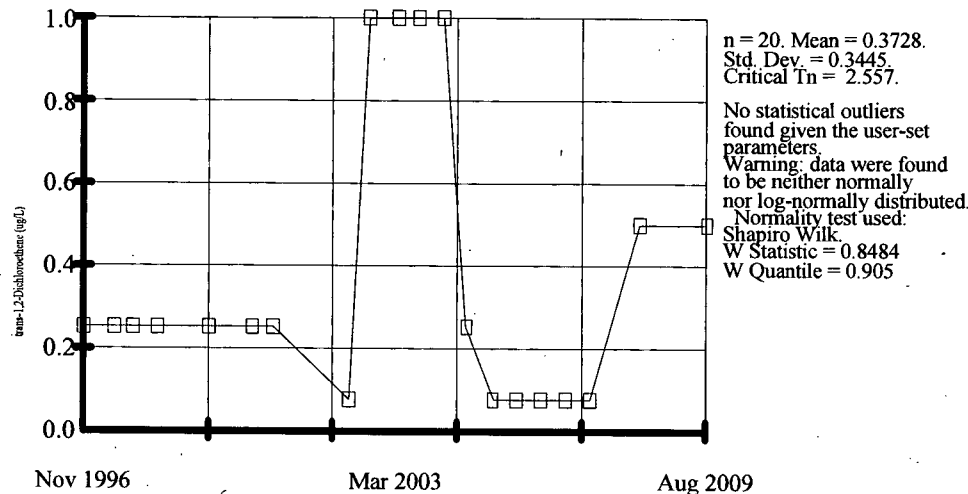
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL97903



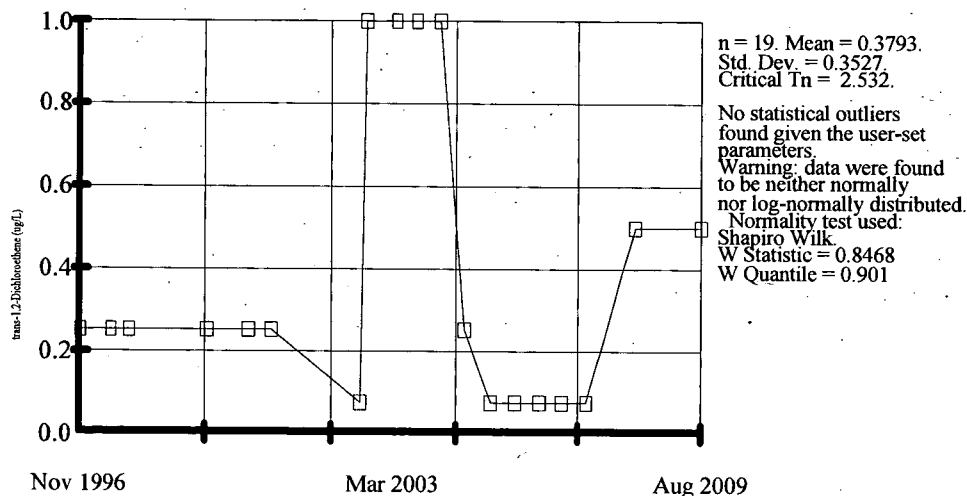
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A



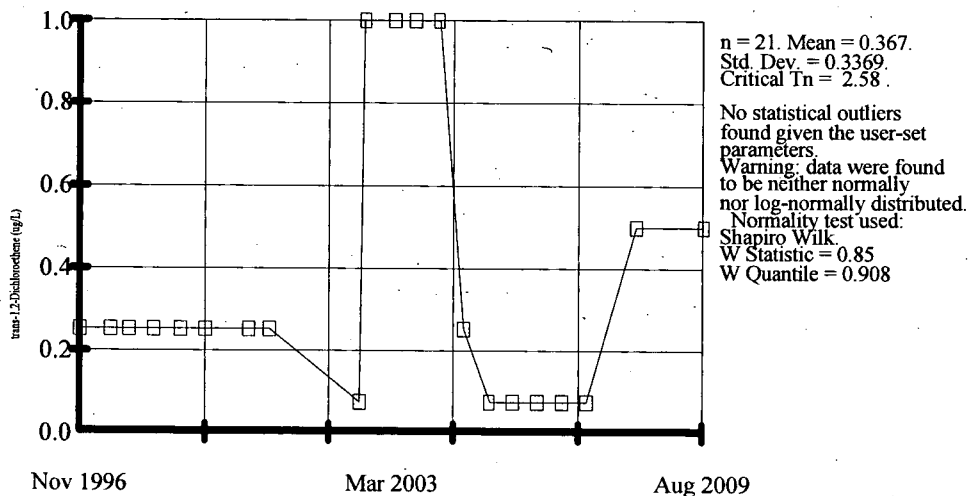
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9403A



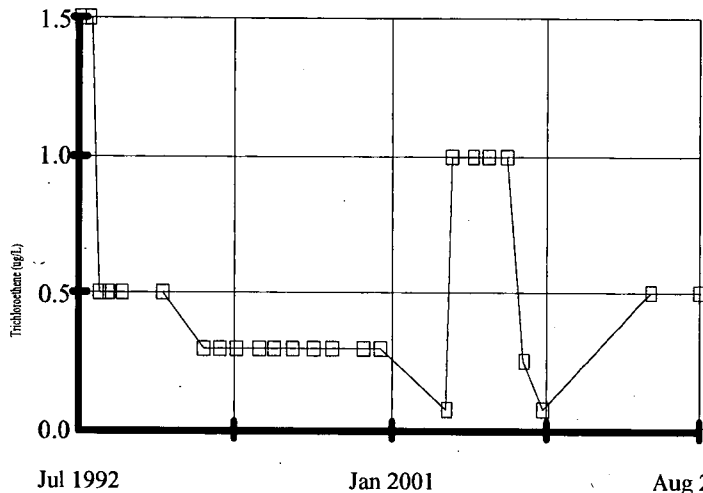
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



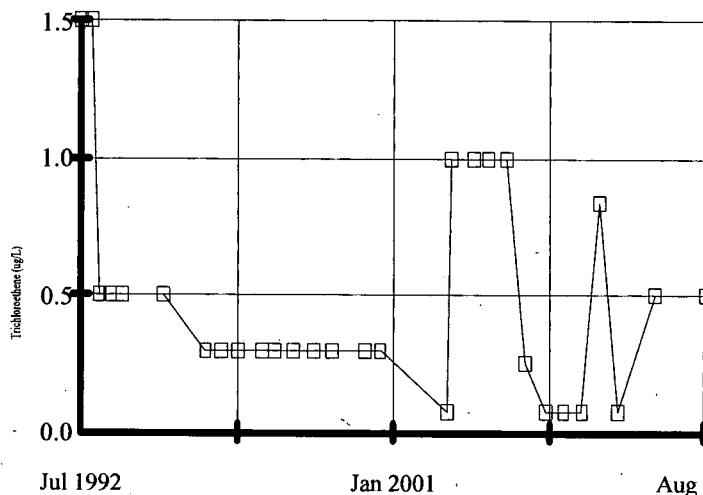
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92303



n = 25. Mean = 0.536.  
Std. Dev. = 0.3974.  
Critical Tn = 2.663.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.8857  
W Quantile = 0.918

### EPA OUTLIER TEST SFL92401

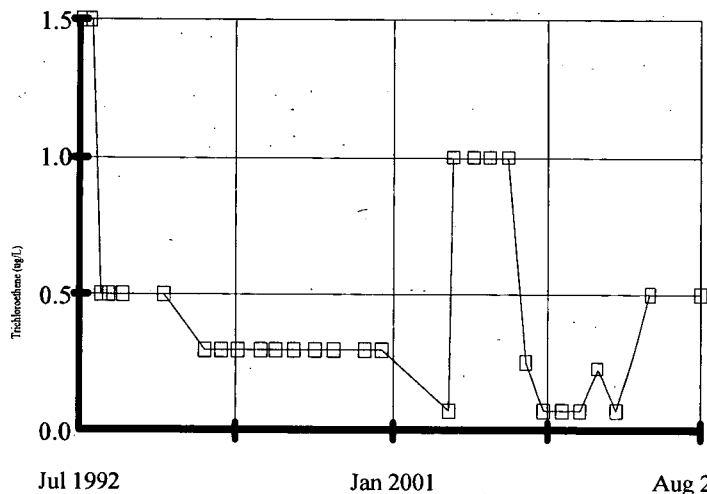


n = 29. Mean = 0.4989.  
Std. Dev. = 0.4.  
Critical Tn = 2.73.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.8883  
W Quantile = 0.926

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

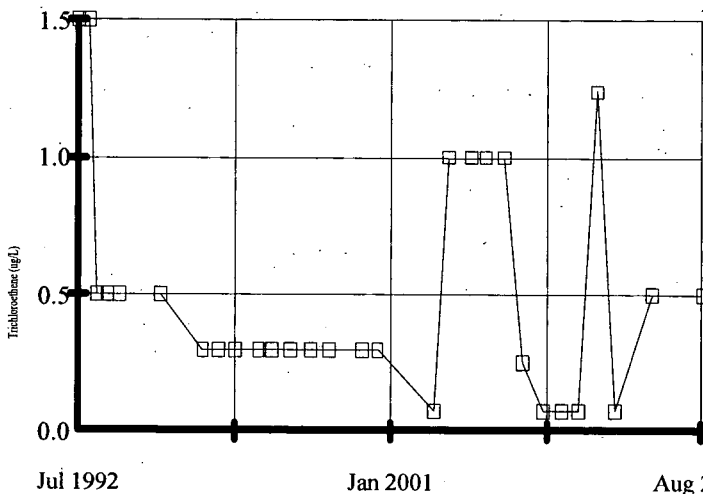
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92403



n = 29. Mean = 0.4778.  
Std. Dev. = 0.3974.  
Critical Tn = 2.73.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.8924  
W Quantile = 0.926

### EPA OUTLIER TEST SFL92601

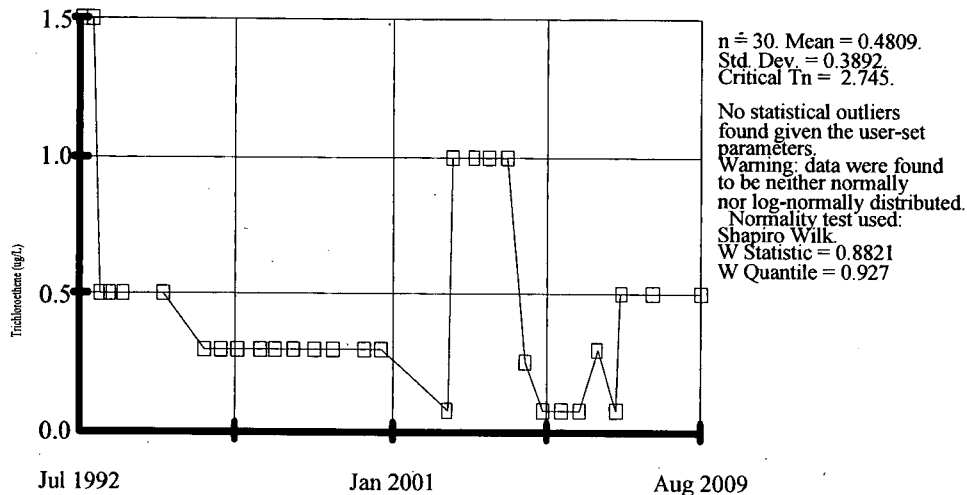


n = 29. Mean = 0.5127.  
Std. Dev. = 0.4186.  
Critical Tn = 2.73.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.8874  
W Quantile = 0.926

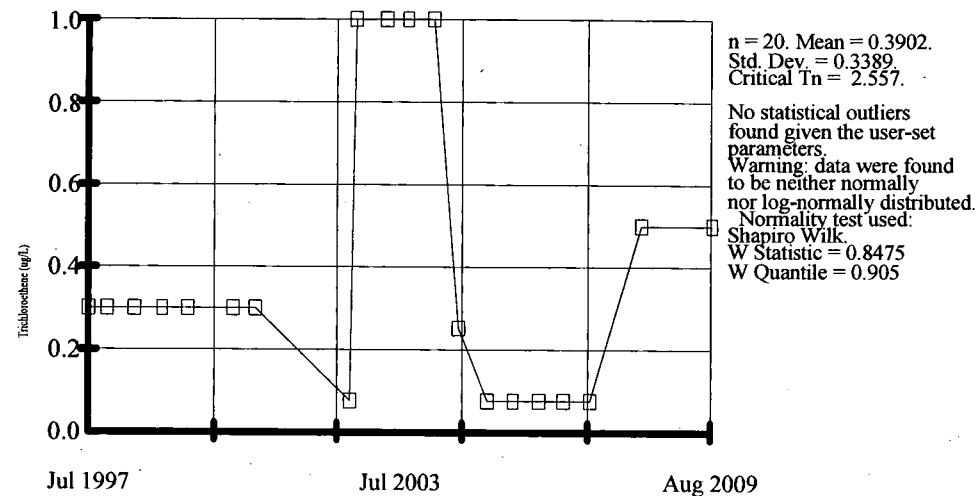
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603



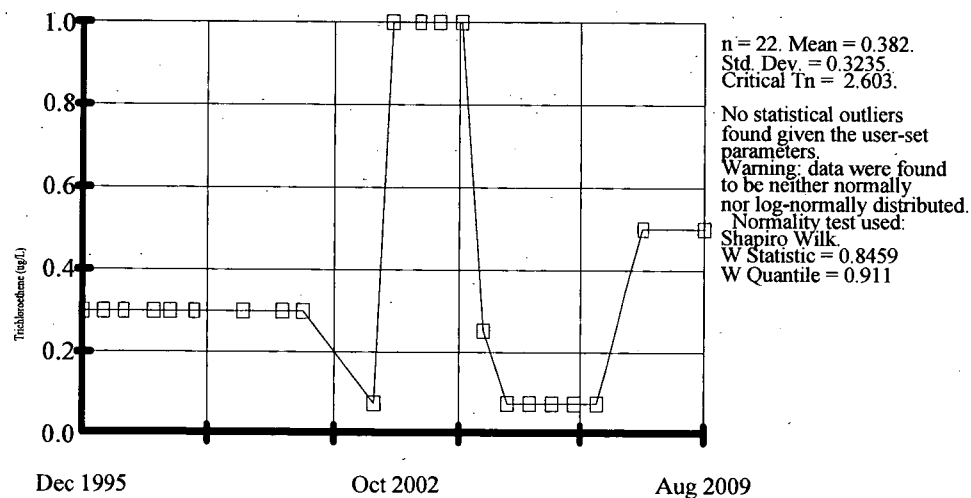
### EPA OUTLIER TEST SFL97903



Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
 Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

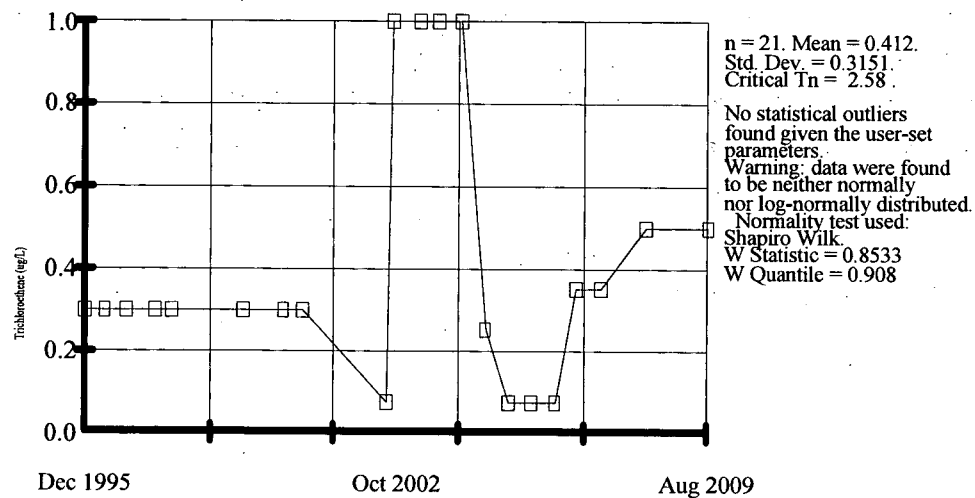
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
 Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A



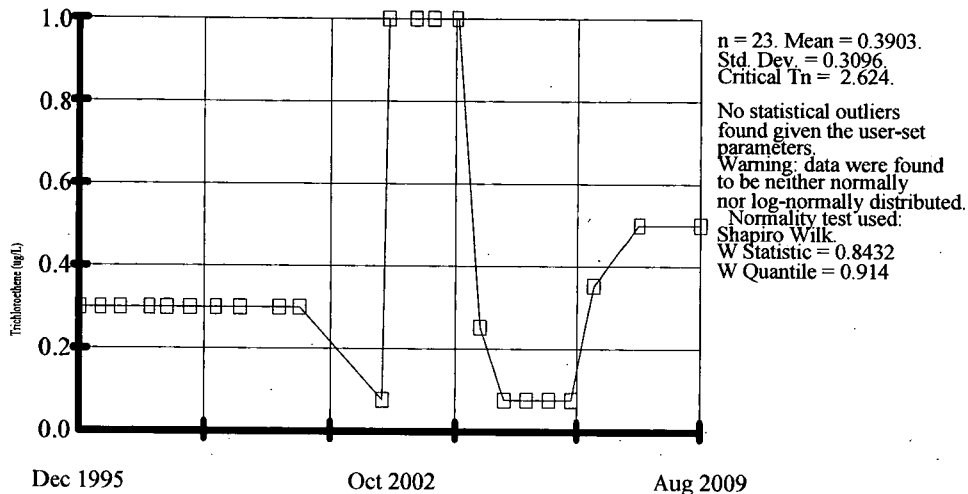
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
 Date: 9/19/09, 10:14 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9403A



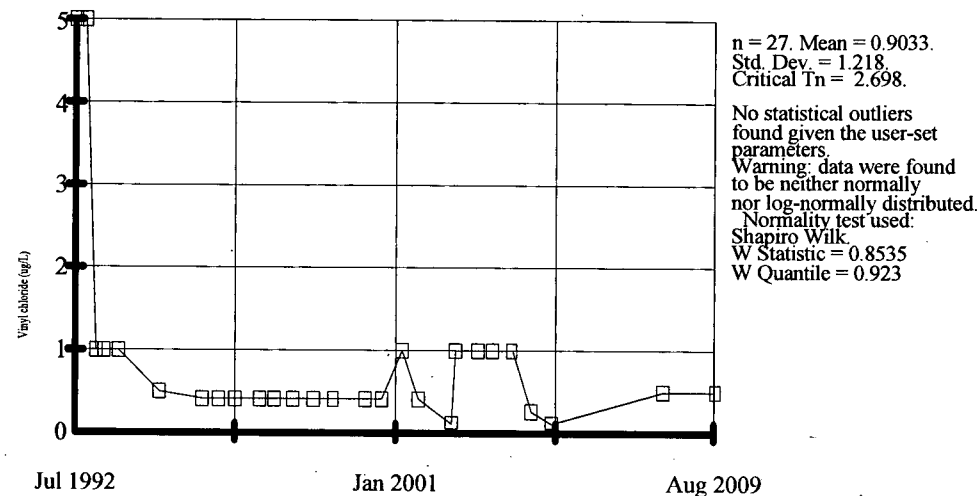
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
 Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



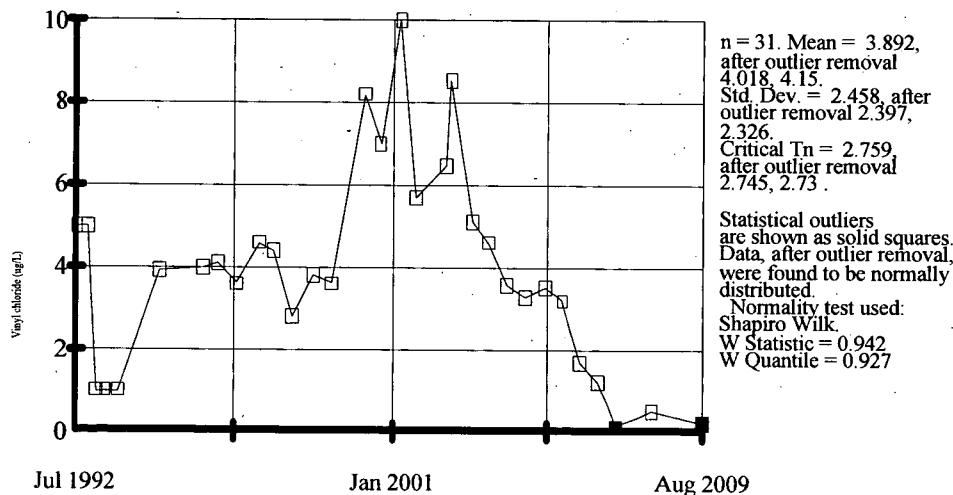
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92303



Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

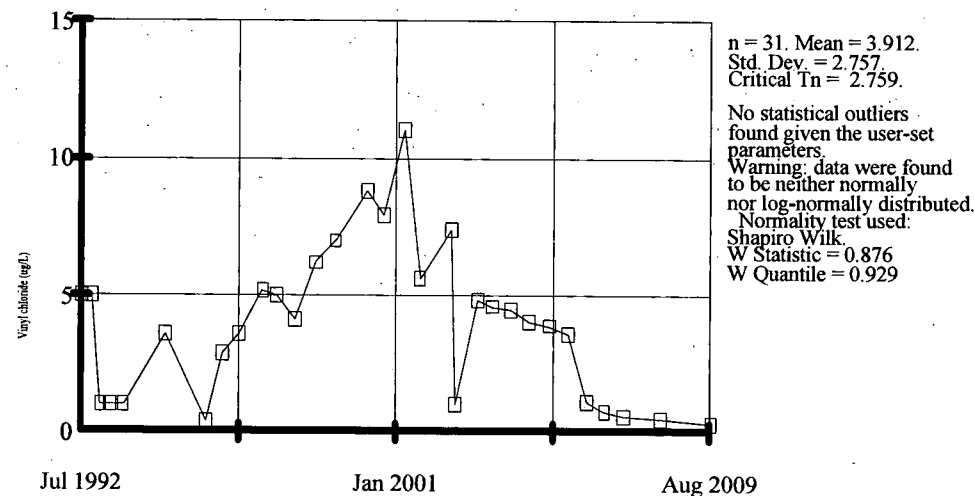
### EPA OUTLIER TEST SFL92401



Jul 1992 Jan 2001 Aug 2009  
Note: EPA guidance directs that statistical outliers should not be removed or altered unless independent evidence error exists.

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92403



Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92601

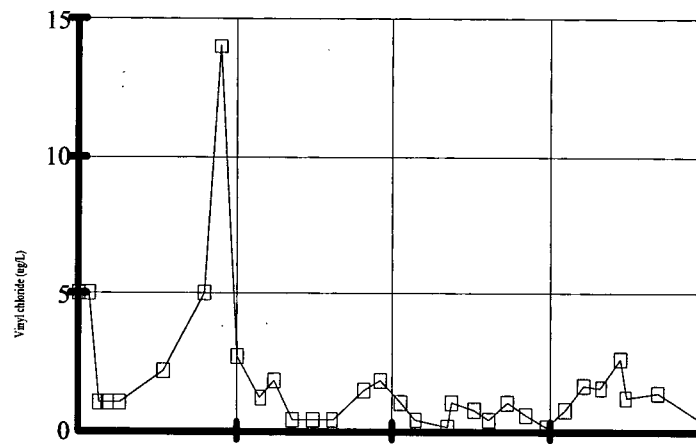


n = 31. Mean = 9.79.  
Std. Dev. = 12.75.  
Critical Tn = 2.759.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.9197  
W Quantile = 0.929

Jul 1992 Jan 2001 Aug 2009

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL92603

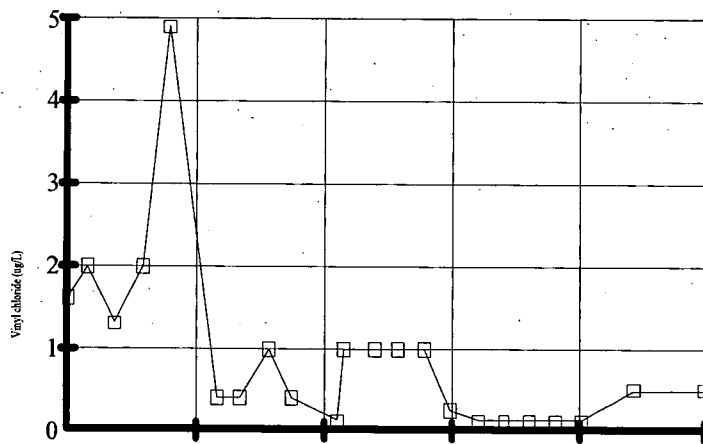


n = 32. Mean = 1.848.  
Std. Dev. = 2.588.  
Critical Tn = 2.773.  
No statistical outliers found given the user-set parameters.  
Data were found to be log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.9714  
W Quantile = 0.930

Jul 1992 Jan 2001 Aug 2009

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL97903

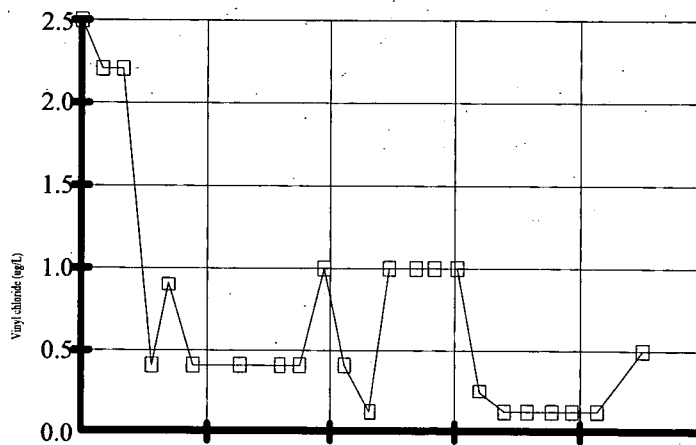


n = 22. Mean = 0.9076.  
Std. Dev. = 1.075.  
Critical Tn = 2.603.  
No statistical outliers found given the user-set parameters.  
Data were found to be log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.9126  
W Quantile = 0.911

Jul 1997 Jul 2003 Aug 2009

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9402A



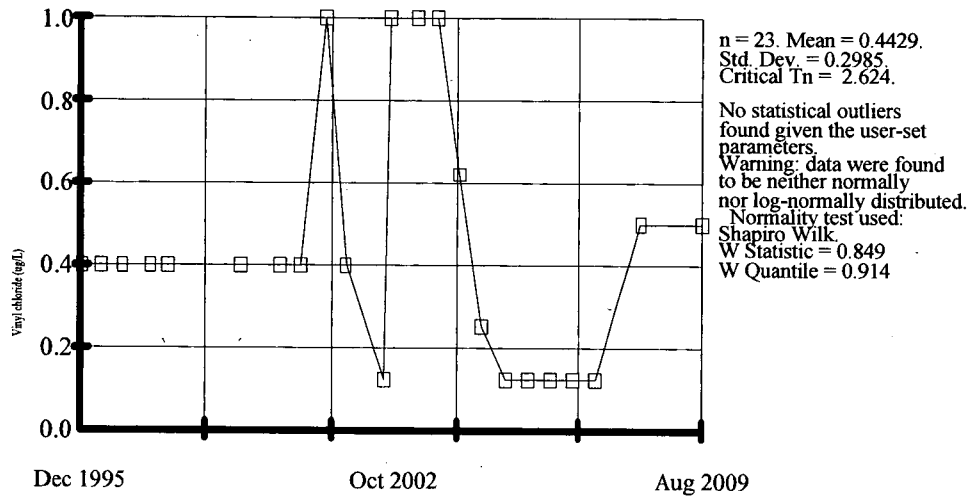
n = 24. Mean = 0.7153.  
Std. Dev. = 0.6937.  
Critical Tn = 2.644.  
No statistical outliers found given the user-set parameters.  
Warning: data were found to be neither normally nor log-normally distributed.  
Normality test used: Shapiro Wilk.  
W Statistic = 0.902  
W Quantile = 0.916

Dec 1995 Oct 2002 Aug 2009

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

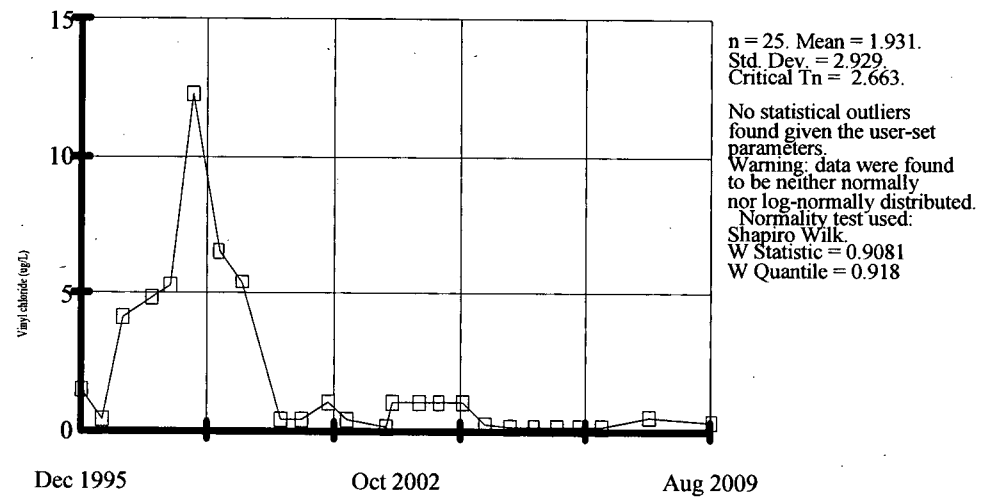


### EPA OUTLIER TEST SFL9403A



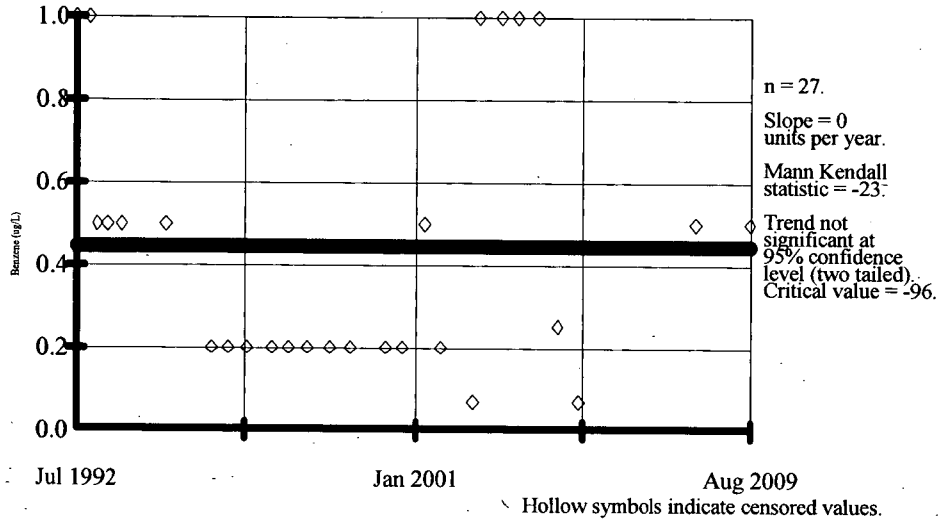
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### EPA OUTLIER TEST SFL9404B



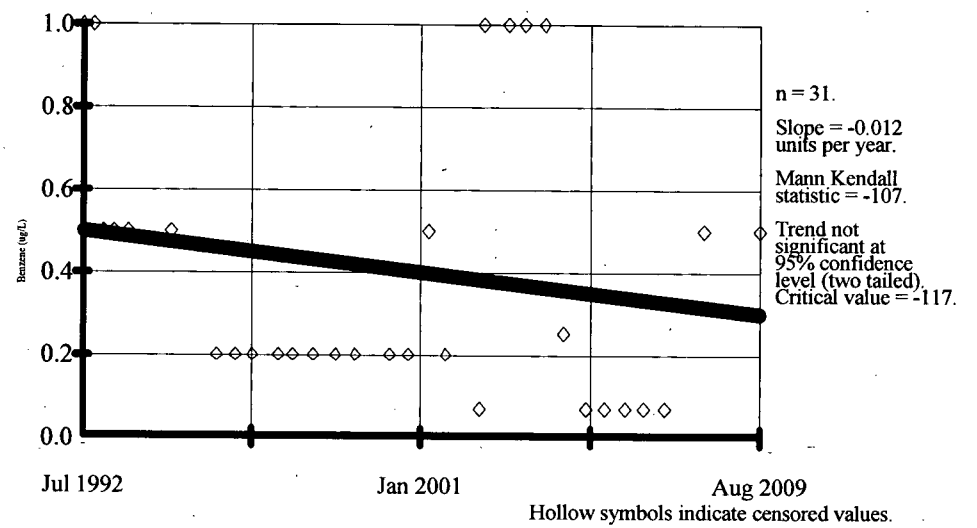
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:15 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92303



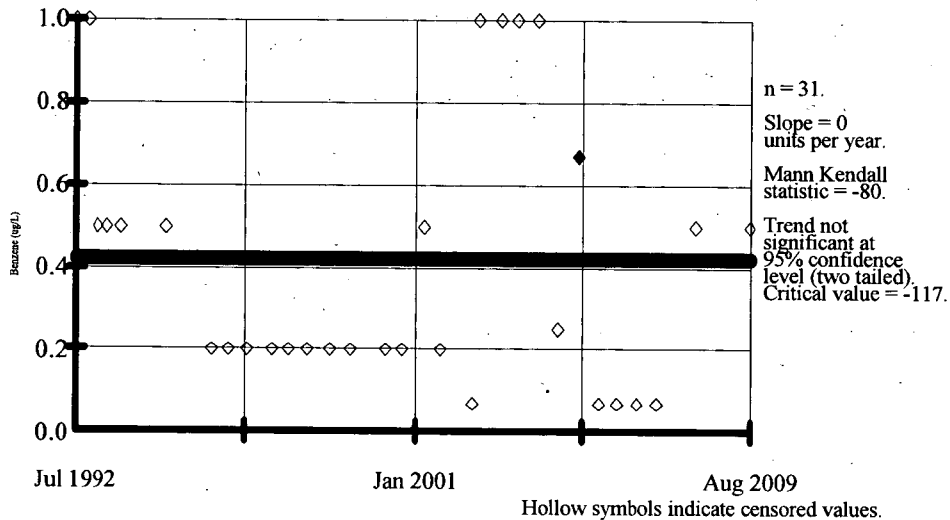
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92401



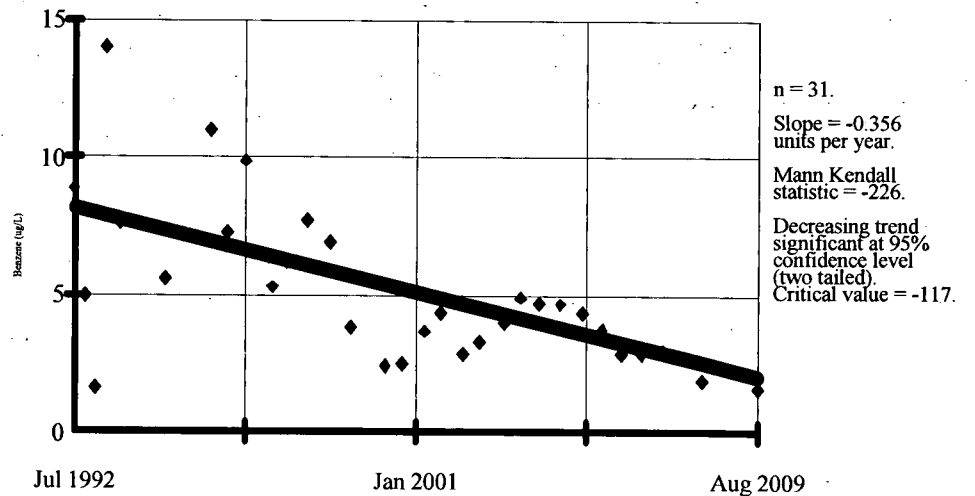
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92403



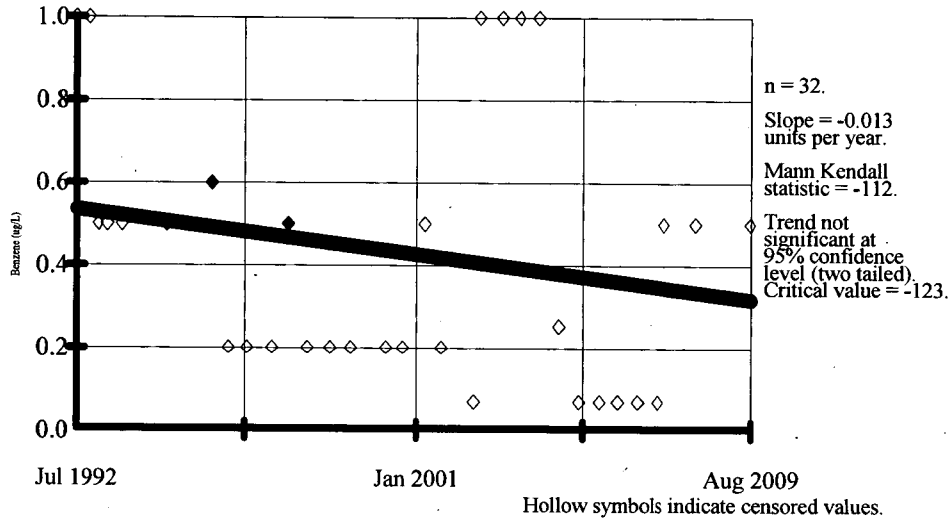
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



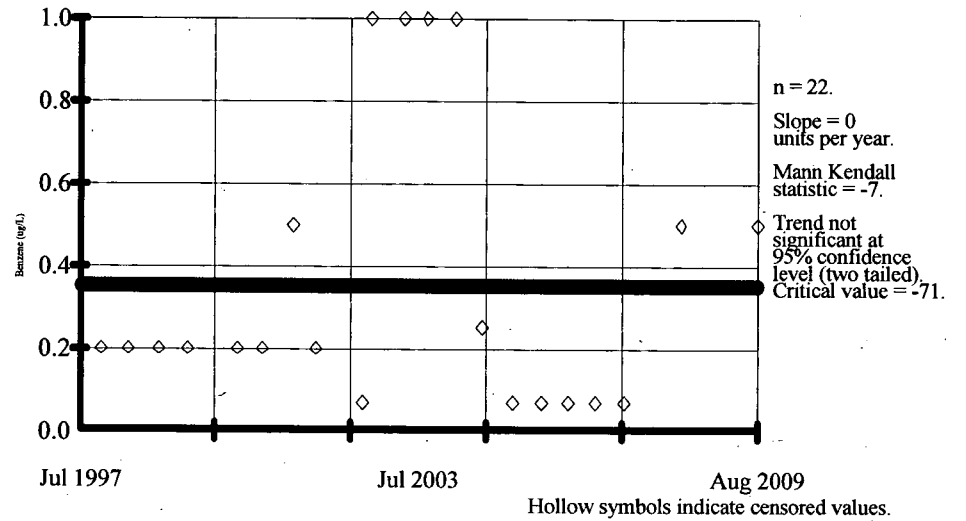
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



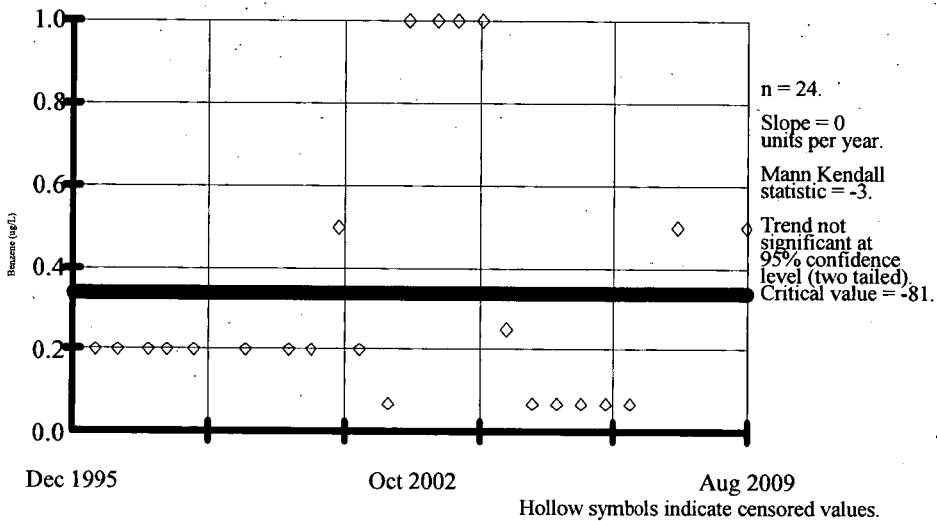
Constituent: Benzene (ug/L) Facility: SW Funston-LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



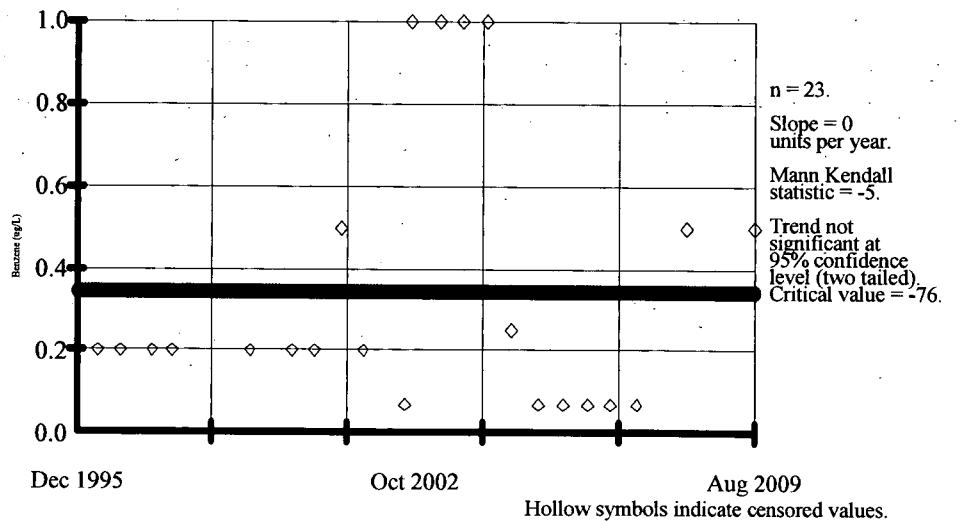
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A



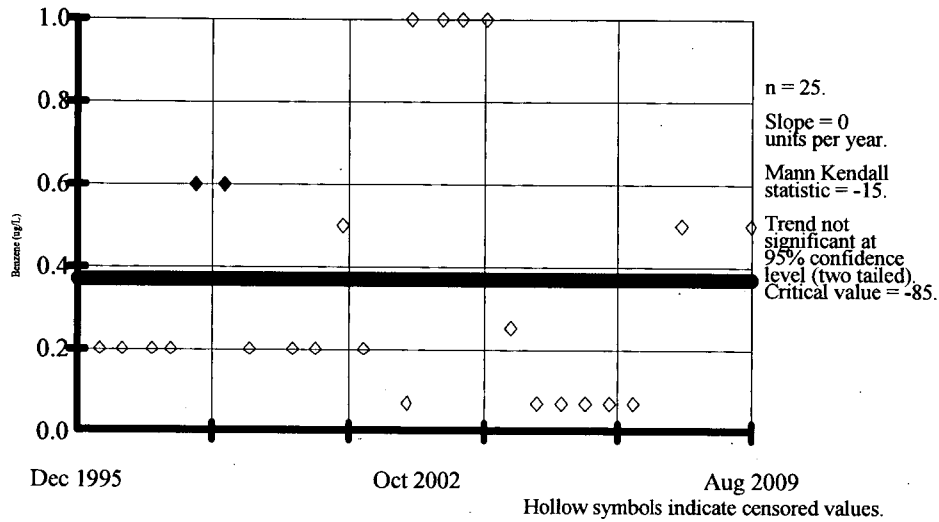
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



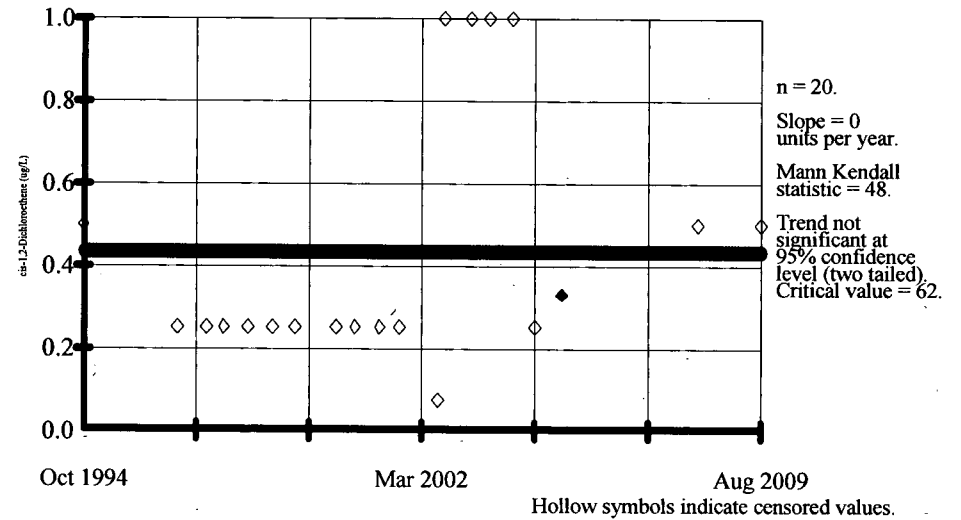
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



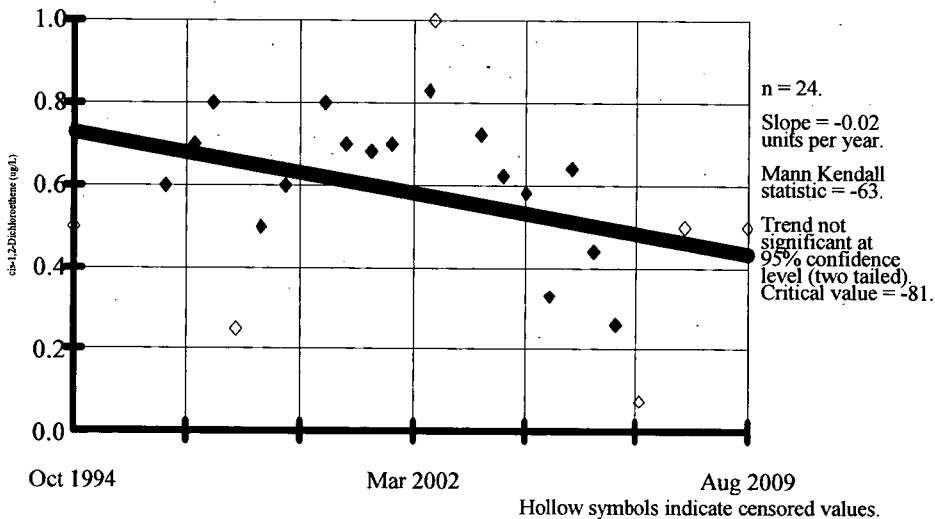
Constituent: Benzene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92303



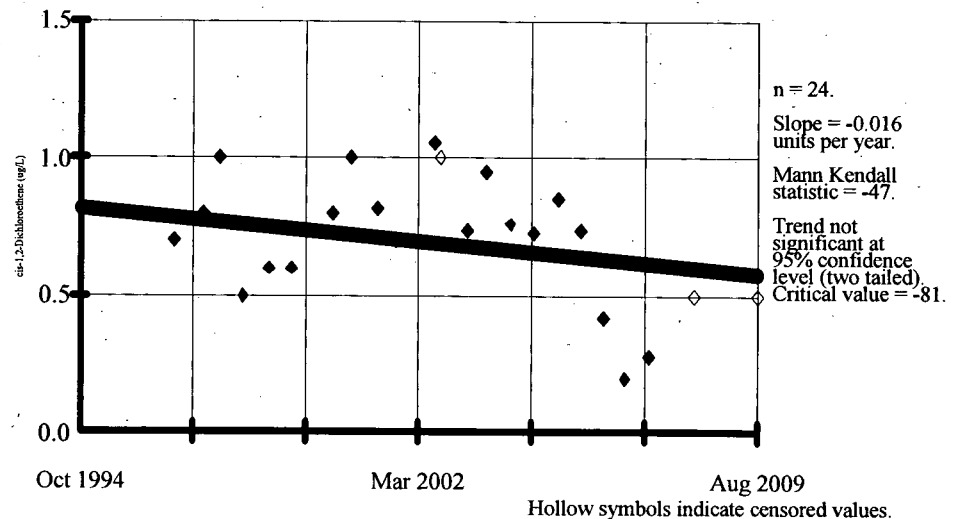
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:57 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92401



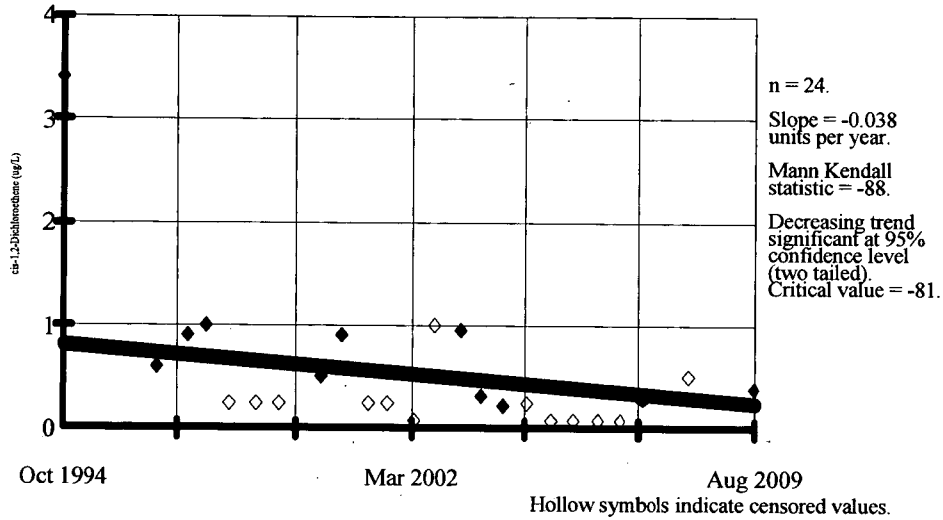
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92403



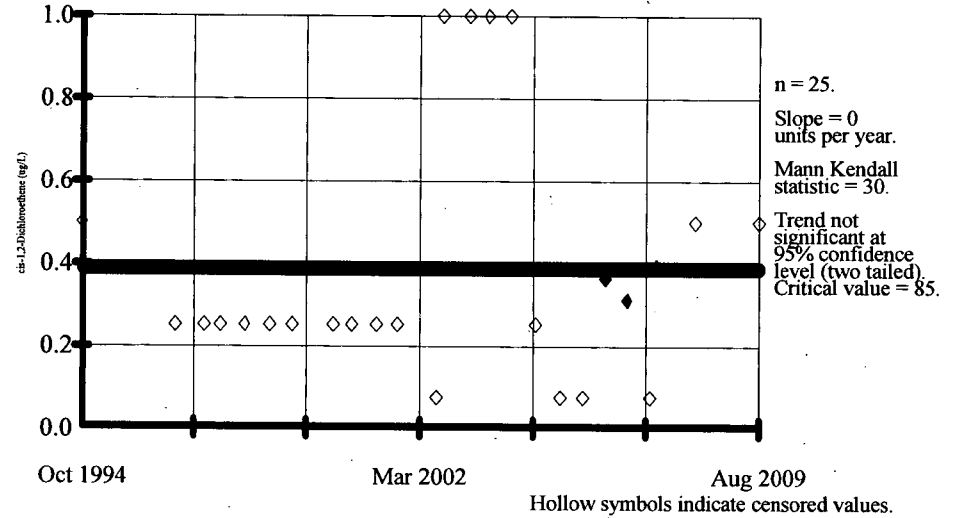
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



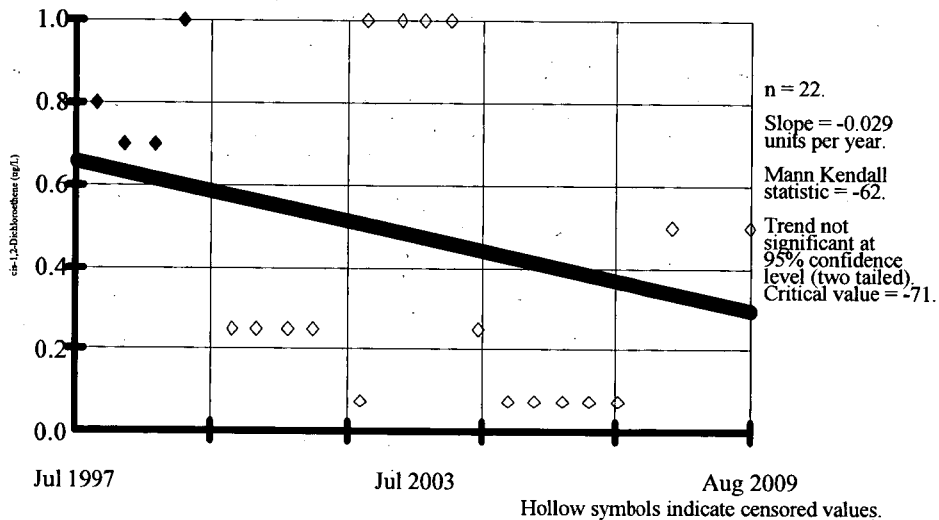
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



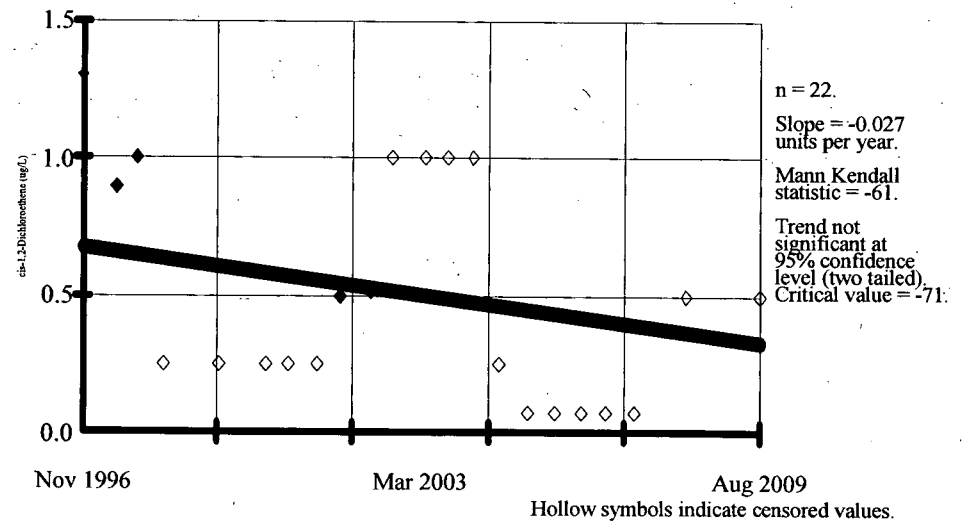
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



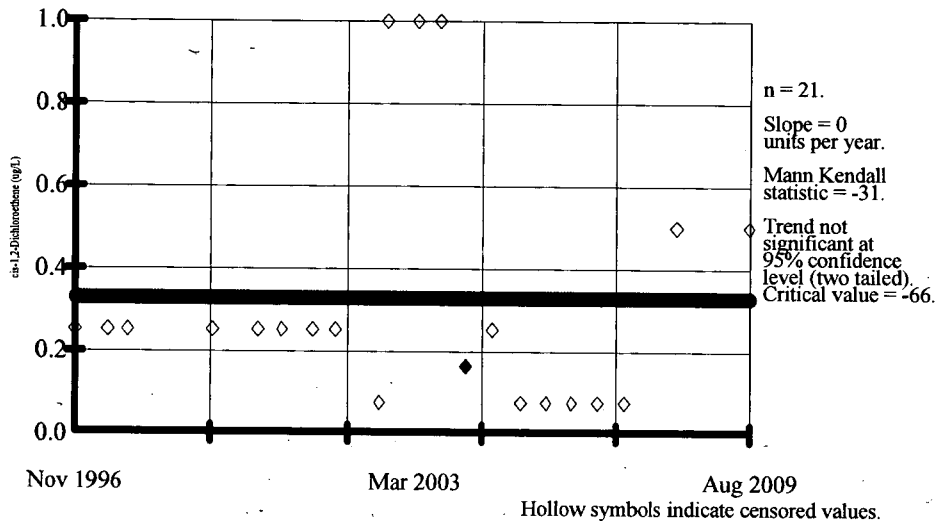
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A



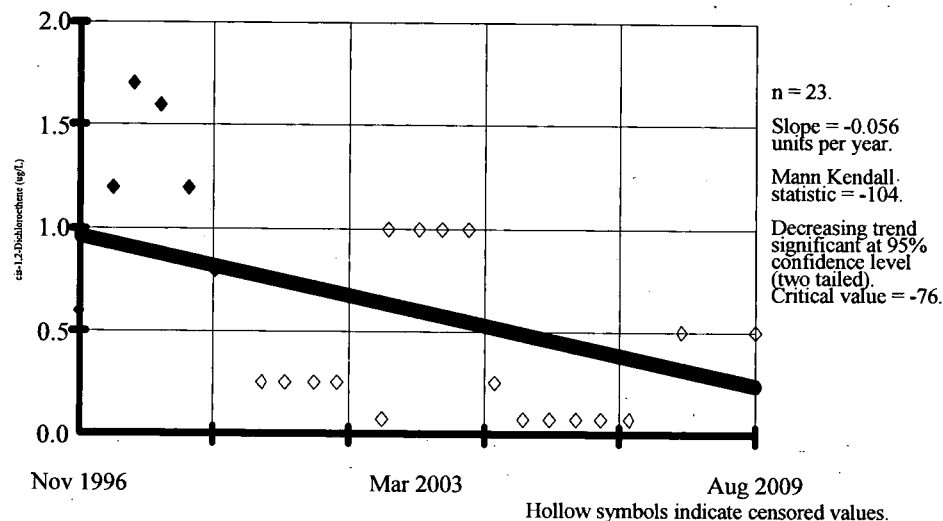
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



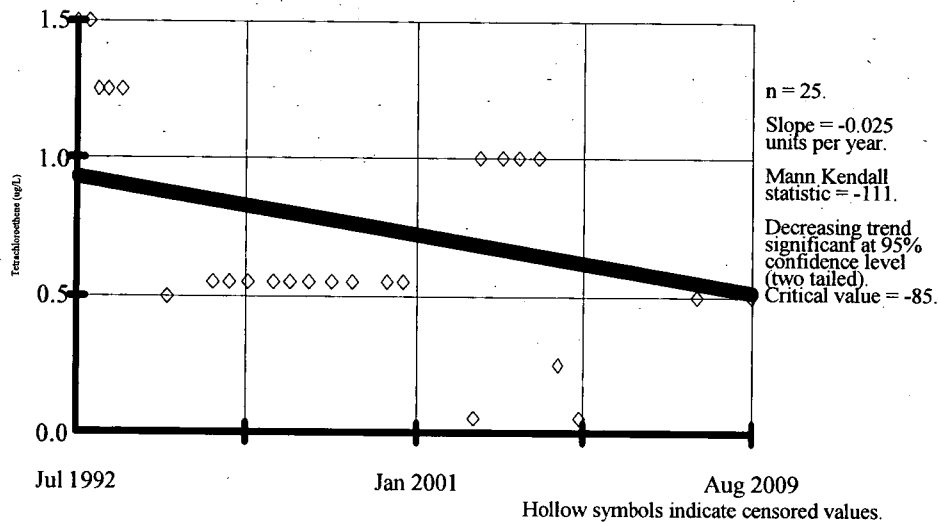
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



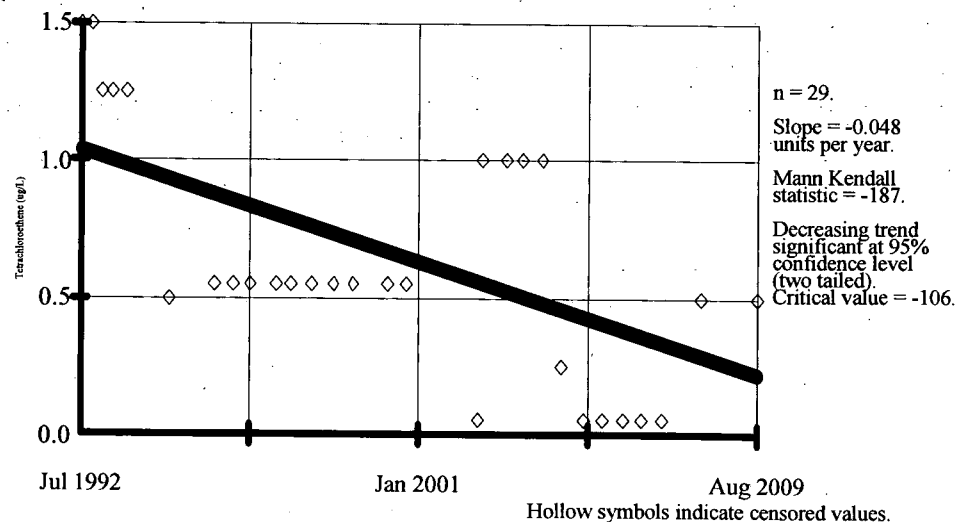
Constituent: cis-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92303



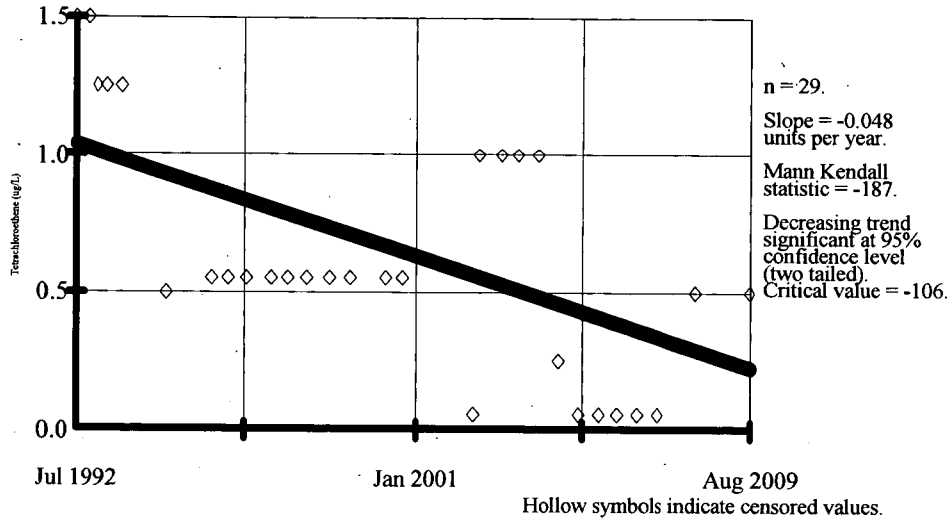
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92401



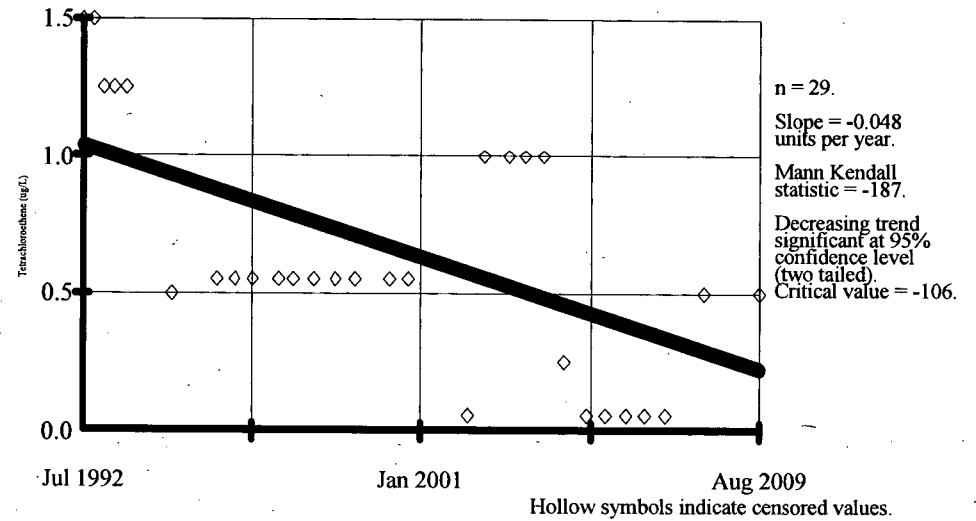
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92403



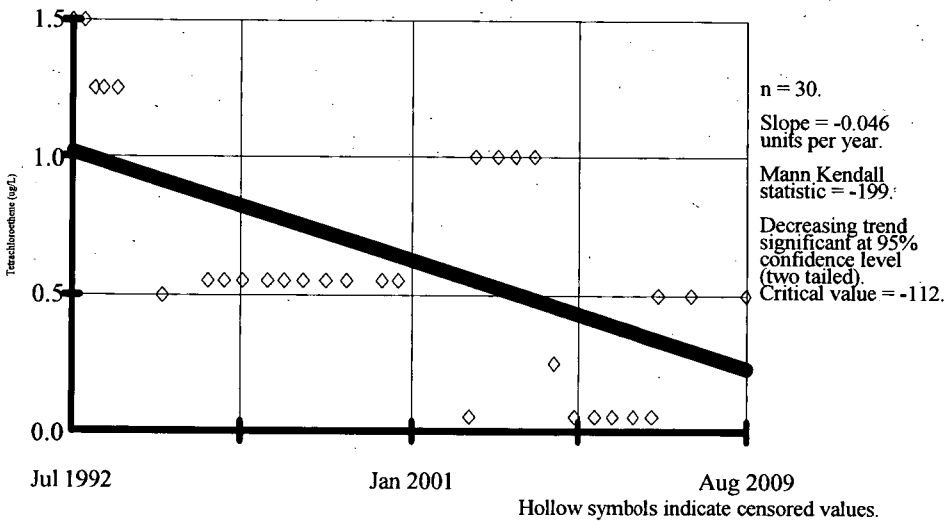
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



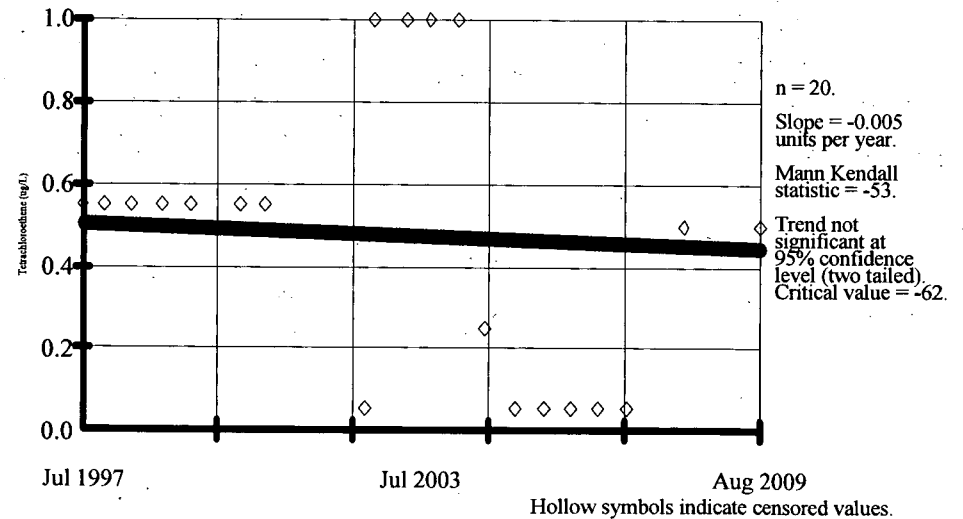
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:58 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



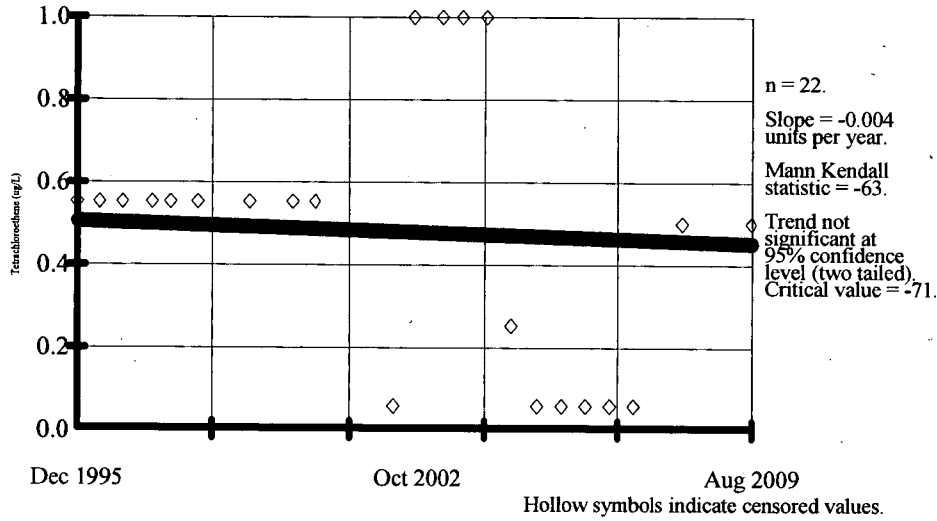
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



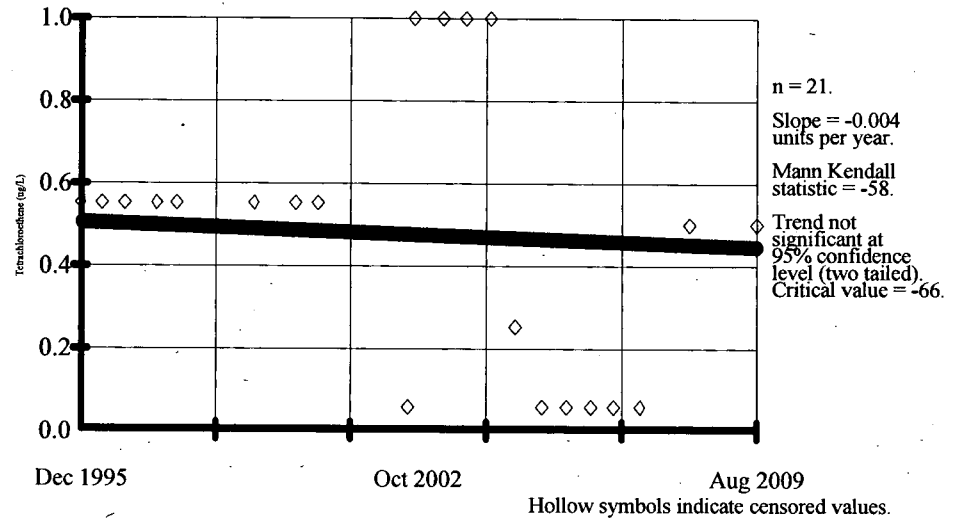
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A



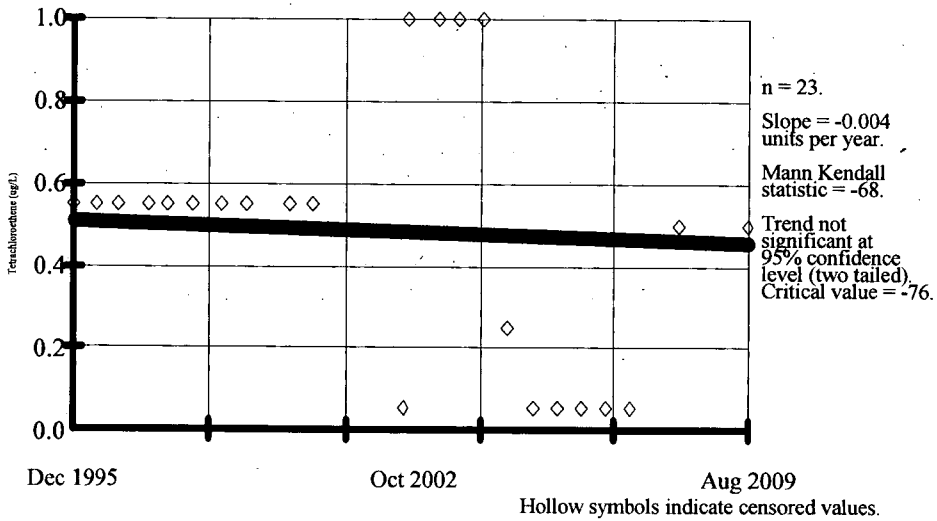
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



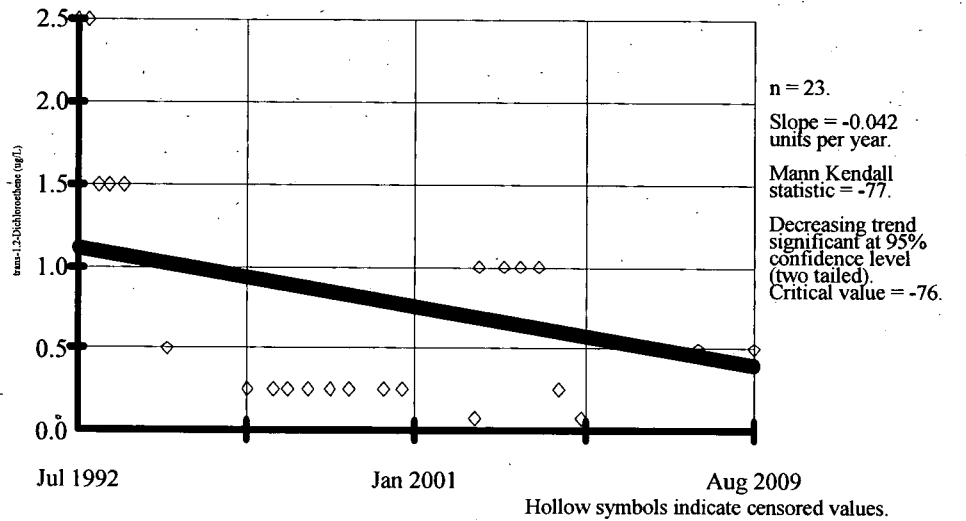
Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



Constituent: Tetrachloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

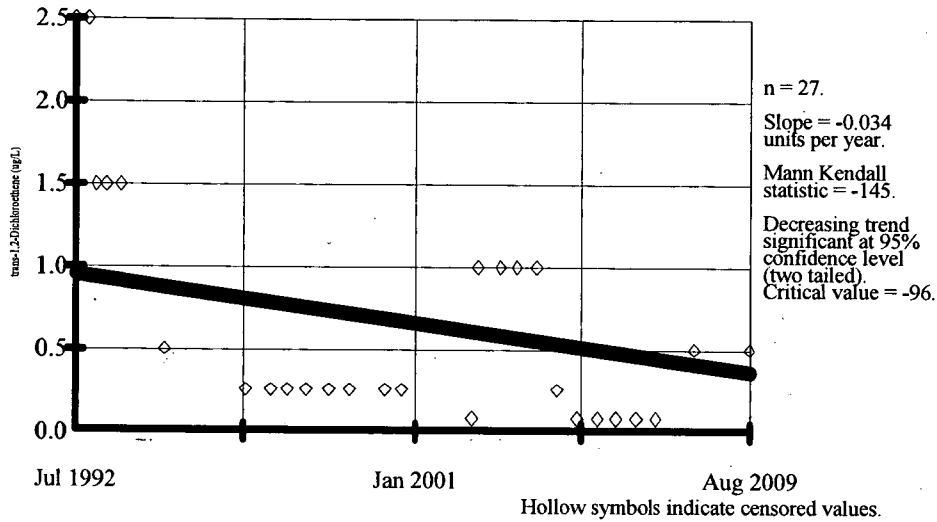
### SEN'S SLOPE ESTIMATOR SFL92303



Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

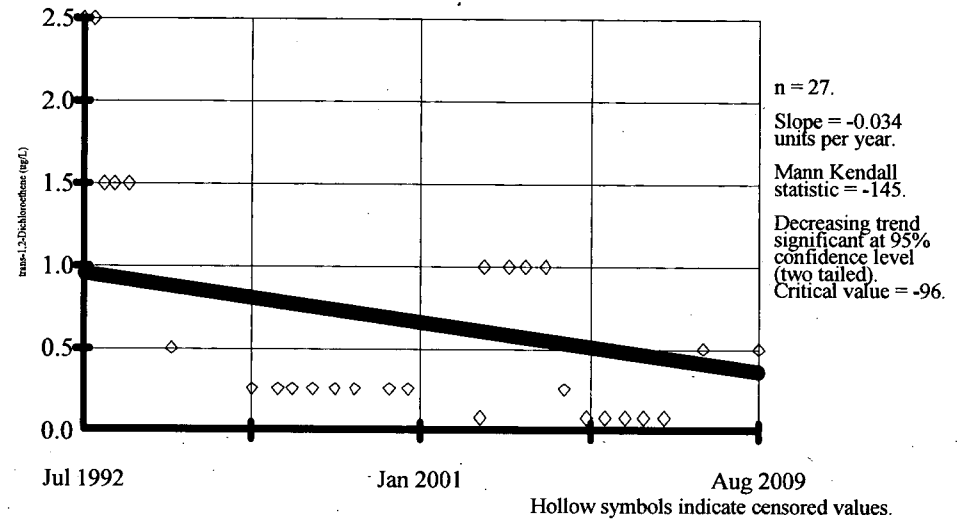


### SEN'S SLOPE ESTIMATOR SFL92401



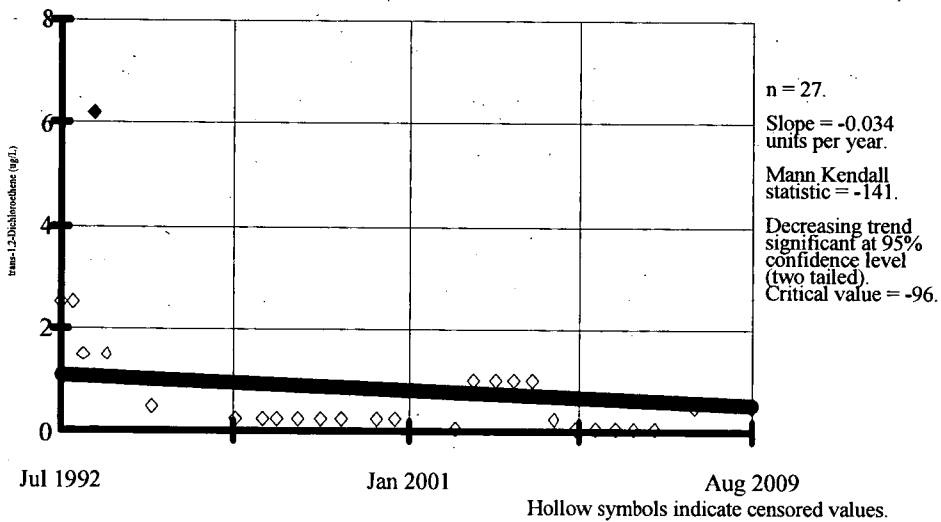
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92403



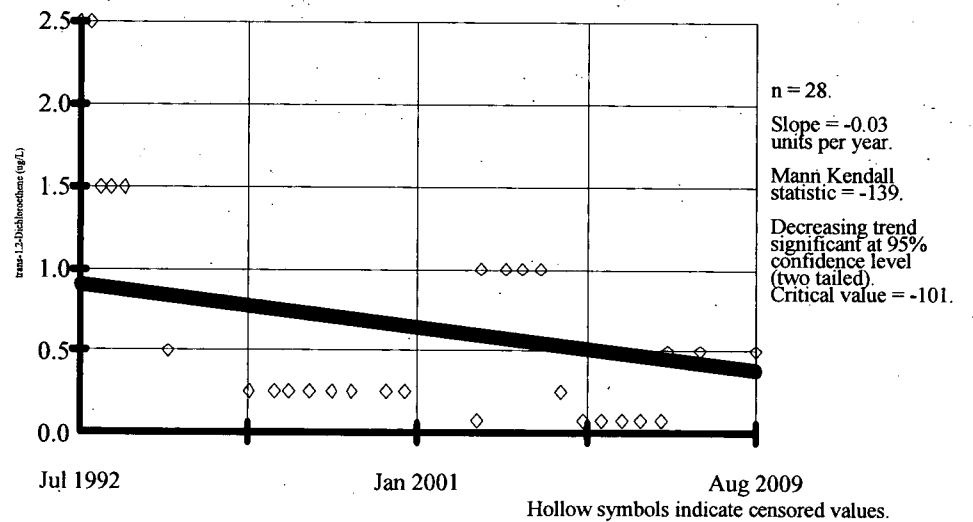
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



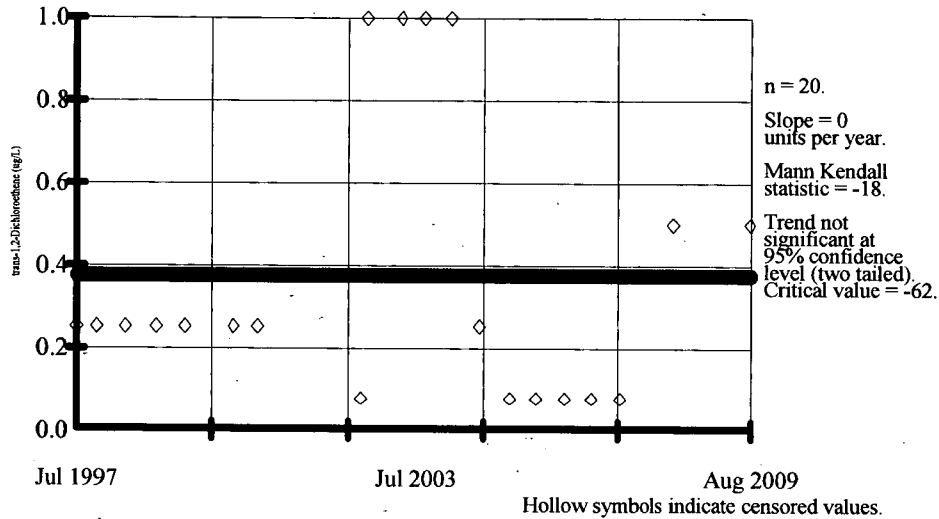
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



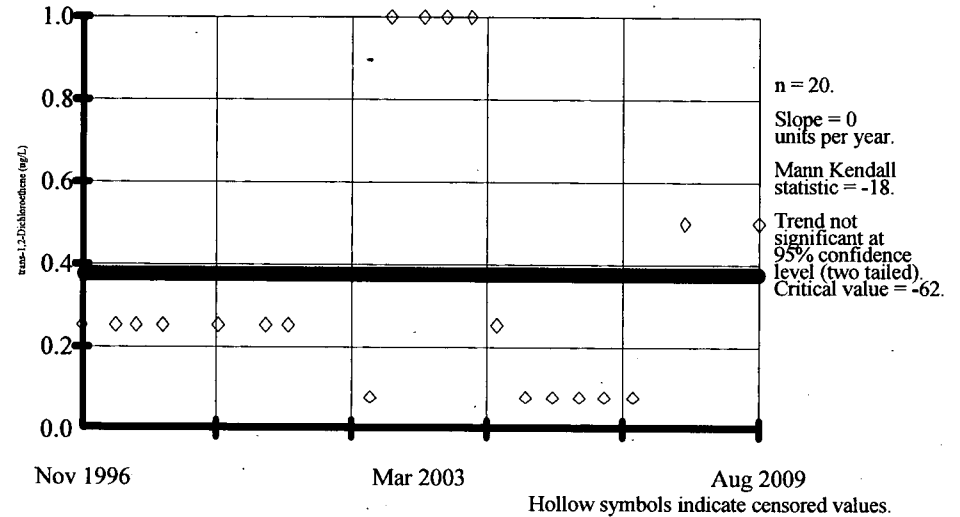
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



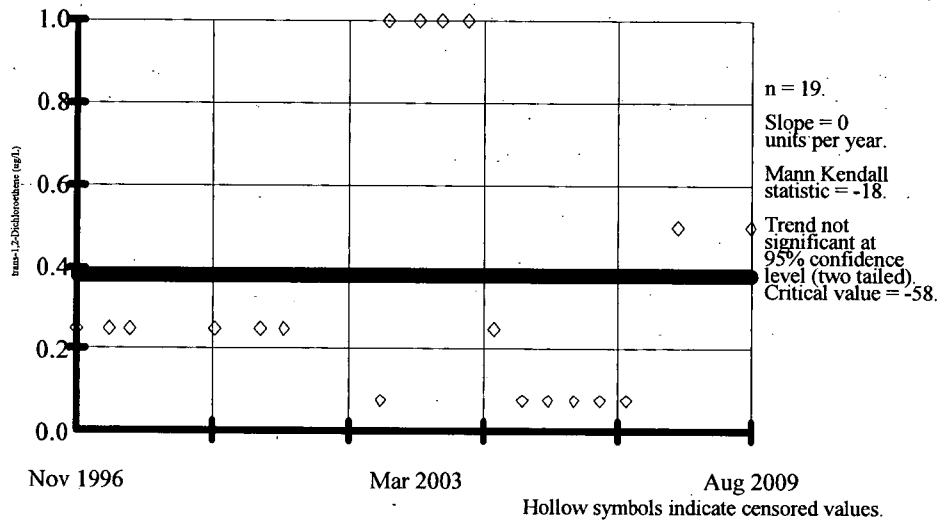
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 9:59 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A



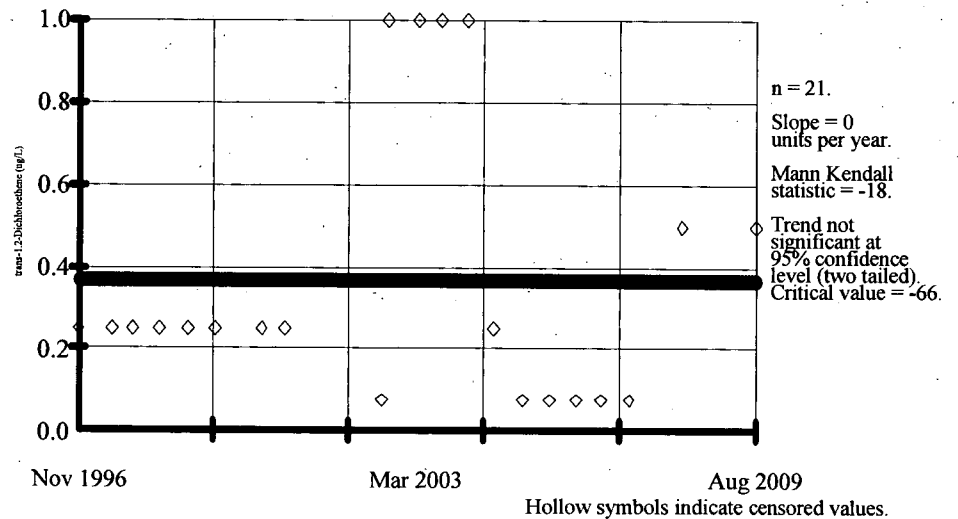
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



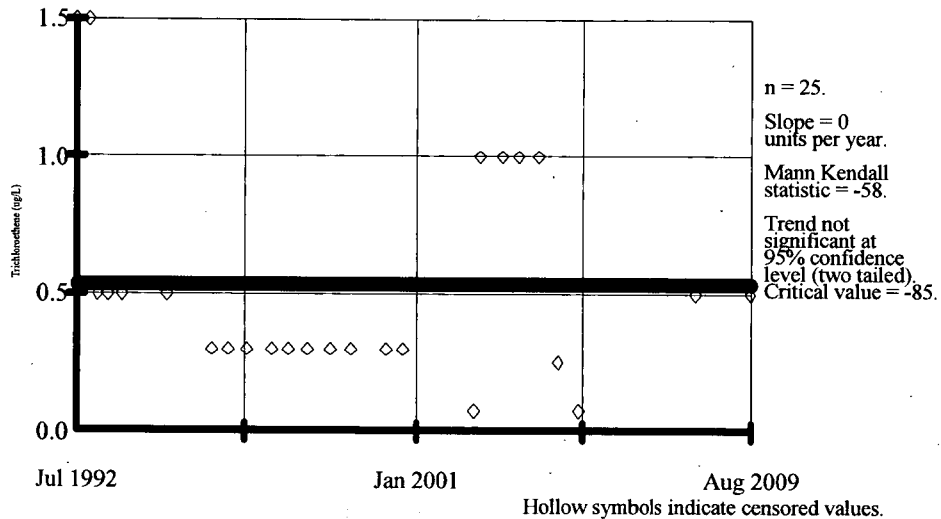
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



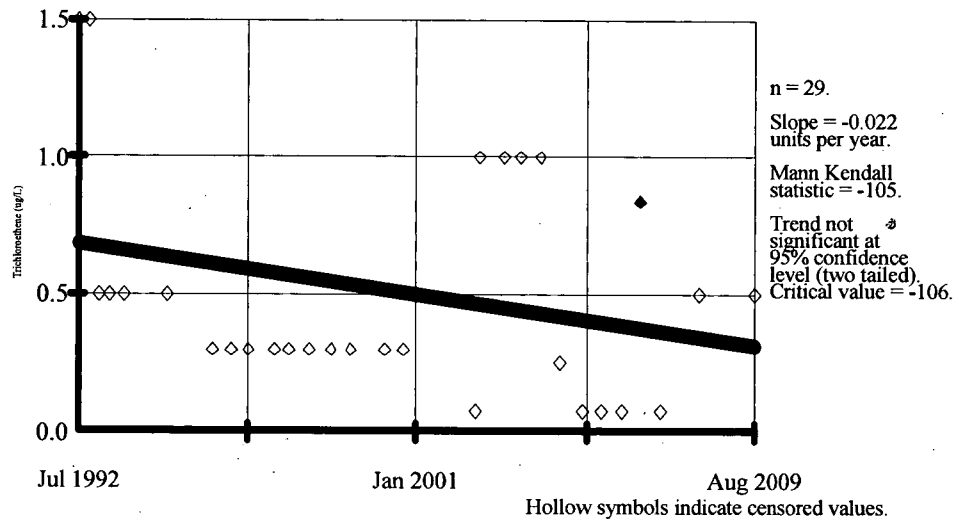
Constituent: trans-1,2-Dichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92303



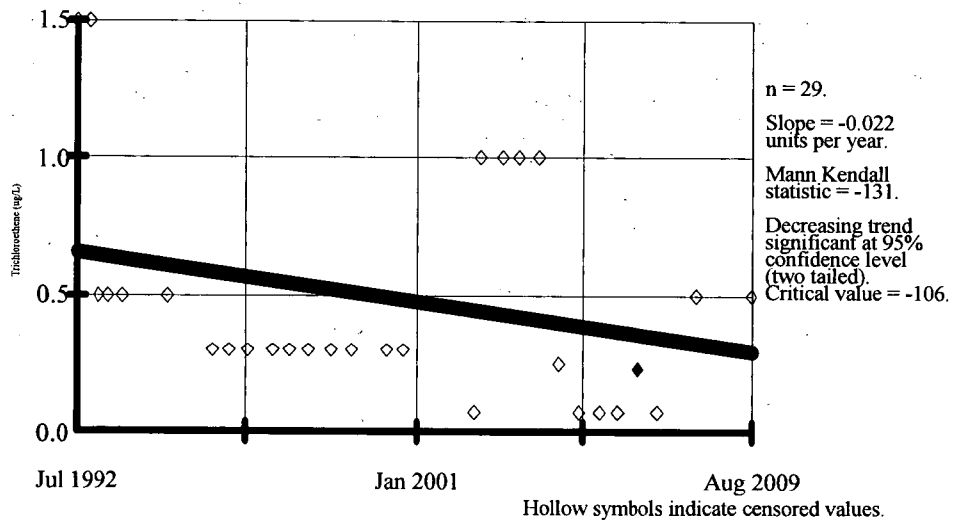
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92401



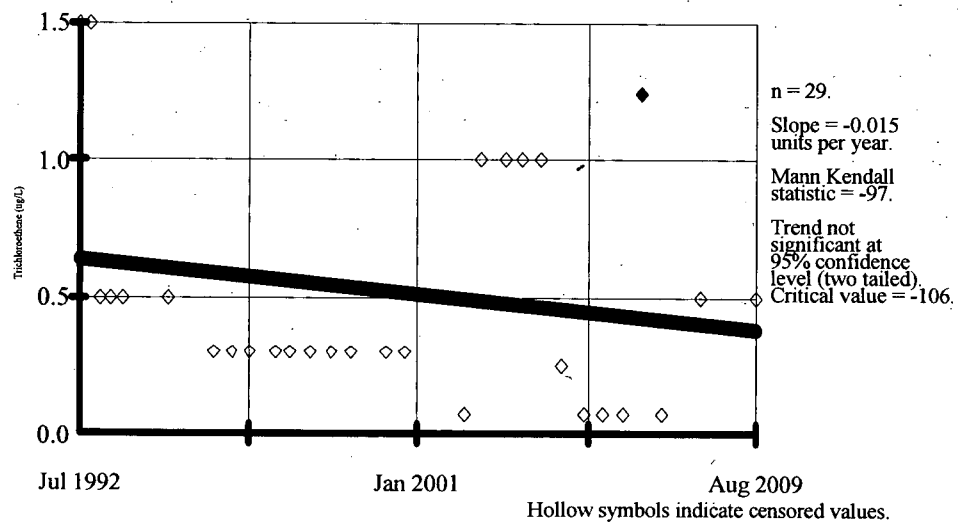
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92403



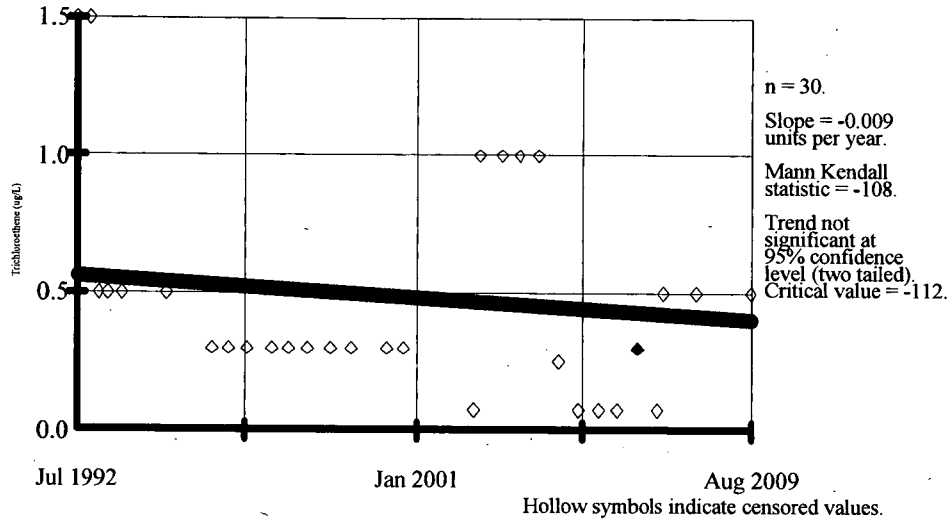
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



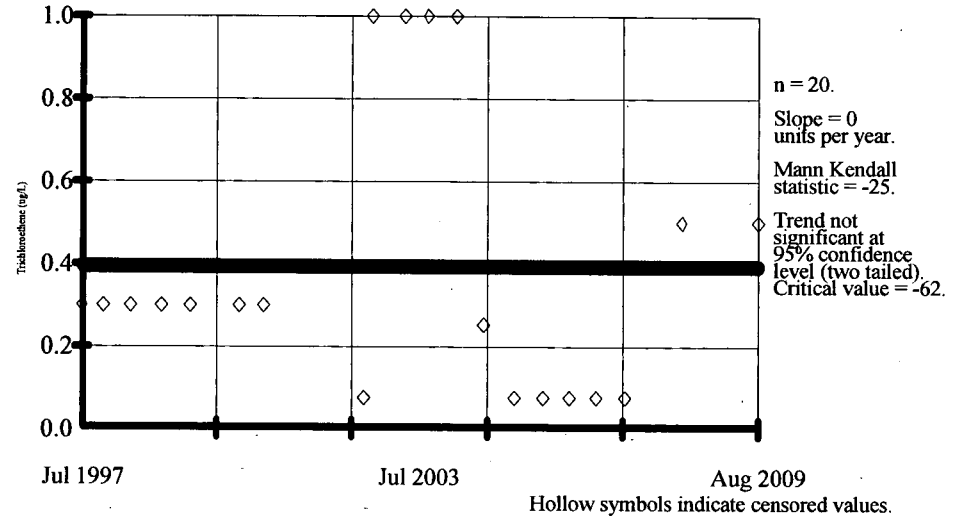
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



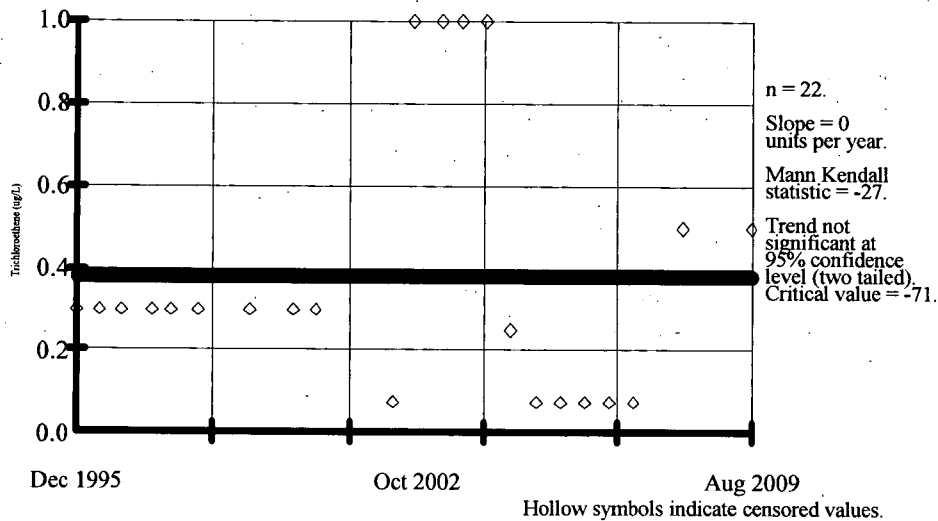
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



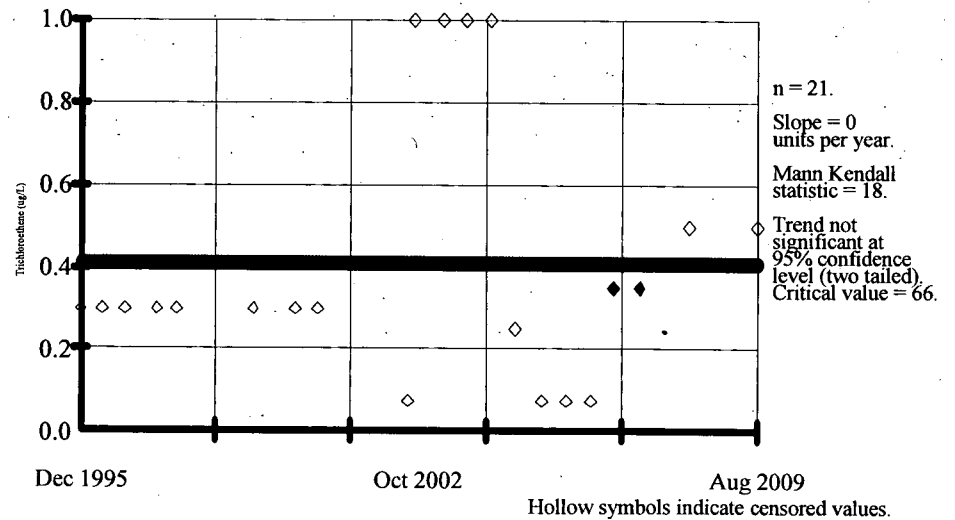
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A



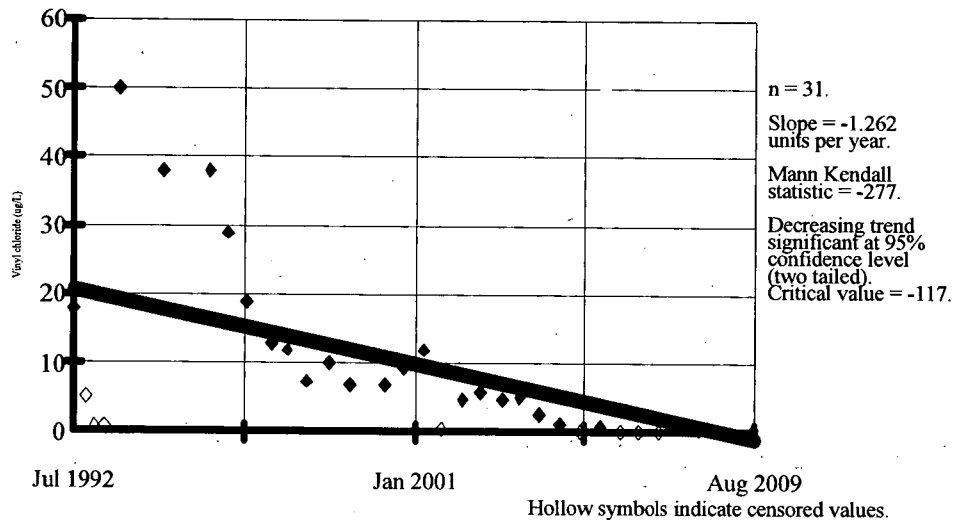
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Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



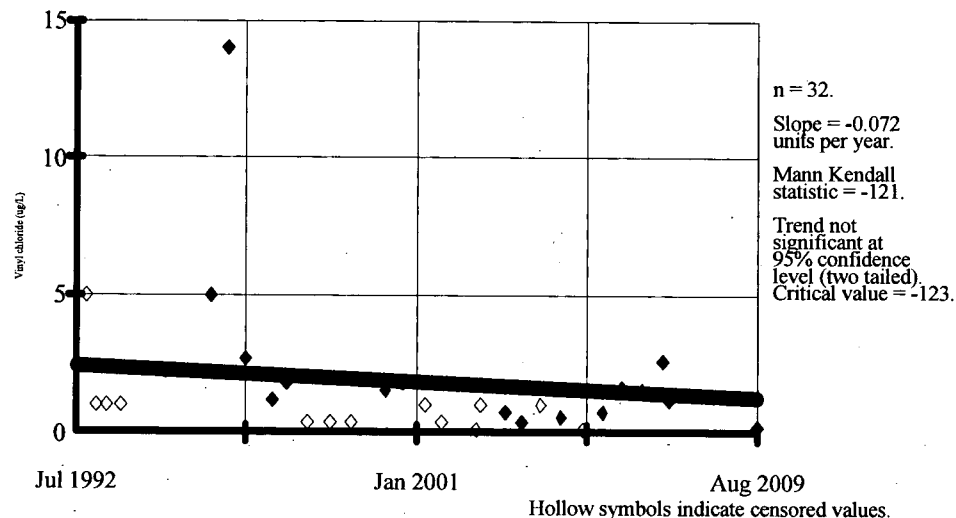
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92601



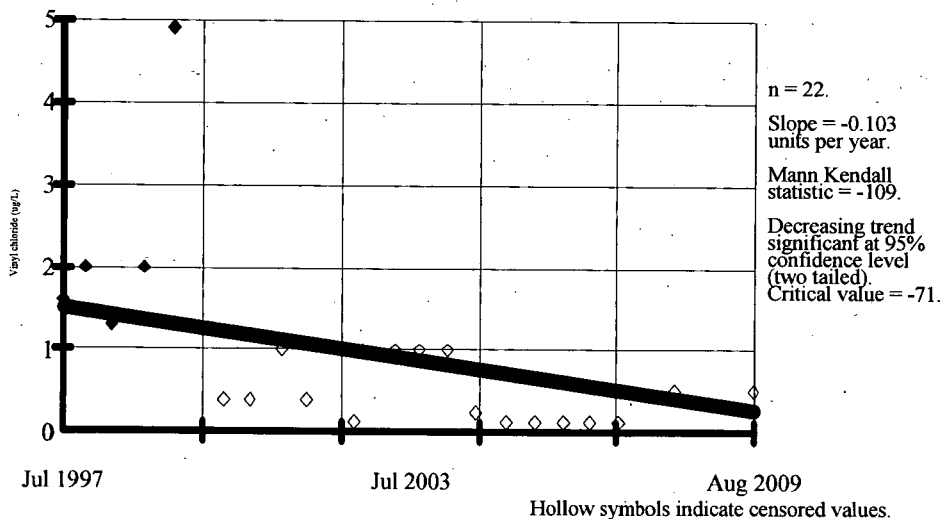
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92603



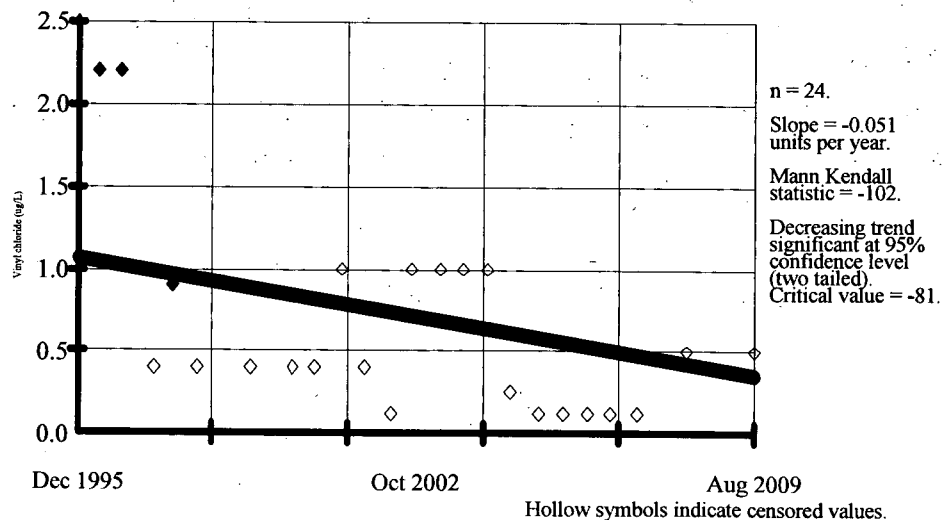
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL97903



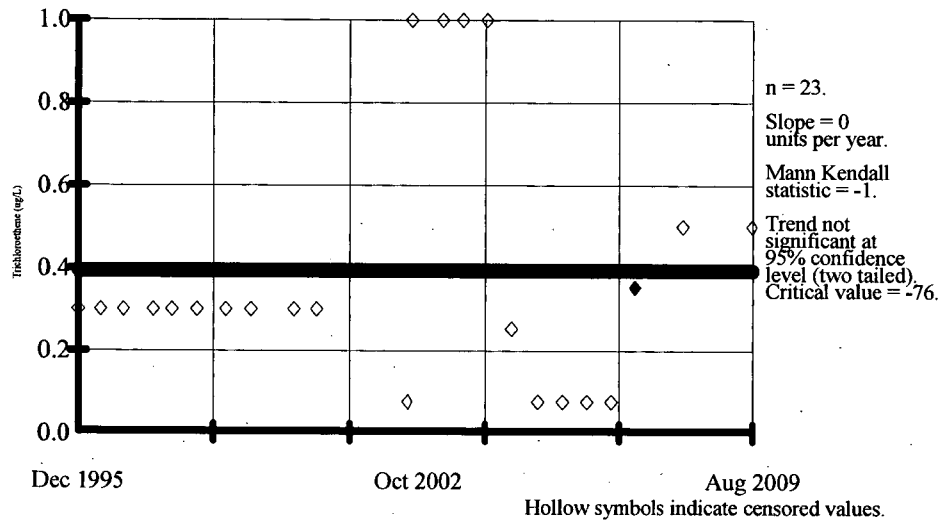
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9402A

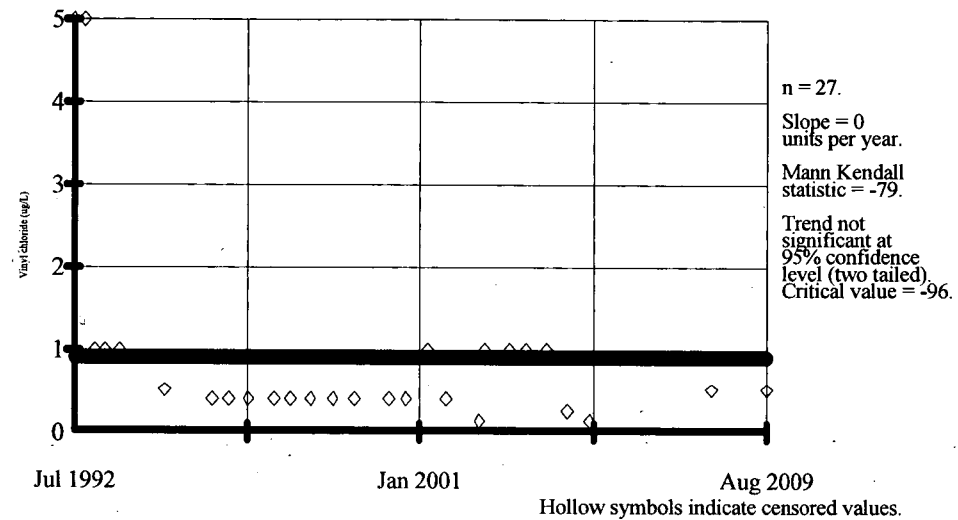


Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



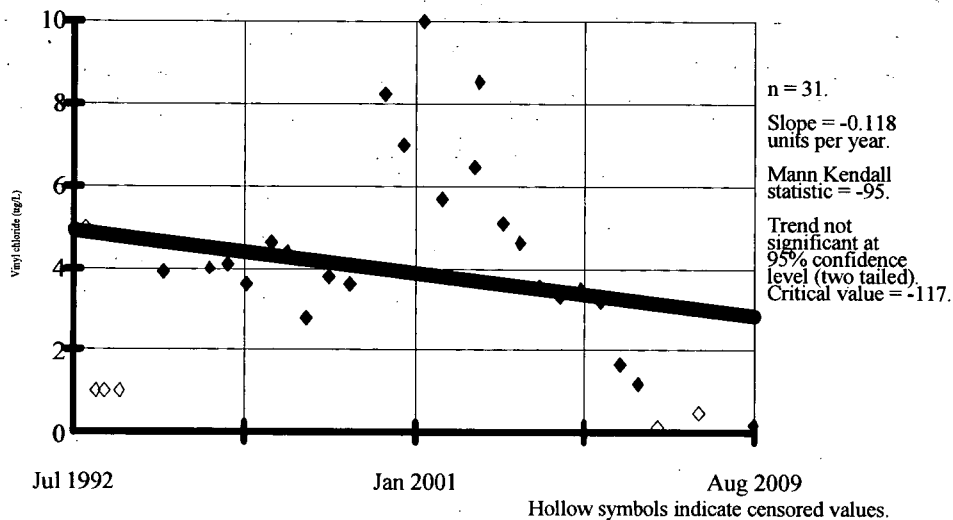
### SEN'S SLOPE ESTIMATOR SFL92303



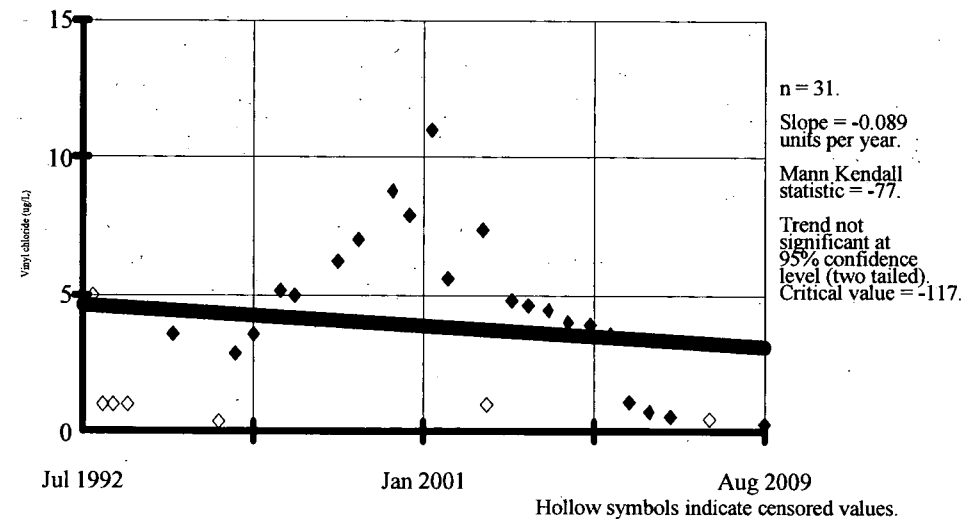
Constituent: Trichloroethene (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:00 AM Client: CTI and Associates View: Batch

Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL92401



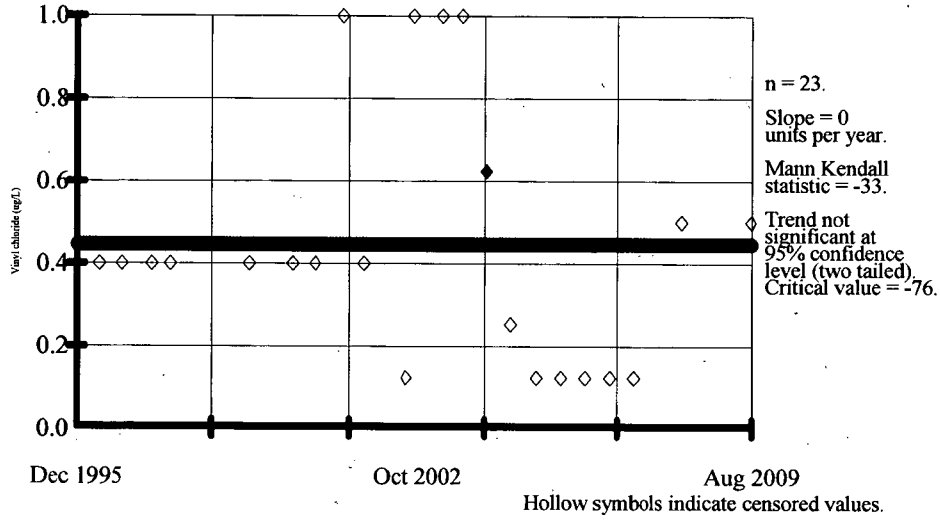
### SEN'S SLOPE ESTIMATOR SFL92403



Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

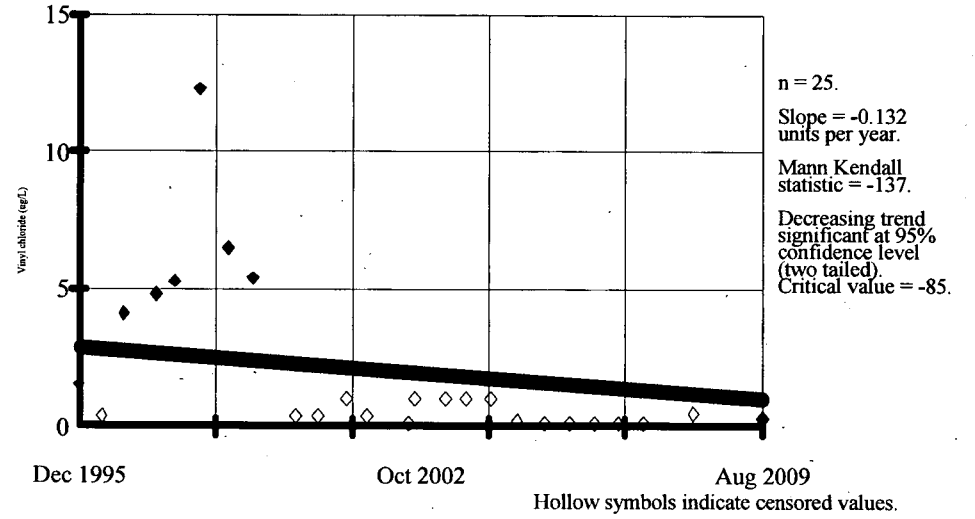
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9403A



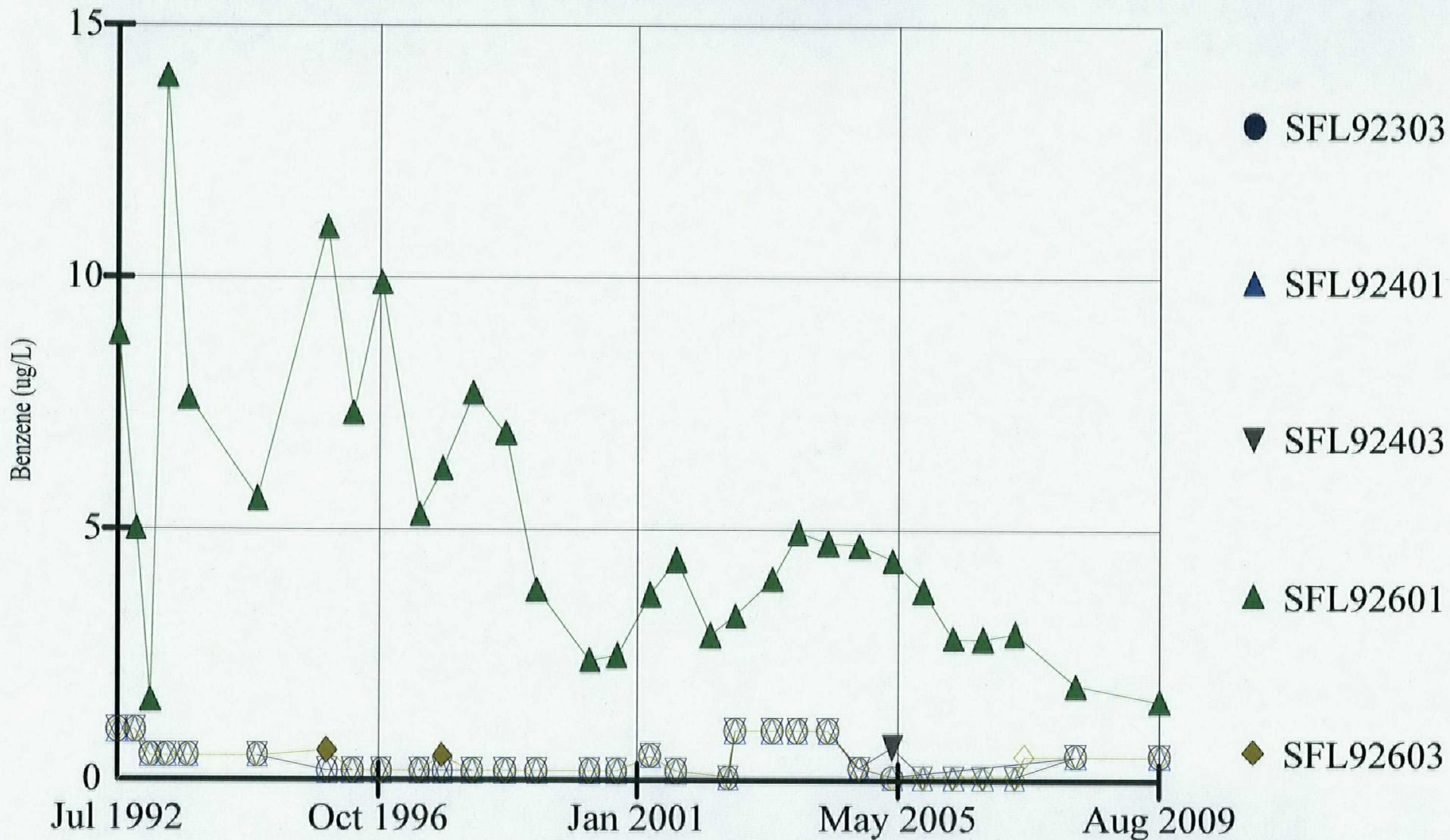
Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

### SEN'S SLOPE ESTIMATOR SFL9404B



Constituent: Vinyl chloride (ug/L) Facility: SW Funston LF Data File: SWFunston Sanitas-Sep09  
Date: 9/19/09, 10:01 AM Client: CTI and Associates View: Batch

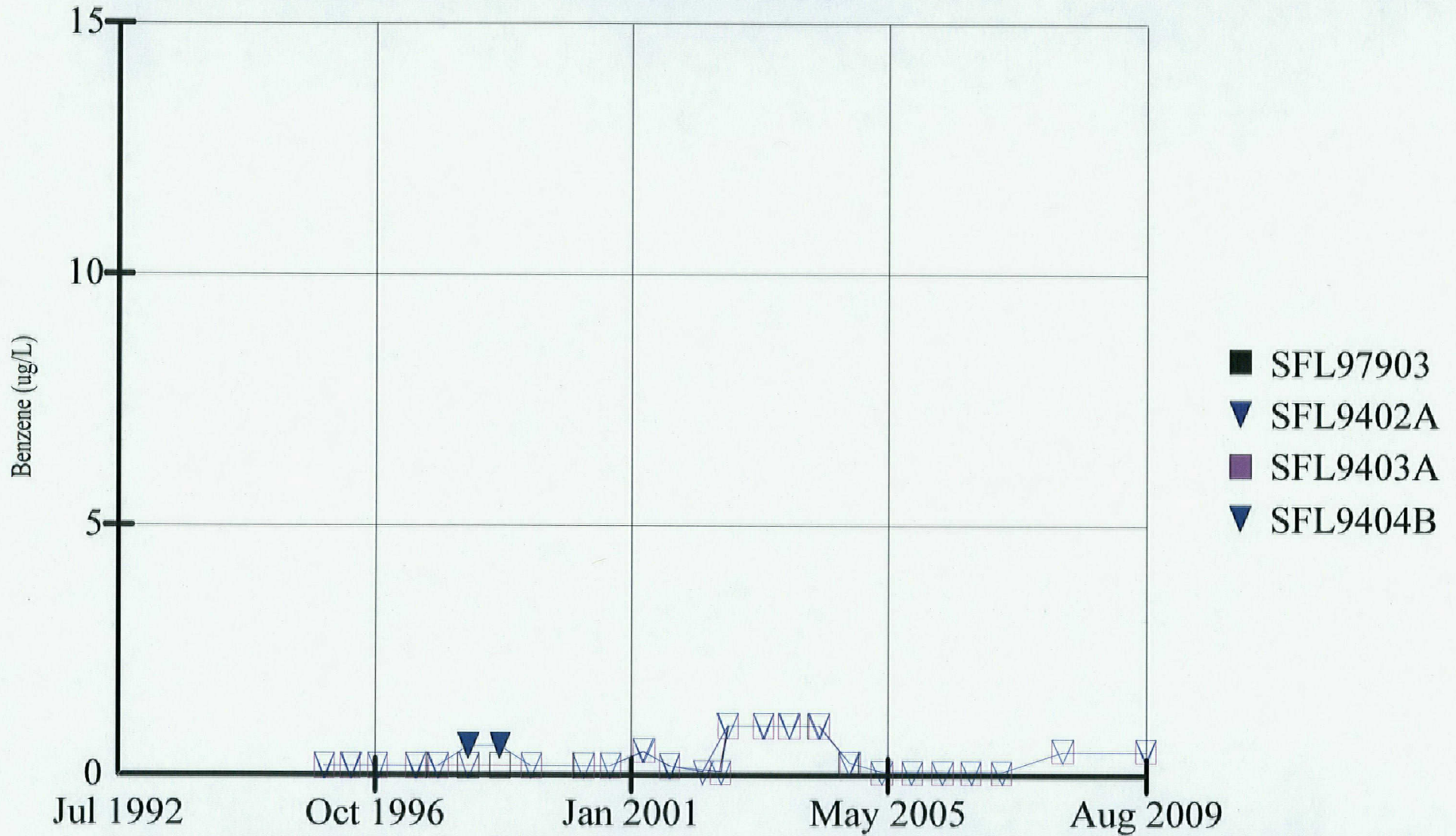
# TIME SERIES



Hollow symbols indicate censored values.



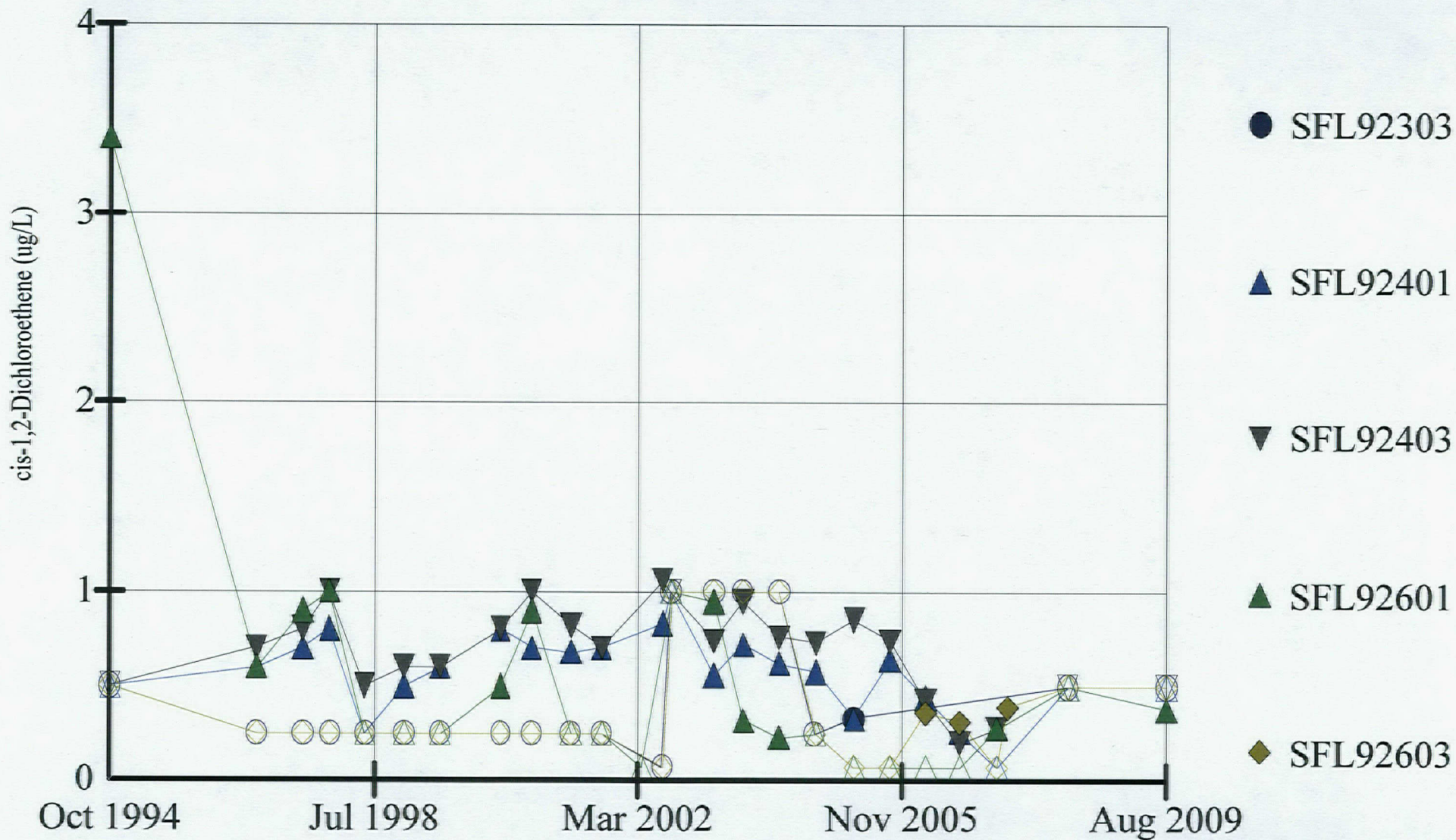
# TIME SERIES



Hollow symbols indicate censored values.



# TIME SERIES



Hollow symbols indicate censored values.

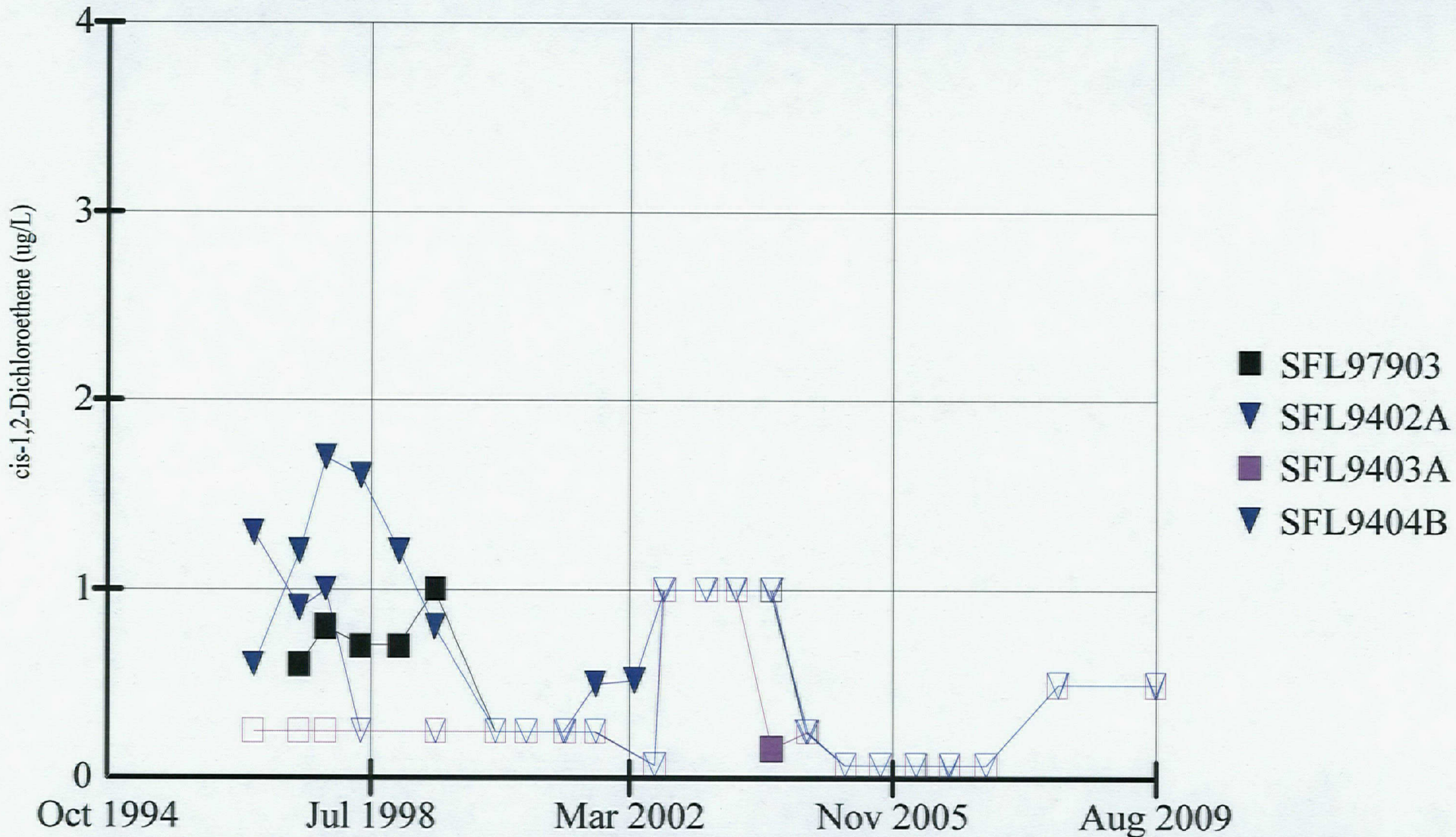
Constituent: cis-1,2-Dichloroethene (ug/L)  
Date: 9/19/09, 9:27 AM

Facility: SW Funston LF  
Client: CTI and Associates

Data File: SWFunston Sanitas-Sep09  
View: Batch



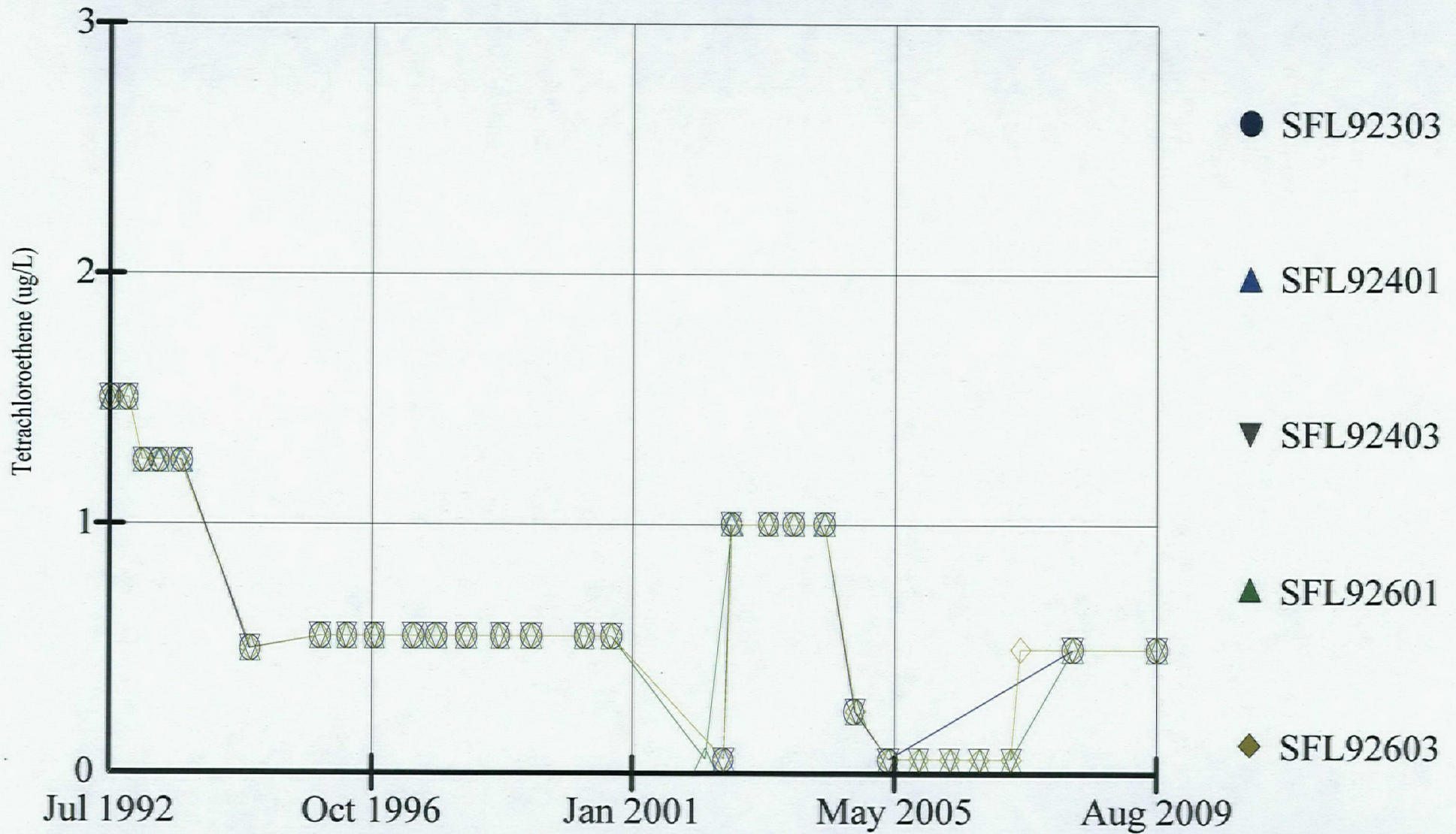
# TIME SERIES



Hollow symbols indicate censored values.



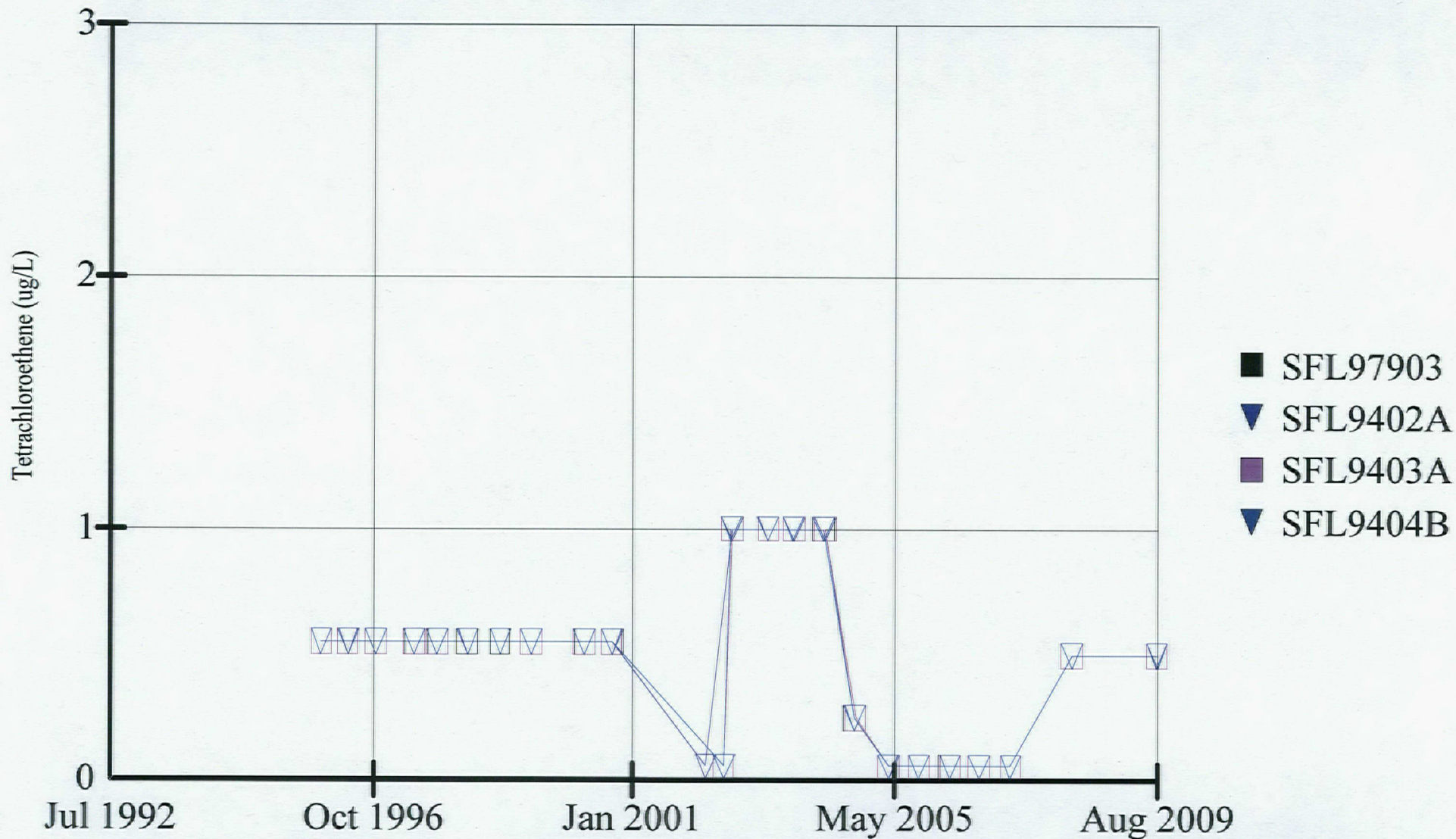
# TIME SERIES



Hollow symbols indicate censored values.



# TIME SERIES



Hollow symbols indicate censored values.

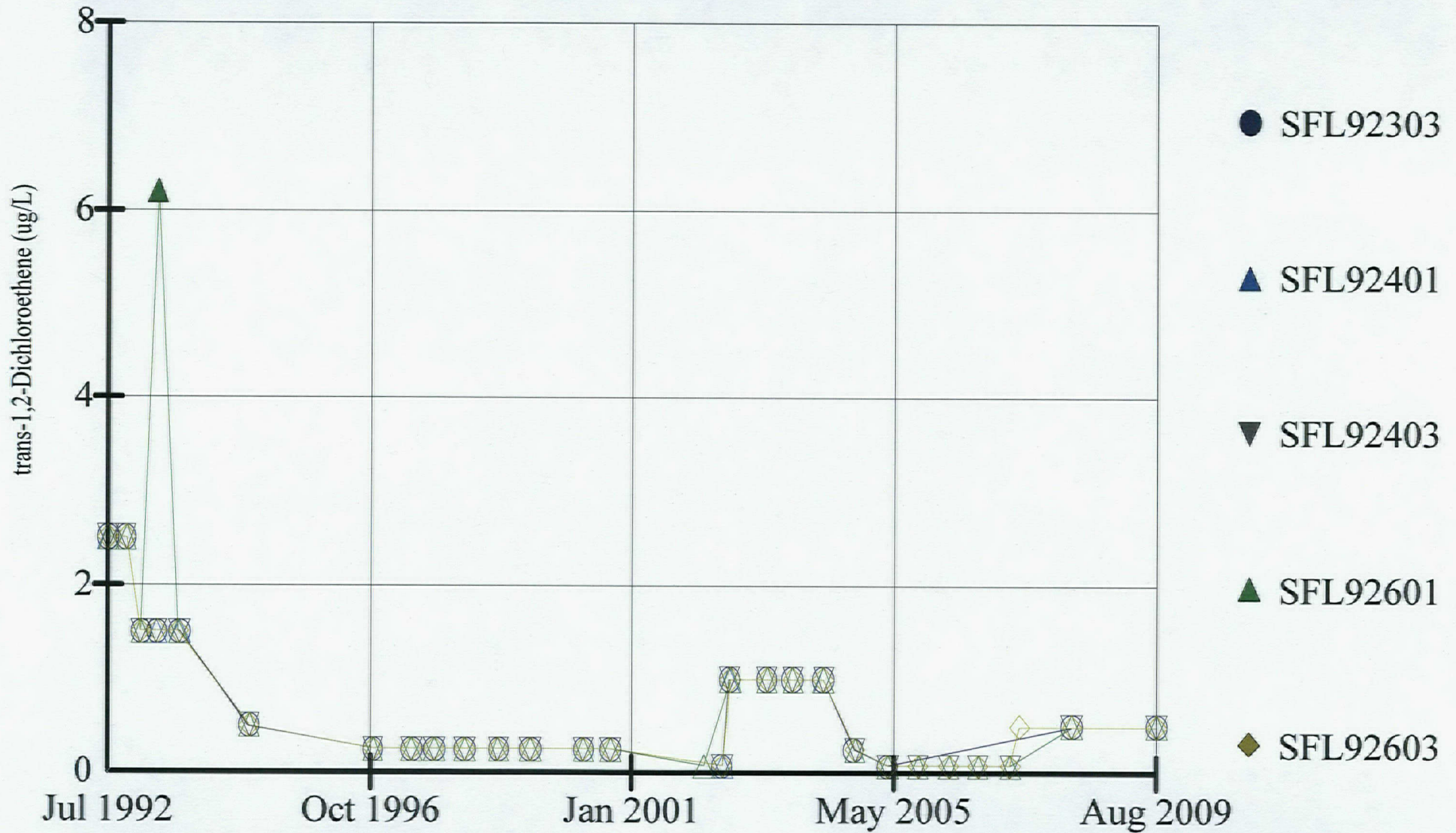
Constituent: Tetrachloroethene (ug/L)  
Date: 9/19/09, 9:27 AM

Facility: SW Funston LF  
Client: CTI and Associates

Data File: SWFunston Sanitas-Sep09  
View: Batch



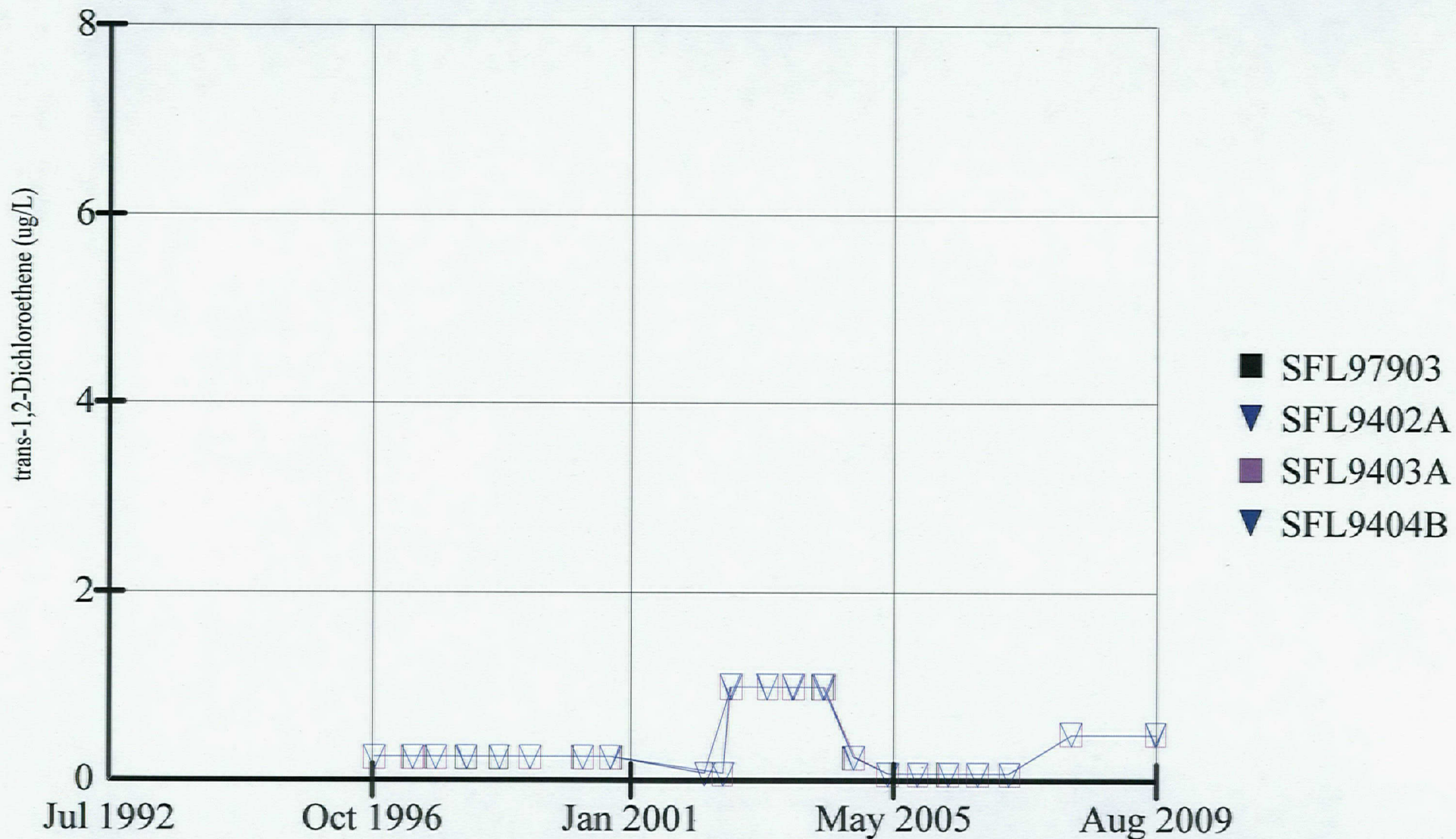
# TIME SERIES



Hollow symbols indicate censored values.



# TIME SERIES



Hollow symbols indicate censored values.

Constituent: trans-1,2-Dichloroethene (ug/L)

Date: 9/19/09, 9:27 AM

Facility: SW Funston LF

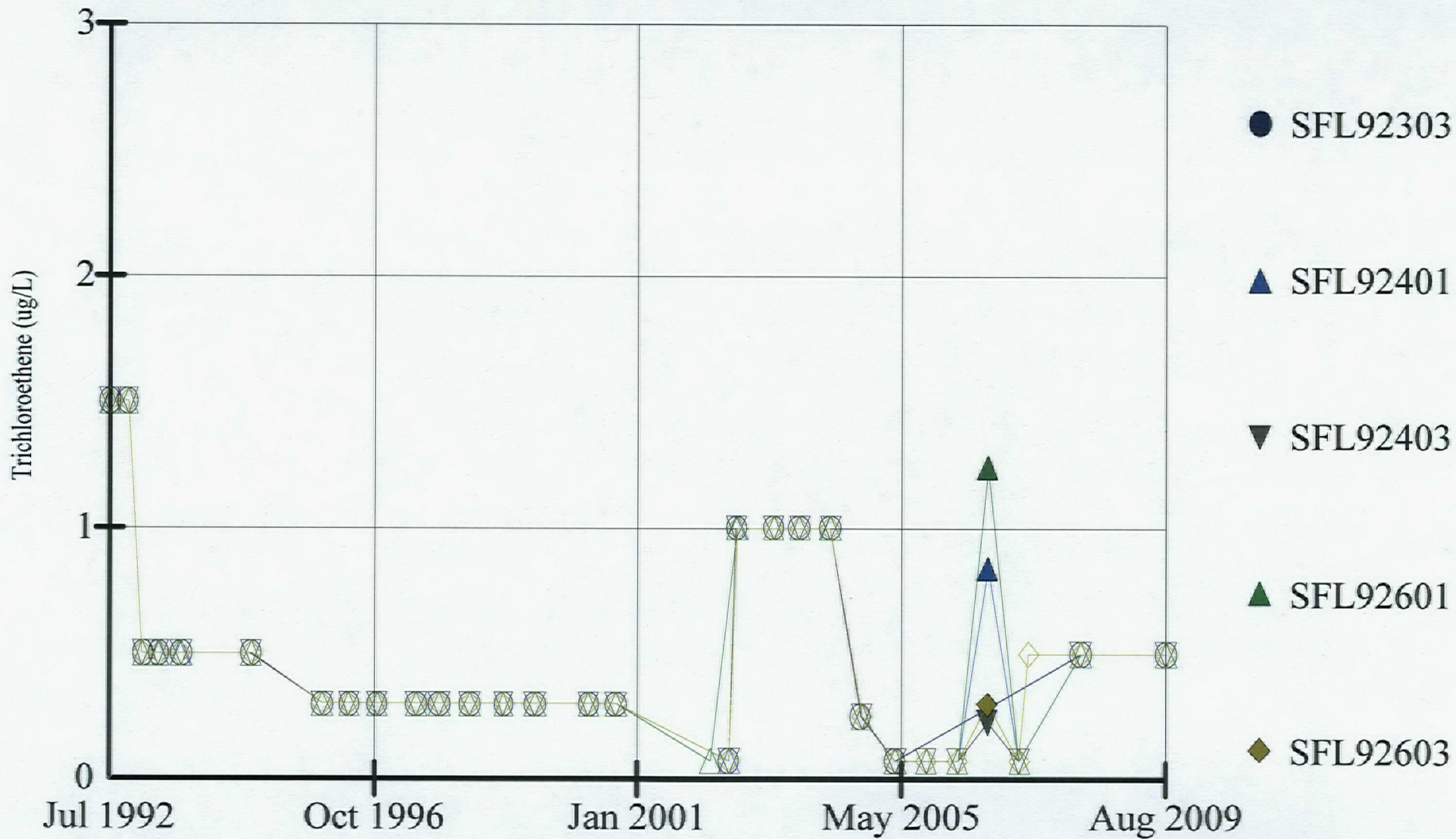
Client: CTI and Associates

Data File: SWFunston Sanitas-Sep09

View: Batch



# TIME SERIES



Hollow symbols indicate censored values.

Constituent: Trichloroethene (ug/L)

Facility: SW Funston LF

Data File: SWFunston Sanitas-Sep09

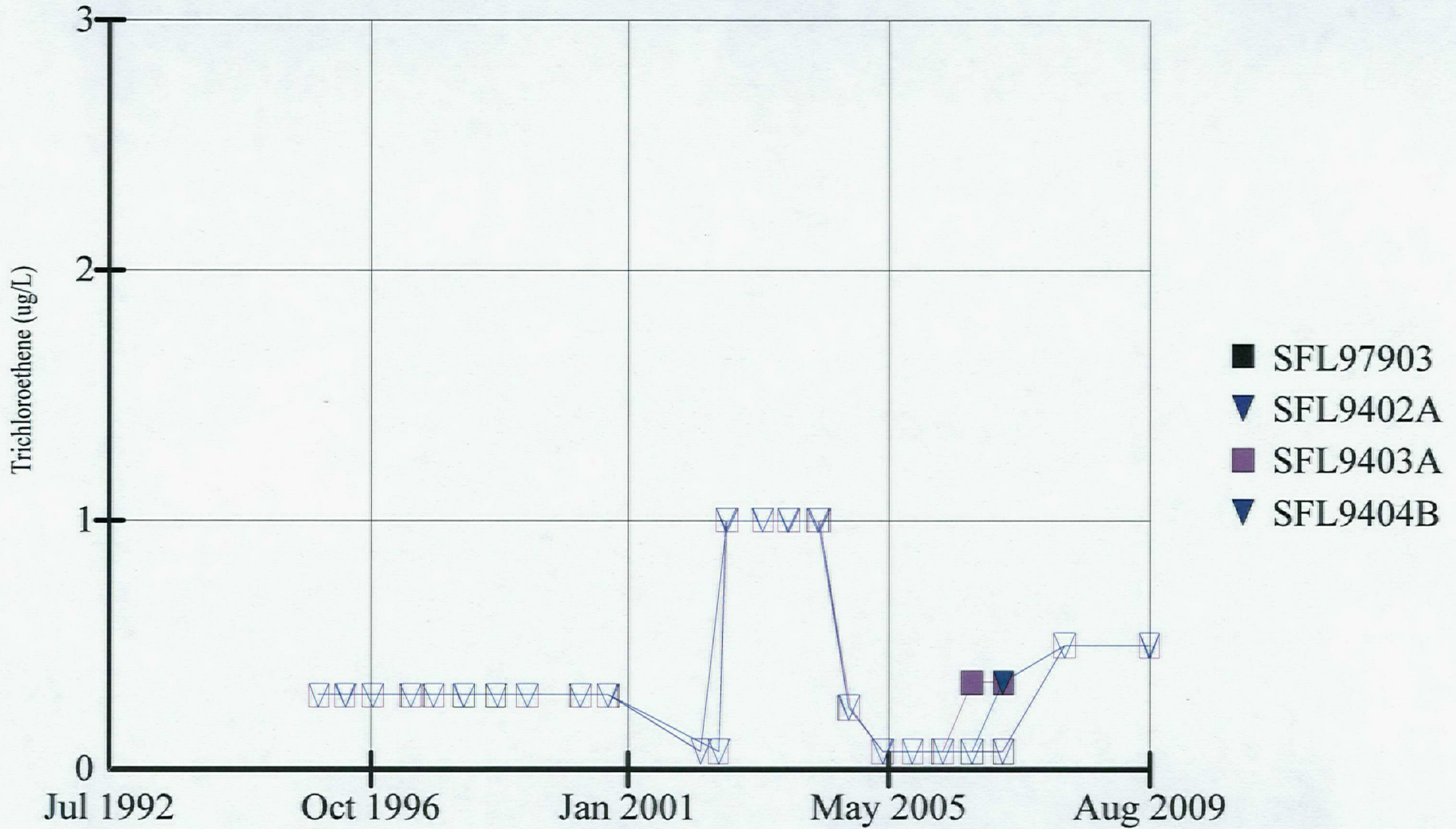
Date: 9/19/09, 9:27 AM

Client: CTI and Associates

View: \_Batch\_



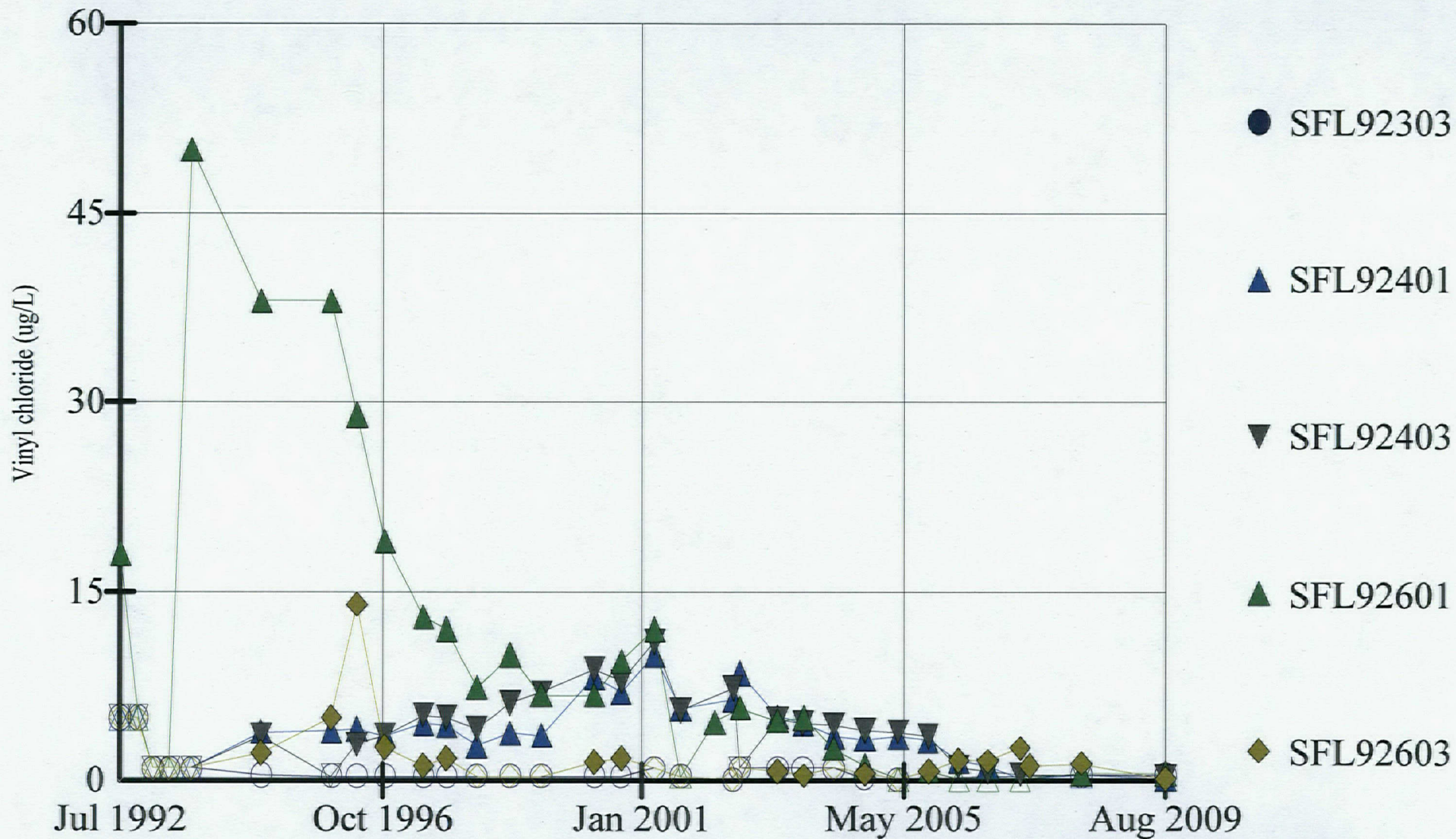
# TIME SERIES



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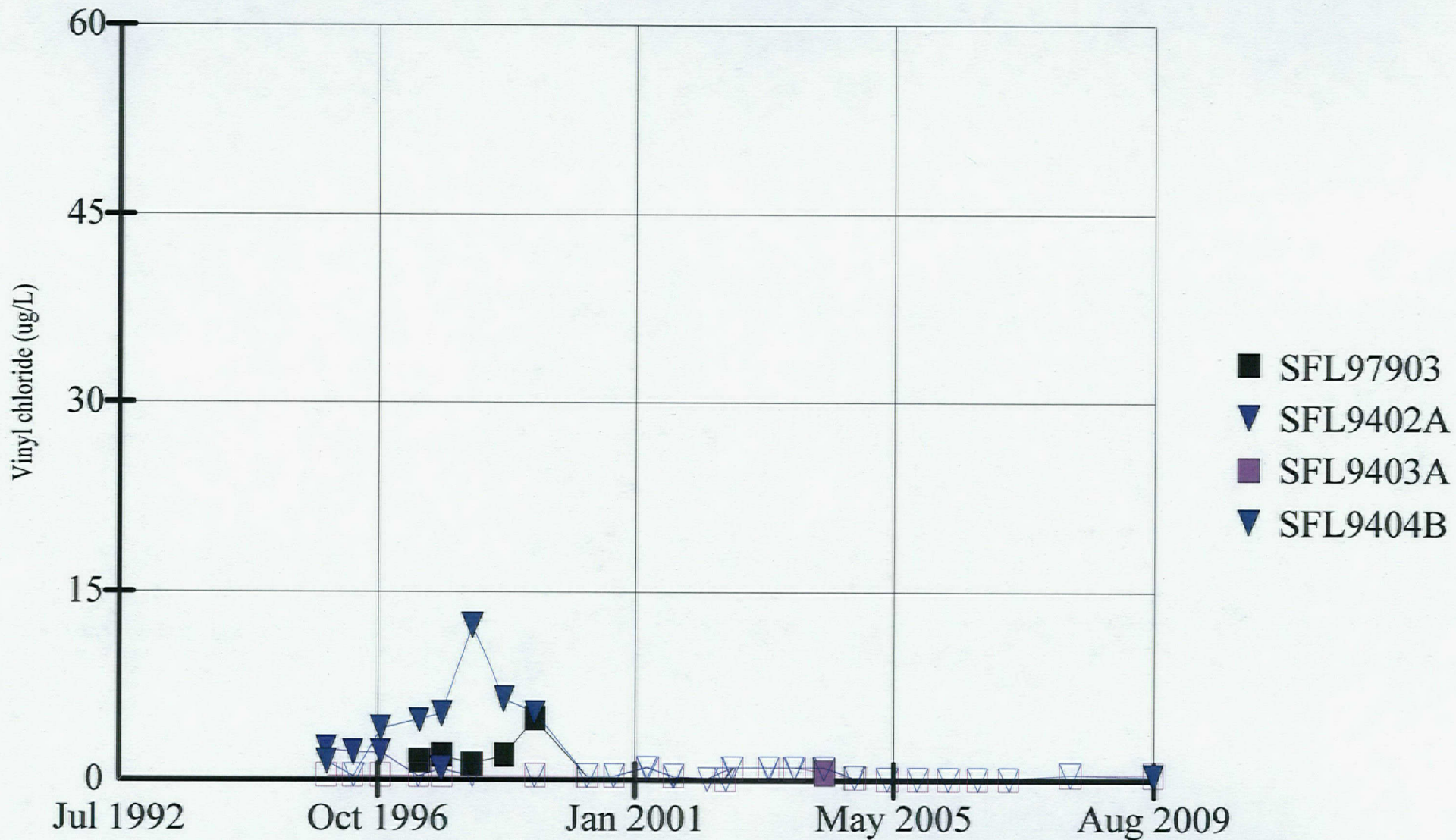
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# TIME SERIES



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**APPENDIX B**

- B-1: Response to Agency (EPA-7 and KDHE) Comments
- B-2: Documents in SFL (OU001) CERCLA Administrative Record, Fort Riley's Installation Restoration Program
- B-3: Fort Riley's Real Property Master Plan, Subsection 4.2.2 Environmental Quality (with Table 4.2 Installation Restoration Program Site Restrictions and Figure 4.9 Environmental Overview)

## Austin, Andrea L CIV USA IMCOM

---

**From:** Austin, Andrea L CIV USA IMCOM  
**nt:** Wednesday, February 10, 2010 8:47 AM  
**o:** 'Stevens.Jim@epamail.epa.gov'; Safadi.Amer@epamail.epa.gov  
**Cc:** Gassen, Tina M Ms CIV USA IMCOM  
**Subject:** RE: EPA attorney response to revised passages for DF RACR for the SFL Site (UNCLASSIFIED)

Classification: UNCLASSIFIED  
Caveats: FOUO

Jim,

On page 4-2, the final paragraph of Section 4.1 of the RACR, the words "for unrestricted exposure" will be deleted, as EPA suggested in Alternative 2. A colon will be added to the first revised paragraph, as EPA suggested. Revised pages of the RACR will subsequently be submitted to EPA (Mr. Amer Safadi) along with the Fort Riley's Garrison Commander's signature page (page 7-1 of the RACR) to finalize the RACR for approval and signature by EPA. Thank you for your time and prompt response to Fort Riley's response comments.

Sincerely,

Andrea Austin  
DPW-Environmental Division  
404 Holbrook Avenue  
Fort Riley, KS 66442  
(85) 239-8536 (phone)  
(85) 239-8535 (fax)

-----Original Message-----

**From:** Stevens.Jim@epamail.epa.gov [mailto:Stevens.Jim@epamail.epa.gov]  
**Sent:** Tuesday, February 09, 2010 3:42 PM  
**To:** Austin, Andrea L CIV USA IMCOM; Safadi.Amer@epamail.epa.gov  
**Subject:** Re: EPA attorney response to revised passages for DF RACR for the SFL Site (UNCLASSIFIED)

Andrea,

Thank you for the Army's responsive wording changes to my comments on the Draft Final Remedial Action Completion Report, Southwest Funston Landfill Site, OU001, Fort Riley, Kansas, dated December 2009. The Army's responses are set forth in a memorandum dated January 28, 2010.

The revised provisions in the January 28 memo have addressed my concerns with the exception of the response to comment 1 for the page 4-2 change to the final paragraph of Section 4.1 of the RACR.

If hazardous wastes are left in place, 5-Year reviews are required so long as contamination is above levels that allow for "unlimited use and unrestricted exposure." The last sentence of the paragraph, referencing unrestricted exposure, is unclear to me. Both unlimited use and unlimited exposure must be met to discontinue 5-year reviews.

Alternative 1 - Please delete the entire final sentence (of the revised paragraph) that reads "However, it does not necessarily imply cleanup to pristine or background conditions for unrestricted exposure."

## Austin, Andrea L CIV USA IMCOM

---

**From:** Stevens.Jim@epamail.epa.gov  
**nt:** Tuesday, February 09, 2010 3:42 PM  
**o:** Austin, Andrea L CIV USA IMCOM; Safadi.Amer@epamail.epa.gov  
**Subject:** Re: EPA attorney response to revised passages for DF RACR for the SFL Site (UNCLASSIFIED)  
**Attachments:** Ft Rly Rspns to EPA Attrny SLF RACR.docx

Andrea,

Thank you for the Army's responsive wording changes to my comments on the Draft Final Remedial Action Completion Report, Southwest Funston Landfill Site, OU001, Fort Riley, Kansas, dated December 2009. The Army's responses are set forth in a memorandum dated January 28, 2010.

The revised provisions in the January 28 memo have addressed my concerns with the exception of the response to comment 1 for the page 4-2 change to the final paragraph of Section 4.1 of the RACR.

If hazardous wastes are left in place, 5-Year reviews are required so long as contamination is above levels that allow for "unlimited use and unrestricted exposure." The last sentence of the paragraph, referencing unrestricted exposure, is unclear to me. Both unlimited use and unlimited exposure must be met to discontinue 5-year reviews.

Alternative 1 - Please delete the entire final sentence (of the revised paragraph) that reads "However, it does not necessarily imply cleanup to pristine or background conditions for unrestricted exposure."

Alternative 2 - Delete "for unrestricted exposure" so the sentence ends with the word with "...conditions."

Please call me if you have any questions.

For what it is worth and for your consideration on a matter of style - I believe it is correct to insert a colon when there is a series of items separated by semi-colons. For example, in the first revised paragraph, the sentence would read "These long-term management (LTM) and care activities will involve: site access and institutional controls; annual inspections and as needed repairs of the landfill vegetative soil cover and the bank stabilization structure; groundwater monitoring until formally terminated; and CERCLA five-year reviews."

In any event, in the paragraph as revised in the memo, the comma after terminated should be a semi-colon.

Jim

James D. Stevens, Assistant Regional Counsel U.S. EPA Region VII, 901 N. 5th Street, Kansas City, Kansas 66101  
Tel: 913.551.7322; Fax - x9322; [stevens.jim@epa.gov](mailto:stevens.jim@epa.gov)

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Fort Riley's Responses (Andrea Austin) to EPA's Attorney on the Draft Final RACR  
for the Southwest Funston Landfill  
January 28, 2010

**1. Fort Riley's Response to EPA-7 Attorney's Comment 1**

The text on page 1-1, third paragraph will be revised to read as follows .

Ongoing CERCLA activities at the SFL site into the future that are not defined as CERCLA response actions will be required. These long-term management (LTM) and care activities will involve site access and land use institutional controls; annual inspections and as needed repairs of the landfill vegetative soil cover and the bank stabilization structure; groundwater monitoring until formally terminated, and CERCLA five-year reviews. Perimeter fencing, locked gates, and warning signs are in place at the SFL site indicating why access is restricted. Obligations to continue the protective conditions for HH & E are in place in Fort Riley's Real Property Master Plan (RPMP), which is updated every five years. (B & V, 2007 and Appendix B: B3).

**2. Fort Riley's Response to EPA-7 Attorney's Comment 2**

At page 4-2, the final paragraph, Section 4.1, will be revised to read as follows.

In 2009,...Although the RGs for the groundwater, the MCLs, have been met, the DA-FR will perform groundwater sampling for the next five-year review in 2012 to assure that the landfill remains functionally stable with site access and land use controls in place and that the concentrations of contaminants in groundwater are less than the MCLs. Subsequent CERCLA five- year reviews will be required at the SFL site until an unlimited use and unrestricted exposure determination is made. Unlimited use generally means that conditions are safe for any exposure scenario, including residential use, subsistence farming, and subsistence fishing. However, it does not necessarily imply cleanup to pristine or background conditions for unrestricted exposure.

The final paragraph of Section 4.2 will be revised as follows.

All but the first sentence in the paragraph will be deleted, beginning with the sentence: Once termination .... [delete all].

The first full paragraph of page 6-3 will be revised as follows.

The frequency...If the contaminant concentrations in groundwater remain less than the MCLs, the DA-FR will evaluate the current and future conditions at the SFL landfill and request approval from the EPA and KDHE for formal termination of the groundwater program (based on 15 years of data, 1997 (SFL ROD)-2012 and 29 years of data since closure in 1983). If the concentration of a contaminant is greater than the MCL for that contaminant in 2012, the DA-FR will evaluate the risk to HH & E and recommend the appropriate strategy for continued monitoring.



Fort Riley's Responses (Andrea Austin) to EPA's Attorney on the Draft Final RACR  
for the Southwest Funston Landfill  
January 28, 2010

The 2<sup>nd</sup> paragraph page 6-4 will be revised as follows.

Ongoing CERCLA activities at the SFL site will continue to be performed by the DA-FR in coordination with the EPA-7 and the KDHE. These long-term management (LTM) and care activities will involve site access and land use institutional controls; annual inspections and as needed repairs of the landfill vegetative soil cover and the bank stabilization structure; groundwater monitoring until formally terminated, and CERCLA five-year reviews.

The last paragraph on page 6-4 also requires revision as follows.

The DA-FR responses the KDHE comments on the draft final RACR (dated December 4, 2009) are included in Appendix B: B-1. The approval letter from the EPA-7 Remedial Project manager was received on November 4, 2009. Subsequently, the EPA-7 site attorney submitted comments via e-mail and the DA-FR responses are included in Appendix B: B-1. The index to the documents in the CERCLA Administrative Record for the SFL site is included in Appendix B: B-2.

**3. Fort Riley's Response to EPA-7 Attorney's Comment 3.**

The last full paragraph on page 6-3, the sentence stating it is no longer appropriate for the SFL to be listed on the NPL will be deleted from the paragraph.

**Austin, Andrea L CIV USA IMCOM**

---

**From:** Safadi.Amer@epamail.epa.gov  
**nt:** Tuesday, January 26, 2010 12:22 PM  
**o:** Austin, Andrea L CIV USA IMCOM  
**Cc:** Gassen, Tina M Ms CIV USA IMCOM  
**Subject:** Fw: Comments on DF RACR Southwest Funston Landfill Site

Andrea,

As I mentioned during our last LIR, since we need to have this document signed by our director, the site EPA attorney has to review it, and I am forwarding his comments to you. At least now we know, so next time you submit a RACR, I'll make sure he reviews before I submit my comments to you. Please let me know if you have any questions.

Thanks  
Amer N. Safadi, RPM  
Environmental Engineer  
Superfund Division - MOKS  
U.S. EPA Region 7  
Phone: (913) 551-7825  
Fax: (913) 551-9825

----- Forwarded by Amer Safadi/SUPR/R7/USEPA/US on 01/26/2010 11:51 AM  
-----

**From:** Jim Stevens/R7/USEPA/US  
**To:** Amer Safadi/SUPR/R7/USEPA/US@EPA  
**Date:** 01/26/2010 11:43 AM  
**Subject:** Comments on DF RACR Southwest Funston Landfill Site

Amer - I have comments on the RACR:

1. At page 1-1, third paragraph, the RACR states that "the ongoing activities into the future are non-CERCLA response activities that will involve de minimis long-term site management (LTM) and care." [italics original]

The maintenance of the landfill cap is not a CERCLA "response" action.

OSWER Directive 9320.2-09A-P: Close Out Procedures for National Priorities List Sites at page 5-1 states: "Section 300.5 [of the NCP], defines response as removal, remedy, or remedial action. EPA interprets that to mean that the site may be deleted when all removals and remedial actions are completed. Operation and Maintenance (O&M) is not defined as a response the NCP, therefore, a site in O&M can be deleted." And in a box below the above quoted paragraph the guidance states "The NCP (40 CFR 300.435(f) [sic ]) states that: (f) Operation and maintenance.

(1) Operation and maintenance (O&M) measures are initiated after the remedy has achieved the remedial action objectives and remediation goals in the ROD, and is determined to be operational and functional, except for ground- or surface-water restoration actions covered under § 300.435 (f)(4)...."

If the above statement in the RACR is meant to convey that the maintenance (O&M) of the landfill is not a CERCLA activity, that is clearly incorrect. The maintenance of the landfill is an institutional control (IC) incorporated into the Base Master Plan under the ROD.

Future 5-year reviews for OU001, required by CERCLA indefinitely because hazardous wastes have been left in place, will evaluate whether the IC is still protective. 5-Year reviews, and activities identified to make the remedy protective if it has become non-protective, are CERCLA activities.

2. At page 4-2, final sentence section 4.1 of the RACR, it states that 5-year reviews may be discontinued based on the groundwater sampling results. See also, final paragraph of Section 4.2 stating the long term maintenance of the landfill is outside of CERCLA. See also, first full paragraph of page 6-3. See also, 2nd paragraph page 6-4.

The above is incorrect. CERCLA §121(c) and the NCP at 40 CFR §300.430 (f)(4)(ii) require 5-year reviews when a remedial action results in any hazardous substances, pollutants, or contaminants remain at the site.

5-year reviews are required unless the levels provide for unlimited use and unrestricted exposure. See, discussion at Comprehensive Five-Year Review Guidance, pages 1-1, 1-2 (OSWER 9355.7-03B-P).

3. The last full paragraph on page 6-3 states it is no longer appropriate for the SFL to be listed on the NPL.

a Notice of Intent to Delete (NOID) is prepared by EPA. The above statement should be removed. The Department of Defense and Environmental Protection Agency Joint Guidance Recommended Streamlined Site Closeout and NPL Deletion Process For DoD Facilities clearly states that EPA prepares the NOID. The RACR is documentation for the completion of the remedial action, not NPL delisting.

Jim

James D. Stevens, Assistant Regional Counsel U.S. EPA Region VII, 901 N. 5th Street, Kansas City, Kansas 66101

Tel: 913.551.7322; Fax - x9322; [stevens.jim@epa.gov](mailto:stevens.jim@epa.gov)

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Mark Parkinson, Governor  
Roderick L. Bremby, Secretary

DEPARTMENT OF HEALTH  
AND ENVIRONMENT

[www.kdheks.gov](http://www.kdheks.gov)

December 29, 2009

Directorate of Environment and Safety  
Ms. Tina Gassen  
407 Pershing Court  
Ft. Riley, Kansas 66442

**Subject: Draft Final Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (Operable Unit 001) at Fort Riley, Kansas, dated December 4, 2009**

Dear Ms. Gassen:

The Kansas Department of Health and Environment/Bureau of Environmental Remediation (KDHE/BER) has reviewed the above referenced document, received on December 7, 2009. No comments were generated from KDHE/BER's review.

If you should have any questions please feel free to contact either myself at (785) 296-6378 or Joe Dom at (785) 296-4367.

Sincerely,

Travis Daneke  
Environmental Scientist and Project Manager  
Superfund Unit/Assessment & Restoration Section

Joe Dom, P.G.  
Landfill/Dry Cleaner Unit  
Assessment & Restoration Section

cc: Jorge Jacobs → Bob Jurgens → Fort Riley (C5-031-03034-1)  
Amer Safadi, USEPA  
Richard Van Saun, USACE

BUREAU OF ENVIRONMENTAL REMEDIATION  
CURTIS STATE OFFICE BUILDING, 1000 SW JACKSON ST., STE. 410, TOPEKA, KS 66612-1367  
Voice 785-296-6378 Fax 785-296-4823 E-Mail [tdaneke@kdheks.gov](mailto:tdaneke@kdheks.gov)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

DEC 23 2009

E-mailed December 23, 2009

Ms. Tina Gassen  
Compliance Branch Chief  
Environmental Division, DPW  
407 Pershing Court  
IMNW-RLY-PWE  
Fort Riley, Kansas 66442

**Re: Draft Final Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (Operable Unit 001) at Fort Riley, Kansas, Dated December 4, 2009**

Dear Ms. Gassen:

The U. S. Environmental Protection Agency (EPA) has completed its review of the subject document received December 7, 2009. Based on this review and your response to EPA's comments submitted on February 12, 2009, and November 4, 2009, EPA believes that the responses have adequately addressed most of the comments and concerns we had. Please continue with your ongoing maintenance activities efforts and groundwater monitoring program to ensure the protection of human health and the environment. As such, EPA approves this final document.

Thank you for the opportunity to review this document. Please contact me via e-mail at [safadi.amer@epa.gov](mailto:safadi.amer@epa.gov) or at (913) 551-7825 if you have any questions or concerns.

Sincerely,

Amer Safadi  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

cc: Travis Daneke, Kansas Department of Health and Environment  
Richard Van Saun, U.S. Army Corps of Engineers

E-mailed December 23, 2009

Ms. Tina Gassen  
Compliance Branch Chief  
Environmental Division, DPW  
407 Pershing Court  
IMNW-RLY-PWE  
Fort Riley, Kansas 66442

**Re: Draft Final Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (Operable Unit 001) at Fort Riley, Kansas, dated December 4, 2009**

Dear Ms. Gassen:

The U. S. Environmental Protection Agency (EPA) has completed its review of the subject document received December 7, 2009. Based on this review and your response to EPA's comments submitted on February 12, 2009, and November 4, 2009, EPA believes that the responses have adequately addressed most of the comments and concerns we had. Please continue with your ongoing maintenance activities efforts, and groundwater monitoring program to ensure the protection of human health and the environment. As such, EPA approves this Final document.

Thank you for the opportunity to review this document. Please contact me via e-mail at [safadi.amer@epa.gov](mailto:safadi.amer@epa.gov) or at (913) 551-7825 if you have any questions or concerns.

Sincerely,

---

Amer Safadi  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

cc: Travis Daneke, Kansas Department of Health and Environment  
Richard Van Saun, U.S. Army Corps of Engineers



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

NOV 04 2009

E-mailed November 4, 2009

Ms. Tina Gassen  
Compliance Branch Chief  
Environmental Division, DPW  
407 Pershing Court  
IMNW-RLY-PWE  
Fort Riley, Kansas 66442

Re: **Revised Draft Remedial Action Completion Report for the Southwest Funston Landfill (Operable Unit 1) at Fort Riley, Kansas, dated October 2009**

Dear Ms. Gassen:

The U. S. Environmental Protection Agency (EPA) has completed its review of the subject document dated October 1, 2009. Based on this review and your response to EPA's comments submitted on February 12, 2009, EPA believes that the responses have adequately addressed most of the comments and concerns we had. However, since this is a landfill, EPA recommends that Fort Riley continues with its ongoing maintenance activities efforts, and that the continuation of a long-term groundwater monitoring program is appropriate to ensure the protection of human health and the environment. As such, EPA approves the document and looks forward to the final Remedial Action Completion Report for this site.

Thank you for the opportunity to review this document. Please contact me via e-mail at [safadi.amer@epa.gov](mailto:safadi.amer@epa.gov) or at (913) 551-7825 if you have any questions or concerns.

Sincerely,

Amer Safadi  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

cc: Travis Daneke, Kansas Department of Health and Environment  
Richard Van Saun, U.S. Army Corps of Engineers





REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT RILEY  
500 HUEBNER ROAD  
FORT RILEY KANSAS 66442-7000

December 4, 2009

Environmental Division, Directorate of Public Works

Mr. Travis Daneke  
Superfund Unit/Assessment & Restoration Section  
Kansas Department of Health & Environment  
Curtis State Office Building  
1000 S.W. Jackson, Suite 410  
Topeka, KS 66612-1367

Dear Mr. Daneke:

Fort Riley received KDHE's comment letter, dated October 28, 2009, on the revised Southwest Funston Landfill Remedial Action Completion Report. Fort Riley provides the following comment responses.

- 1) KDHE: Page 3-4, lines 38-43. "Storm-water ponding after a heavy rain event is not a problem if evaporation occurs, which it does, and the soil beneath the pond retains water and vegetation transpires, preventing percolation into the landfill contents. The storm-water ponding is not of concern unless the water remains for a long period of time, stagnates, vegetation is killed, and infiltrates into the landfill contents." KDHE does not concur that storm-water ponding is an acceptable landfill condition. While evapotranspiration likely occurs, the SFL landfill cap is not an approved alternative cover. True evapotranspirative covers are designed and upheld to performance monitoring to insure that percolation into the waste is not occurring. The objective of the SFL cover is ultimately to promote runoff and enhance evapotranspiration. To ultimately classify the SFL cover as an evapotranspirative cover, lysimeters would need to be placed in the landfill to verify the less than 3 mm per year infiltration, which is the standard for an evapotranspirative cover.

Comment Response: The storm-water ponding statements beginning with ["The thick soil..."] (lines 36-43) will be deleted. The sentence beginning with ["The cover vegetation..."] in lines 35-36 will be revised as follows. The potential for leachate generation has been reduced by repairing the native soil cover to achieve a thickness of at least 2 feet, seeding with a native grass mixture, and minimizing storm-water ponding and infiltration into the waste containment area.

The repairs described on page 3-5 have been completed. Bullets will be added on pages 3-3 and 3-4 to present the September to October 2009 repairs to the landfill cover and rock armoring of the upper riverbank slope to cover slate, tar material, and

4% Chrysotile asbestos tiles. The first paragraph on page 3-5, lines 3-7 will be revised as follows. The areas of differential settlement and storm-water ponding noted in the northeastern and east central portions of the landfill during the 2009 annual inspection were repaired in September to October 2009 using local top soil from an off-site borrow site (Training Area 49) on Fort Riley. Fill areas from the repair will be seeded with a mixture of native grass seed in early December 2009. These areas were the recommended cover repairs in the 2009 Annual Inspection Report (Appendix C: C-1). In addition, the second paragraph on page 3-5, lines 9-14 will be revised as follows. Rock armoring of 250 linear feet of the Kansas River bank with 1,000 cubic yards of 9-inch nominal size quarry run stone was placed in October 2009 over the rubble area along the SFL upper riverbank slope where limited sampling in 2009 found 4% Chrysotile asbestos tiles. The back cut erosion at the downstream edge of the riverbank stabilization structure and southeast of the landfill, noted during the 2009 annual inspection (Photograph SFL2009-8 in Appendix C: C-1) is an outstanding deficiency that will be addressed as funds become available. Photographs have been added to Appendix C: C-1 to demonstrate completion of the repair/update of site access signage and fencing, the landfill cover repairs, and the rock armoring of the upper riverbank slope.

Fort Riley agrees that it is important to note that the design and construction of the SLF conventional cover did not specifically consider a performance equivalent to an alternative cover system (i.e., an evapotranspirative (ET) cover). Rather the SFL cover was made to meet the closure requirements of 40 CFR 258(a) and was approved jointly by EPA and KDHE as the selected remedy. The cover repairs provided an infiltration layer of at least 2 feet thick using the local soils (mixed clayey to silty loam and very fine sand) with moderate permeability to meet the thickness criterion in the regulation, to minimize infiltration and erosion, and to establish native grasses to facilitate evaporation and transpiration. Monitoring of infiltration/percolation was not required. The design criteria for the SFL cover were performance and risk-based driven in that the acceptable percolation into the waste was to ensure minimal risk and improve groundwater quality in the alluvial aquifer. Groundwater monitoring required by the SFL ROD was the metric for the performance of the SFL cover.

The regulatory driven performance standard of 3 mm per year acceptable percolation rate cited by KDHE for an evapotranspirative (ET) cover applies to demonstrating equivalent performance of an ET cover to a composite barrier landfill cover design system and is not applicable to the type of SFL cover. The SFL cover is a conventional, native soil cover with no barrier. The ET equivalency metric to the SFL final soil cover is 30 mm per year (see the results from the USEPA's Alternative Cover Assessment Program). The SFL EE/CA states that the average evapotranspiration of the native grasses planted on the cover is 19 inches per year or 482.59 mm/year. As such, the SFL final cover system, with native grasses and soils from borrow areas with

a high capacity to hold water, functions as an evapotranspirative cover, even though it was not classified specifically as such in the SFL ROD.

Regardless, references in the text to having an evapotranspirative cover will be replaced with language used in the SFL ROD and Removal Action Report, that being a native soil cover planted with a mixture of native grass seed, to facilitate evaporation and transpiration. The revisions to the text will be made on the following pages:

page 1-4, lines 28-29, ...surface, adding clayey to silty loam soil obtained from a former rifle range berm to provide...;

page 1-8, lines 16-20, ...yards of soil (composed of alluvial silt material) on the landfill was accomplished. A native grass seed mixture was drilled into the newly placed cover soil. The inspection on October 17, 1996 confirmed the minimum thickness of two feet for the cover soils that were generally a clay to silty loam and clayey to fine-grained sands.

page 3-4, line 23...landfill soil cover with native grasses was inspected...;

page 3-4, line 36 The evapotranspirative cover-sentence is deleted;

page 6-1, line 9, ...establishing a functional soil cover planted with native grasses...;

page 6-2, line 16 ...soil cover with native grasses will be maintained....

- 2) KDHE: Page 3-10, lines 30-40. "In March 2008...1,2,4-trimethylbenzene...naphthalene...were detected in monitoring well SFL92-601 at concentrations less than their respect MCLs. In August 2009, 1,2,4-trimethylbenze...naphthalene...were detected at monitoring well SFL92-601 at concentrations less than the MCL." Certain select VOC constituents listed, such as naphthalene and 1,2,4-trimethylbenzene do not have an applicable MCL. However, the KDHE Bureau of Environmental Remediation uses Risk-Based Standards for evaluation of such contaminants with no identified MCL. For each constituent with an MCL, the RSK is of quantitative equivalence. However, if a particular constituent, such as naphthalene, does not have a MCL, but does have a RSK, the RSK is applicable to that constituent. In March 2008, well SFL92-601 exceeded the Kansas Risk-Based Standards (RSKs) of 3 ug/L for naphthalene, based on the KDHE RSK Manual-4th Version dated June 2007. In August 2009, well SFL 92-601 exceeded the RSK for naphthalene. Naphthalene was detected in well SFL 92-601 at 8.8 ug/L.

Comment Response: The text will be revised to add RSKs following MCLs, to delete naphthalene from the list of VOCs, and to state that in March and August 2009, naphthalene was detected in this well at concentrations greater than the method detection limit but less than the method reporting limit, at 8 µg/L and 8.8 µg/L,

respectively. The residential RSK for naphthalene is 3 µg/L, and the industrial RSK is 9 µg/L. RSKs will be added to the acronym list.

- 3) KDHE: Page 3-12, lines 25-26: "The potential exposure pathways remain incomplete, and no new contaminants and/or contaminant sources have been identified." In remaining consistent with the KDHE Closed Landfill Program policy, please find the enclosed page titled "KDHE Recommended Groundwater Monitoring Parameters and Detection Limits for Landfills Closing Prior to 4/9/94." The attached reference document identifies the parameters (VOCs, geochemicals, metals) that KDHE typically requires to be analyzed prior to groundwater monitoring being officially terminated at a site. The purpose is to ensure that no additional constituents, other than the COPCs being tested, have been introduced into the environment. It is currently unknown if new contaminants have been introduced, as VOCs are currently the only constituent being tested. KDHE understands that COPCs have been identified in the ROD for this site. However, from a State Solid Waste perspective, the August 2009 constituent list is not comprehensive enough to rule out all potential contaminants associated with a landfill.

Comment Response: Fort Riley currently analyzes for the organics recommended by KDHE in the attached reference document for landfills closing prior to 4/9/94 by following EPA Method 8260B. EPA Method 8260B does not limit the analyses to just the COPCs. The results for all analytes under this method are reported by the laboratory and included in the Quality Control Summary Reports (QCSRs) for the Southwest Funston Landfill.

SVOCs, heavy metals and geochemicals were analyzed for in the past and approved to be discontinued by EPA and KDHE based on no detections or low concentrations (see CD in Appendix C). The table of the history of water quality parameter results from the 2009 SFL annual long-term monitoring report will be added to the CD in Appendix C. The long-term monitoring results have been used to characterized the Southwest Funston Landfill and used to determine which constituents associated with the closed landfill should be monitored as potential threats to human health and the environment.

- 4) KDHE: Page 4-2, Long-Term Site Management and Care Activities: KDHE recommends including methane monitoring as a long-term care activity be implemented. Landfill gas has been documented in the wells at this site. In addition, the location of the landfill along the Kansas River makes the SFL more susceptible to the migration of landfill gas. This is especially true during high river stages when groundwater elevations are likely to rise. The rise in

groundwater reduces air space and forces the gas to displace. Observations for signs of landfill gas (i.e., distressed vegetation, odors, etc.) should be documented during annual inspections and monitoring wells should continue to be regularly tested for methane. KDHE continues to caution Fort Riley against burning the landfill due to the potential for subsurface fire and explosive conditions.

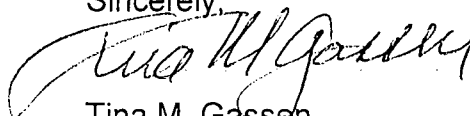
Comment Response: The landfill native soil and grass cover is moderately permeable and should not be trapping methane gas. However, the capped monitoring well is a closed system that could trap methane gas. As such, the well cap for well SFL 92-603, where methane gas was measured at 100% LEL in March 2009, was vented. This released the gas in the monitoring well rather than trapping it until the next monitoring event. Methane gas was not measured at a hazardous level during the August 2009 sampling event at this well or in any other monitoring wells.

Historically, landfill gas production rates peak typically during the first or second year following waste placement and decline thereafter. Since the landfill closed in 1982-1983, the landfill gas production rates should no longer be of concern. No toxic stress to vegetation from landfill gas and no bulges in slope from landfill gas pressures have been observed. Routine prescribed burns have been performed in either the late fall or early spring, and a problem with igniting methane gas has not occurred. On page 4-3 the following bullet will be added under Inspections. Observations for signs of landfill methane gas (i.e., distressed vegetation, odors, or bulges in slope from landfill gases pressure) will be documented during annual inspections. A bullet will be added under Sampling, Monitoring, and Analysis as follows. Monitoring for methane gas in the capped monitoring well will be performed for safety before collecting groundwater samples.

Copies of this letter are being furnished to Mr. Amer Safadi, the U.S. Environmental Protection Agency, Region 7; Dr. Richard Van Saun, Kansas City District Corps of Engineers; and Mr. Peter Rissell, Army Environmental Center.

Please do not hesitate to call me at (785) 239-3272 or e-mail me if you have any questions or comments on this submittal or Andrea Austin, Directorate of Public Works, Environmental Division, Installation Restoration Program, Project Manager, at (785) 239-8536.

Sincerely,



Tina M. Gassen  
Chief, Compliance & Restoration Branch



Mark Parkinson, Governor  
Roderick L. Bremby, Secretary

DEPARTMENT OF HEALTH  
AND ENVIRONMENT

www.kdheks.gov

Division of Environment

October 28, 2009

Ms. Andrea Austin  
Environmental Division  
U.S. Army Directorate of Public Works  
407 Pershing Ct.  
Fort Riley, KS 66442

**Subject: Southwest Funston Landfill—KDHE Project Code: C5-081-03034; Revised Draft Remedial Action Completion Report (RACR)**

Dear Ms. Austin,

The Kansas Department of Health and Environment (KDHE) received the revised Remedial Action Completion Report (RACR) for the Southwest Funston Landfill (SFL), Fort Riley, Kansas on October 1, 2009. After reviewing the report, KDHE acknowledges that the remedial action objectives and remedial goals established under CERCLA have been accomplished. As such, no additional responses will be performed under CERCLA to protect the human health or the environment. However, as indicated in the RACR, since the site will always be a landfill with buried waste non-CERCLA long-term care will continue. The ongoing maintenance activities identified in Section 4.0 of the RACR will be essential for ensuring that the future integrity of the landfill is sustained. Please be aware that from a solid waste standpoint, the Kansas Statutes continue to advocate legal responsibility for the landfill. Kansas Statutes K.S.A. 65-3411 and K.S.A. 65-3419(e) state that the Secretary of KDHE may order the cleanup of such waste that threatens human health and/or the environment should future conditions warrant such action.

Overall KDHE finds the report content generally acceptable. However, KDHE provides the following comments pertaining directly to specific items of the RACR:

**SPECIFIC COMMENTS**

- 1) Page 3-4, Lines 38-43: "Storm-water ponding after a heavy rain event is not a problem if evaporation occurs, which it does, and the soil beneath the pond retains water and vegetation transpires, preventing percolation into the landfill contents. The storm-water ponding is not of concern unless the water remains for a long period of time, stagnates, vegetation is killed, and infiltrates into the landfill contents." KDHE does not concur that storm-water ponding is an acceptable landfill condition. While evapotranspiration likely

occurs, the SFL landfill cap is not an approved alternative cover. True evapotranspirative covers are designed and upheld to performance monitoring to insure that percolation into the waste is not occurring. The objective of the SFL cover is ultimately to promote runoff and *enhance* evapotranspiration. To ultimately classify the SFL cover as an evapotranspirative cover, lysimeters would need to be placed in the landfill to verify the less than 3 mm per year of infiltration, which is the standard for an evapotranspirative cover. For more information on evapotranspirative covers please refer to the EPA guidance document located at <http://www.epa.gov/tio/download/remed/epa542f03015.pdf>

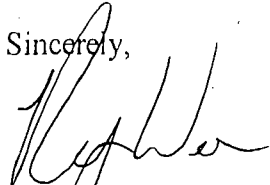
- 2) Page 3-10, Lines 30-40: "In March 2008...1,2,4-trimethylbenzene...naphthalene...were detected in monitoring well SFL 92-601 at concentration less than their respective *MCLs*. In August 2009, 1,2,4-trimethylbenzene...naphthalene...were detected at monitoring well SFL 92-601 at concentrations less than the *MCL*." Certain select VOC constituents listed, such as Naphthalene and 1,2,4-trimethylbenzene do not have an applicable MCL. However, the KDHE Bureau of Environmental Remediation uses Risk-Based Standards for evaluation of such contaminants with no identified MCL. For each constituent with an MCL, the RSK is of quantitative equivalence. However, if a particular constituent, such as Naphthalene, does not have a MCL, but does have a RSK, the RSK is applicable to that constituent. In March 2008, well SFL92-601 exceeded the Kansas Risk-Based Standards (RSKs) of 3 µg/L for Naphthalene, based on the KDHE RSK Manual-4<sup>th</sup> Version dated June 2007. In August 2009 well SFL92-601 exceeded the Kansas Risk Based Standards (RSK) for Naphthalene. Naphthalene was detected in well SFL92-601 at 8.8 µg/L.
- 3) Page 3-12, Lines 25-26: "The potential exposure pathways remain incomplete, and no new contaminants and/or contaminant sources have been identified.." In remaining consistent with the KDHE Closed Landfill Program policy, please find the enclosed page titled "*KDHE RECOMMENDED GROUNDWATER MONITORING PARAMETERS AND DETECTION LIMITS FOR LANDFILLS CLOSING PRIOR TO 4/9/94*". The attached reference document identifies the parameters (VOCs, geochemicals, metals) that KDHE typically requires to be analyzed prior to groundwater monitoring being officially terminated at a site. The purpose is to ensure that no additional constituents, other than the COPCs being tested, have been introduced into the environment. It is currently unknown if new contaminants have been introduced, as VOCs are currently the only constituent being tested. KDHE understands that COPC have been identified in the ROD for this site. However, from a State Solid Waste perspective, the August 2009 constituent list is not comprehensive enough to rule out all potential contaminants associated with a closed landfill.
- 4) Page 4-2, Long Term Site Management and Care Activities: KDHE recommends including methane monitoring as a long term care activity to be implemented. Landfill gas has been documented in the wells at this site. In addition, the location of the landfill along the Kansas River makes SFL more susceptible to the migration of landfill gas. This is especially true during high river stages when groundwater elevations are likely to rise. The rise in groundwater reduces air space and forces the gas to displace.



Observations for signs of landfill gas (i.e., distressed vegetation, odors, etc.) should be documented during annual inspections and monitoring wells should continue to be regularly tested for methane. KDHE continues to caution Fort Riley against burning the landfill due to the potential for subsurface fire and explosive conditions.

If you have any questions or require additional information please contact me at (785) 296-1938 or email [rweiser@kdheks.gov](mailto:rweiser@kdheks.gov).

Sincerely,

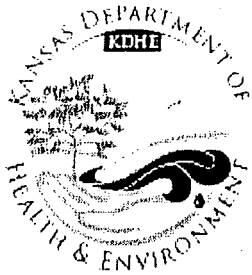


Ryan Weiser  
Professional Geologist  
Bureau of Environmental Remediation



Travis Daneke  
Environmental Scientist  
Bureau of Environmental Remediation

cc: Jorge Jacobs→ Bob Jurgens→ Southwest Funston Landfill: C5-081-03034 (1)  
Amer Safadi, USEPA Region 7  
Richard Van Saun, U.S. Army Corps of Engineers, Kansas City District



**KDHE RECOMMENDED GROUNDWATER MONITORING  
PARAMETERS AND DETECTION LIMITS FOR  
LANDFILLS CLOSING PRIOR TO 4/9/94**

**HEAVY METALS: (Detection Limits)**

Dis-Arsenic*	5 ug/l
Dis-Barium*	50 ug/l
Dis-Cadmium*	1 ug/l
Dis-Chromium*	5 ug/l
Dis-Lead*	5 ug/l
Dis-Mercury*	.5 ug/l
Dis-Selenium*	5 ug/l
Dis-Silver*	5 ug/l

**GEOCHEMICALS:**

- Alkalinity
- Calcium
- Chemical Oxygen Demand (COD)
- Chloride
- Nitrate
- Nitrite
- Potassium, dissolved
- Sodium, dissolved
- Sulfate
- Total Dissolved Solids (TDS)

**ORGANICS: (Detection Limits)**

**(METHOD 8260 OR 624)**

Acetone	100 ug/l
Benzene*	.5 ug/l
Bromodichloromethane	.5 ug/l
Bromomethane	.5 ug/l
Bromoform	.5 ug/l
2-Butanone (MEK)	100 ug/l
Carbon Disulfide	.5 ug/l
Carbon Tetrachloride	.5 ug/l
Chlorobenzene	.5 ug/l
Chloroethane	.5 ug/l
2-Chloroethylvinyl ether	5 ug/l
Chloroform	.5 ug/l
Chloromethane	.5 ug/l
Dibromochloromethane	.5 ug/l
1,1-Dichloroethane	.5 ug/l
1,2-Dichloroethane*	.5 ug/l
1,1-Dichloroethene*	.5 ug/l
cis/trans-1,2 Dichloroethene	.5 ug/l
1,2-Dichloropropane*	.5 ug/l
cis-1,3-Dichloropropene	.5 ug/l
trans-1,3-Dichloropropene	.5 ug/l
Ethylbenzene*	.5 ug/l
2-Hexanone	50 ug/l
4-Methyl-2-pentanone	50 ug/l
Methylene Chloride	.5 ug/l
Styrene*	.5 ug/l
Tetrachloroethene*	.5 ug/l
Toluene*	.5 ug/l
Total Xylenes*	.5 ug/l
1,1,2,2-Tetrachloroethane	.5 ug/l
1,1,1-Trichloroethane*	.5 ug/l
1,1,2-Trichloroethane	.5 ug/l
Trichloroethene*	.5 ug/l
Vinyl Acetate	50 ug/l
Vinyl Chloride	.5 ug/l

\*MCL promulgated

Appendix B-2  
 Documents in SFL (OU001) RCLA Administrative Record  
 Fort Riley's Installat estoration Program

OU 001/ FTRI-003	Site	Section	Doc #	Document Date	Document Title	Author
		3.4	001	7/1/1993	Final Engineering Evaluation/Cost Analysis (EE/CA) Study Report for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		3.5	001	10/21/1993	Draft Action Memorandum for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		3.7	001	6/23/1997	Removal Action Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas April 1994 - March 1997	Corps of Engineers
		4.1	001	12/1/1991	Draft Final Volume I - Work Plan; Volume II Site Safety and Health Plan; Volume III - Quality Assurance Project Plan; Volume IV Field Sampling Plan	Law Environmental
		4.1	002	9/1/1992	Volume I Draft Final Modified Work Plans for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.1	003	9/1/1992	Volume II Draft Final Modified Quality Assurance Project Plan for Remedial Investigation/Feasibility Study Southwest Funston Landfill & Pesticide Storage Facility Fort	Law Environmental
		4.1	004	9/1/1992	Volume III Draft Final Modified Site Specific Safety and Health Plan for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.1	005	9/1/1992	Volume IV Draft Final Modified Basic Safety and Health Plan for Remedial Investigation/Feasibility Study Southwest Funston Landfill & Pesticide Storage Facility Fort	Law Environmental
		4.1	006	9/1/1992	Volume V Draft Final Modified Field Sampling Plan for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	001	9/8/1992	Trip Report and Data Summary Southwest Funston Landfill Fort Riley, Kansas TES 9	PRC Environmental Management
		4.3	002	10/7/1992	Volume I Quality Control Summary Report (Baseline) and Appendices A-E for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	003	10/7/1992	Volume II Quality Control Summary Report (Baseline) Appendix F Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	004	10/7/1992	Volume III Quality Control Summary Report (Baseline) Appendix F Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	005	1/6/1993	Quality Control Summary Report First Quarter Ground-Water Sampling Event for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	006	4/14/1993	Quality Control Summary Report Second Quarter Ground-Water Sampling Event for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	007	7/9/1993	Quality Control Summary Report Third Quarter Ground-Water Sampling Event for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	008	10/22/1993	Quality Control Summary Report Fourth Quarter Ground-Water Sampling Event for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	009	1/13/1995	Quality Control Summary Report - Volume I Monitoring Well Sampling & Analysis for Southwest Funston Landfill, Camp Funston & Southeast Funston Landfill Fort Riley, Kansas	Law Environmental
		4.3	010	1/13/1995	Quality Control Summary Report - Volume II Monitoring Well Sampling & Analysis for Southwest Funston Landfill, Camp Funston & Southeast Funston Landfill Fort Riley, Kansas	Law Environmental
		4.4	001	4/13/1994	Draft Final Remedial Investigation Report for Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		4.4	002	4/13/1994	Draft Final Remedial Investigation Report Appendices for Southwest Funston Landfill Fort Riley, Kansas	Law Environmental
		5.2	001	4/12/1994	Draft Final Feasibility Study Report for Remedial Investigation/Feasibility Study Southwest Funston Landfill Fort Riley, Kansas	Law Environmental

Appendix B-2  
Documents in SFL (OU001) RCRA Administrative Record  
Fort Riley's Installation Restoration Program

OU:001/ FTRI-003	Site	Section	Doc #	Document Date	Document Title	Author
		6.1	001	11/1/1994	Proposed Plan Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas	Ft Riley IRP
		7.1	001	11/1/1995	Record of Decision Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas	Ft Riley IRP
		8.1	001	2/1/2002	Project Work Plan Landfill Repairs at Southwest Funston Landfill Fort Riley, Kansas	Corps of Engineers
		9.1	001	9/30/1996	Draft Final Operation and Maintenance Plan for Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas for Native Soil Cover Kansas River Bank Stabilization Hydraulic Control	Corps of Engineers
		9.2	001	4/19/1996	Addenda for Monitoring Well Sampling and Analysis Southwest Funston Landfill Camp Funston Southeast Funston Landfill Fort Riley, Kansas	Louis Berger & Associates
		9.2	002	1/1/1997	Long-Term Groundwater Monitoring Plan for Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas	Corps of Engineers
		9.2	003	1/31/2003	Draft Final Site-Specific Sampling and Analysis Plan Long Term Monitoring Fort Riley Southwest Funston Landfill Camp Funston Area Groundwater Petroleum, Oil, and	Environmental Chemical Corp
		9.2	004	10/15/2001	Addendum to Field Sampling Plan Fort Riley, Kansas Long Term Operations/Long Term Monitoring (LTO/LTM) Contract	Environmental Chemical Corp
		9.2	005	8/1/1997	Monitoring Well Installation Report Camp Funston Area Groundwater Fort Riley, Kansas	Corps of Engineers
		9.2	006	3/7/2008	Site Specific Plans for Groundwater Monitoring Activities Southwest Funston Landfill Fort Riley, Kansas	CTI
		9.3	001	2/15/1996	Quality Control Summary Report Monitoring Well Sampling Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	002	7/17/1996	Quality Control Summary Report Monitoring Well Sampling Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	003	1/3/1997	Quality Control Summary Report Monitoring Well Sampling Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	004	8/21/1997	Quality Control Summary Report Monitoring Well Sampling Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas Analytical Data Reported for	Louis Berger & Associates, Inc
		9.3	005	1/16/1998	Quality Control Summary Report Monitoring Well Sampling Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas Analytical Data Reported for	Louis Berger & Associates
		9.3	006	7/23/1998	Quality Control Summary Report Monitoring Well Sampling - May 1998 Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	007	2/9/1999	Quality Control Summary Report Monitoring Well Sampling - December 1998 Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	008	8/9/1999	Quality Control Summary Report Monitoring Well Sampling - June 1999 Southwest Funston Landfill Camp Funston Southeast Funston Landfill at Fort Riley, Kansas	Louis Berger & Associates
		9.3	009	11/27/2000	Quality Control Summary Report April 2000 Groundwater Sampling Event for Southwest Funston Landfill Long-Term Monitoring and Camp Funston Area Groundwater Study at Fort	Burns & McDonnell
		9.3	010	11/27/2000	Quality Control Summary Report September 2000 Groundwater Sampling Event for Southwest Funston Landfill Long-Term Monitoring and Camp Funston Area Groundwater Study at Fort	Burns & McDonnell
		9.3	011	2/19/2002	Quality Control Summary Report April 2001 Sampling Event Volume 1 of 2 Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	012	2/19/2002	Quality Control Summary Report April 2001 Sampling Event Volume 2 of 2 Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	013	9/28/2001	Quality Control Summary Report July 2001 USGS River Sampling Event for the Dry Cleaning Facilities Area, 354 Solvent Detections, Marshall Army Airfield, Southwest Funston Landfill at	Burns & McDonnell

Appendix B-2  
 Documents in SFL (OU001) RCRA Administrative Record  
 Fort Riley's Installation Restoration Program

OU 001/ FTRI-003	Site	Section	Doc #	Document Date	Document Title	Author
		9.3	014	4/2/2002	Quality Control Summary Report September 2001 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	015	6/12/2002	Quality Control Summary Report April 2002 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	016	9/27/2002	Quality Control Summary Report July 2002 Resampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	017	11/13/2002	Quality Control Summary Report September 2002 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	018	9/16/2003	Quality Control Summary Report April 2003 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	019	11/11/2003	Quality Control Summary Report September 2003 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	020	8/25/2004	Quality Control Summary Report March 2004 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	021	11/16/2004	Quality Control Summary Report September 2004 Sampling Event Southwest Funston Landfill/Camp Funston Area Groundwater Fort Riley, Kansas	Environmental Chemical Corp
		9.3	022	6/3/2005	Quality Control Summary Report March 2005 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	023	11/15/2005	Quality Control Summary Report September 2005 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	024	7/5/2006	Quality Control Summary Report March 2006 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	025	11/6/2006	Quality Control Summary Report September 2006 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	026	5/16/2007	Quality Control Summary Report March 2007 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	027	7/10/2007	Addendum Quality Control Summary Report May 2007 Sampling Event Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.3	028	5/18/2008	Quality Control Summary Report for Groundwater Monitoring Activities Funston Landfill Fort Riley, Kansas	CTI
		9.3	029	6/3/2009	Quality Control Summary Report for Groundwater Monitoring Activities Southwest Funston Landfill Fort Riley, Kansas	CTI
		9.3	030	8/26/2009	Quality Control Summary Report 2009 Groundwater Resampling Event Southwest Funston Landfill Fort Riley, Kansas	CTI
		9.4	001	8/29/1997	Annual Monitoring Report for the Southwest Funston Landfill, Fort Riley, Kansas, December 1995-November 1996	USGS
		9.4	002	9/17/1998	Annual Monitoring Report for Southwest Funston Landfill, Fort Riley, Kansas, 1997	USGS
		9.4	003	9/24/1999	Annual Monitoring Report for Southwest Funston Landfill, Fort Riley, Kansas, 1998	USGS
		9.4	004	2/22/2002	Annual Monitoring Report 1999 and 2000 Sampling Events for Southwest Funston Landfill Long-Term Monitoring at Fort Riley, Kansas	Burns & McDonnell
		9.4	005	3/29/2002	Long Term Monitoring Report 2001 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp

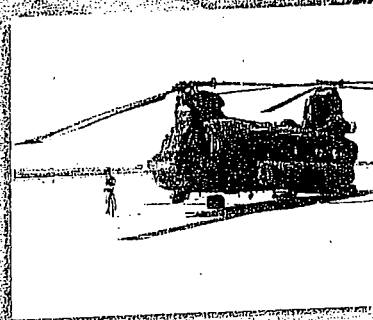
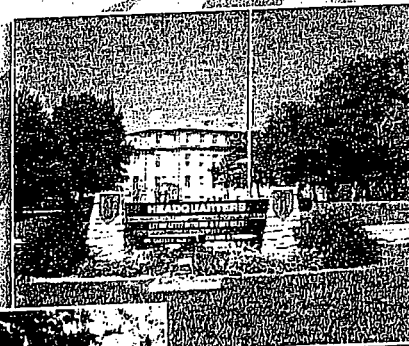
Appendix B-2  
 Documents in SFL (OU001) RCLA Administrative Record  
 Fort Riley's Intalla Restoration Program

OU/001/ FTRI-003	Site	Section	Doc #	Document Date	Document Title	Author
		9.4	006	4/30/2003	Long Term Monitoring Report 2002 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	007	2/26/2004	Long Term Monitoring Report 2003 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	008	3/25/2005	Long Term Monitoring Report 2004 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	009	3/20/2006	Long Term Monitoring Report 2005 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	010	2/27/2007	Long Term Monitoring Report 2006 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	011	9/28/2007	Long Term Monitoring Report 2007 Southwest Funston Landfill Fort Riley, Kansas	Environmental Chemical Corp
		9.4	012	7/28/2008	Long Term Monitoring Report Southwest Funston Landfill Fort Riley, Kansas 2008	CTI
		9.4	013	11/18/2009	Long Term Monitoring Report Southwest Funston Landfill Fort Riley, Kansas 2009	CTI
		9.5	001	11/3/1997	1997 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	002	10/15/1998	1998 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	003	12/8/1999	1999 Annual Inspection Report and Maintenance/Repair Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill	Corps of Engineers
		9.5	004	10/16/2000	2000 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	005	3/5/2002	2001 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	006	11/13/2002	2002 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	007	12/10/2003	2003 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	008	1/6/2005	2004 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	009	10/18/2005	2005 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	010	10/18/2006	2006 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	011	10/5/2007	2007 Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable Unit 001 Fort Riley,	Corps of Engineers
		9.5	012	10/15/2008	2008 Maintenance and Repair Report and Annual Inspection Report Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston	Corps of Engineers
		9.5	013	6/10/2009	2009 Maintenance and Repair Report and Annual Inspection Report Southwest Funston Landfill Fort Riley, Kansas (Bound in Annual Inspections Southwest Funston Landfill Operable	Corps of Engineers
		9.6	001	11/1/1997	Institutional Controls Plan for Southwest Funston Landfill Operable Unit 001 Fort Riley, Kansas	Corps of Engineers
		13	001	8/15/1993	Public Notice for Southwest Funston Landfill EE/CA	Fort Riley
		13	002	11/6/1994	Public Notice for Southwest Funston Landfill Proposed Plan	Fort Riley

# Real Property Master Plan Digest

Fort Riley, Kansas

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U.S. Army Garrison  
Fort Riley, Kansas

2010-2011



(e.g., improvement of low-water stream crossings both improves safety of soldiers training and water quality in the streams).

The Fort Riley Integrated Natural Resources Management Plan (INRMP) addresses the Installation's efforts to protect and manage the natural resources of Fort Riley's 100,707 acres. The Installation is predominantly grassland interspersed with linear communities of woodlands highly variable in width and associated with streams, other woodland plantings, relatively small man-made water impoundments, and structures. The Installation's community is representative of mid-continent species dependent upon those physiographic and floral features. The fauna (as well as to a more limited degree the flora) in some areas are further influenced by their proximity to Milford Lake, a 15,000-acre impoundment adjacent to the Fort. The INRMP describes the Installation, its natural resources, and the activities currently undertaken to manage those resources. It assigns responsibilities for management actions and describes funding requirements for those actions.

**4.2.1.16 Bird Aircraft Strike Hazard (BASH) Plan** Airfields and their environs provide favorable habitat for feeding, loafing, breeding, and roosting of both indigenous and over-wintering bird populations, thus



▲ Open Green Area, Main Post

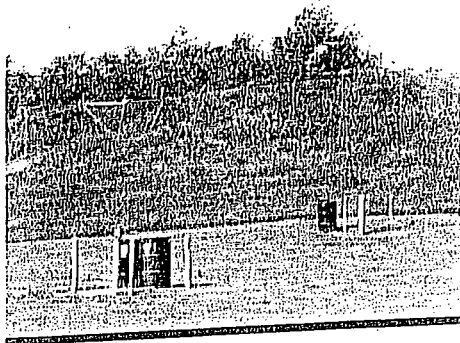
creating the potential for bird aircraft strikes. Presently, there is no aviation safety control plan to manage bird strikes at Marshall Army Airfield. The airfield is currently used by only rotary-wing aircraft.

**4.2.2 Environmental Quality**

The impact of an area's environmental factors must be considered when planning for future development. The following are important factors that impact Fort Riley and must be considered in the decision-making process.

**4.2.2.1 Hazardous Waste Generation Points**

The purpose of the Installation Restoration Program (IRP) is to clean-up sites contaminated by hazardous chemical and petroleum products and if possible make them available for unrestricted use. However, clean-up at some sites is either impracticable or long term and contamination remains in place.



▲ Installation Restoration Program Site  
Monitoring Wells at Marshall Army Airfield

Institutional controls are then required to prevent disturbance of these sites. Any activity or land use change (e.g. open space to industrial) on or near the IRP sites require review by the IRP, EDPW, and PW.

IRP sites are shown in the Environmental Overview map, Figure 4.9. The sites with their restriction are tabulated on Table 4.2, Installation Restoration Program Site Restrictions.

Looking at Figure 4.9, the following observations can be made:

- The IRP Area of Influence is shown on the map by the left-to-right cross-hatches. The active contaminated sites are designated in the white text boxes. These sites have subsurface soil and or groundwater contamination.
- Landfills are designated by the right-to-left cross-hatches. The main hazards at landfills are from soil subsidence and asbestos exposure. Signs are posted at landfill perimeters and vehicle

access is restricted by gates at the active Campbell Hill Construction Debris Landfill and at the two most recently closed sanitary landfills on Custer Hill and Southwest Funston.

- Old small arms ranges not associated with the Impact Area are designated by peppered markings. The main hazard at these ranges is from lead-contaminated soil.

The following activities are restricted within the IRP Area of Influence and at landfills:

- Building Construction and Demolition
- Use of Track Vehicles
- Digging and Trenching
- Drilling Drinking Water Wells

The main negative impact organizations can have to the IRP is damaging monitoring wells from vehicle use or construction activities. The following monitoring well components require protection: concrete pads, protective posts, survey markers, locks, pumps, data collection platforms, and well risers. The protective posts are generally painted with either brown or orange paint. Flush mount wells at the ground surface have round brass and metal covers. The locations of most of the monitoring wells are shown in Figure 4.9, but there are a few on the perimeter of the Impact Area that are not shown.

Table 4.2  
Installation Restoration Program Site Restrictions

SITES	PHYSICAL CONTROLS		RESTRICTED ACTIVITIES			
	Fence	Signs	Bldg. Const & Demo	Use of Track Vehicles	Digging & Trenching	Drilling Drinking Water Wells
<b>Camp Forsyth</b>			X	X	X	
Former Wherry Substation			X	X	X	X
Forsyth Landfills			X		X	
Old Small Arms Ranges						
<b>Camp Funston</b>			X	X	X	
DRMS Storage Area 1			X		X	X
Former Bldg 1044			X		X	X
Dispensing Station					X	X
Former Bldg 1245			X		X	X
Dispensing Station			X		X	X
Former Bldg 1637			X			X
Dispensing Station			X			X
Former DS/GS Bldg 1693			X		X	
Old Small Arms Ranges			X	X	X	X
Southeast Funston Landfill			X	X	X	X
Southwest Funston Landfill	X	X	X		X	
WW1 Camp Funston			X		X	
Former Incinerator Site						
<b>Camp Whitside</b>						
Camp Whitside Const		X	X	X	X	X
Debris Landfill						
<b>Campbell Hill</b>						
Campbell Hill Const Debris		X	X	X	X	X
Landfill						
<b>Custer Hill</b>						
Custer Hill PX USTs						X
Bldg 5320			X	X	X	X
Custer Hill Sanitary Landfill	X	X	X	X	X	X
Ellis Heights Const Debris			X	X	X	X
Landfill			X	X	X	X
POL Tank Farm						
<b>Impact Area</b>			X	X	X	X
OB/OD Ground (Range 16)						
<b>Main Post</b>						
354 Area Solvent Detections			X		X	X
Dry Cleaning Facilities Area			X	X	X	X
Main Post Landfills					X	
Pesticide Storage Facility			X			
Bldg 348						X
TMP Gas Station Bldg 388						
<b>Marshall Army Airfield</b>						
Abandoned Gas Line			X		Y	X
Former Fire Training Area			Y		Y	
Marshall Army Airfield						
Water Tower Control			X			
Station Bldg 734						

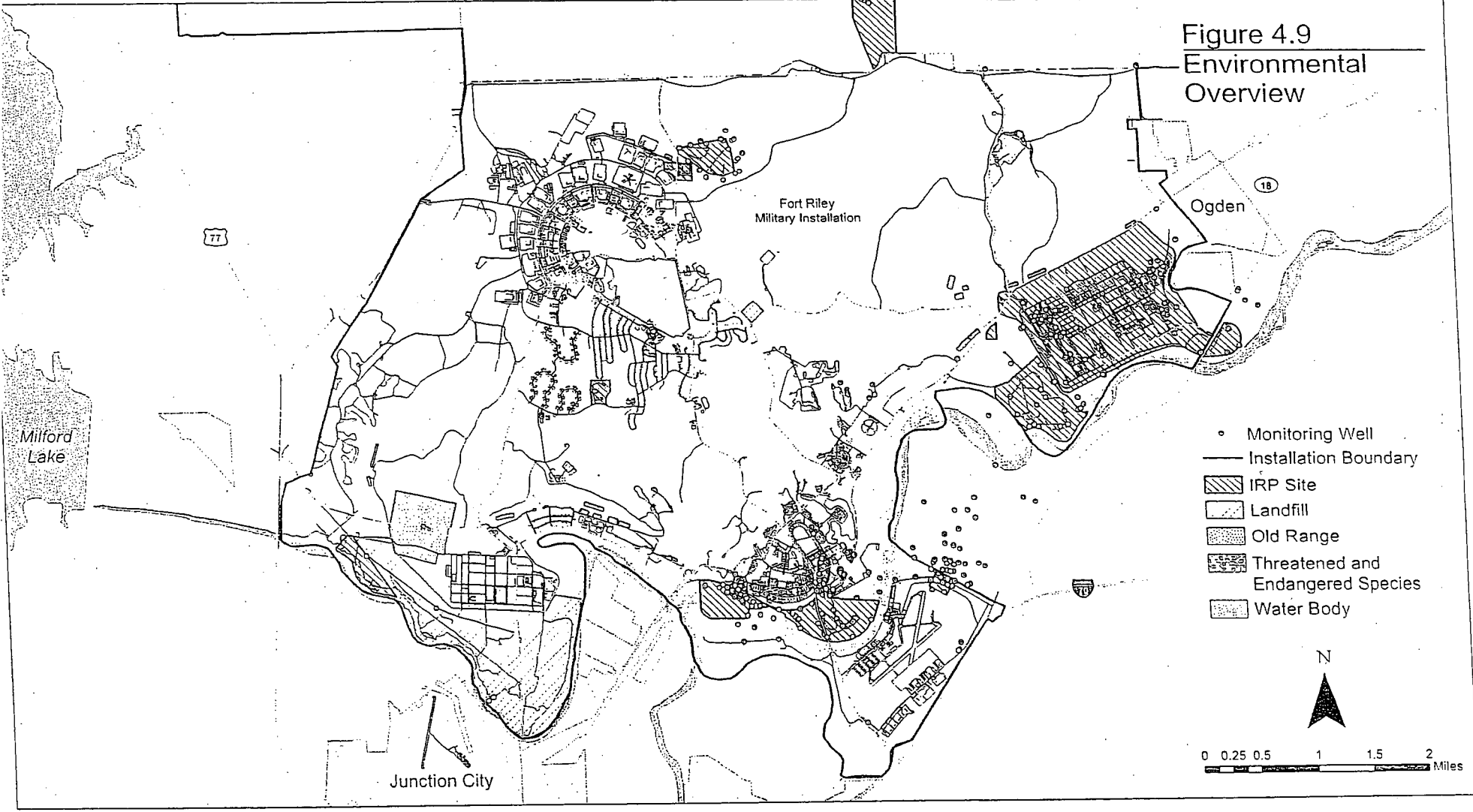


Figure 4.9  
Environmental  
Overview

- Monitoring Well
- Installation Boundary
- ▨ IRP Site
- ▨ Landfill
- ▨ Old Range
- ▨ Threatened and Endangered Species
- ▨ Water Body



0 0.25 0.5 1 1.5 2 Miles

Sites	Physical Controls		Restricted Activities			
	Fences	Signs	Building Construction /Demolition	Use of Track Vehicles	Digging/ Trenching	Drilling Drinking Water Wells
<b>Camp Forsyth</b>						
Former Wherry Substation			X	X	X	
Forsyth Landfills			X	X	X	X
Old Small Arms Ranges			X		X	
<b>Camp Funston</b>						
DRMO Storage Area 1			X	X	X	
Former Building 1044 Dispensing Station			X		X	X
Former Building 1245 Dispensing Station			X		X	X
Former Building 1637 Dispensing Station			X		X	X
Former DS/GS (Bldg 1693)			X			X
Old Small Arms Ranges			X		X	
Southeast Funston Landfill			X	X	X	X
Southwest Funston Landfill	X	X	X	X	X	X
WW1 Camp Funston Former Incinerator Site			X		X	
<b>Camp Whitside</b>						
Camp Whitside Construction Debris Landfill		X	X	X	X	X
<b>Campbell Hill</b>						
Campbell Hill Construction Debris Landfill		X	X	X	X	X
<b>Custer Hill</b>						
Custer Hill PX USTs (Bldg 5320)						X
Custer Hill Sanitary Landfill	X	X	X	X	X	X
Ellis Heights Construction Debris Landfill			X	X	X	X
POL Tank Farm			X		X	
<b>Impact Area</b>						
OB/OD Ground (Range 16)			X	X	X	X
<b>Main Post</b>						
354 Area Solvent Detections						X
Dry Cleaning Facilities Area			X		X	X
Main Post Landfills			X	X	X	X
Pesticide Storage Facility (Bldg 348)			X		X	
TMP Gas Station (Bldg 388)						X
<b>Marshall Army Airfield</b>						
Abandoned Gas Line			X		X	X
Former Fire Training Area Marshall Army Airfield			X		X	
Water Tower Control Station (Bldg 734)			X			

**APPENDIX C**

- C-1: *2009 Maintenance and Repair Report and Annual Inspection Report, Southwest Funston Landfill, Fort Riley, Kansas, June 10, 2009 and Photographs of the Site Access Controls, the Landfill Cover Repair and the Rock Armoring of the Upper Riverbank Slope in September-October 2009*
  
- C-2: CD of SFL Historical Analytical Data

2009

**MAINTENANCE AND REPAIR REPORT**

**and**

**ANNUAL INSPECTION REPORT**

**SOUTHWEST FUNSTON LANDFILL**

**FORT RILEY, KANSAS**

**June 10, 2009**

**1. INTRODUCTION**

The Operations and Maintenance (O&M) Plan for Southwest Funston Landfill (SFL) dated September 30, 1996 requires that a Maintenance/Repair Report be prepared whenever these activities are accomplished. Landfill repairs were accomplished during the period of May 20 through July 16, 2008. The repaired areas were reseeded with native grass seed during winter/spring of 2009.

The calendar year 2009 inspection of Southwest Funston Landfill was conducted on May 11, 2009. The sky was clear and the temperature was 55 degrees Fahrenheit. The inspection team included two environmental protection specialists and an agronomist from the Directorate of Public Works, Environmental Division, Fort Riley, Kansas, two environmental scientists from the Kansas Department of Health and Environment, and a civil engineer from the U.S. Army Corps of Engineers, Kansas City District. The landfill surface and vegetative cover, signage, and the Kansas River bank stabilization were included in this inspection.

**2. 2009 MAINTENANCE AND REPAIR REPORT**

Differential settlement on the eastern half of landfill was repaired during 2008 through a contract executed by the Corps of Engineers, Kansas City District. The details of the project, that were reported in the 2008 Inspection Report, follow:

Contractor: McKinzie Construction, Inc., Kansas City, Missouri

Contract Amount: \$266,252

Performance Period: June thru July 2008.



Project Scope:

- Approximately 10,000 cubic yards of fill were placed, graded and compacted to restore differentially settled areas to their original grade on the eastern half of the landfill.

The areas that were repaired during June and July 2008 were seeded with a native grass mixture in January 2009 and repaired areas that were missed during the initial seeding were seeded on April 8, 2009. The following seed mixture was sown in the repaired areas:

<u>Species</u>	<u>Cultivar</u>	<u>by Weight</u>	<u>Pounds per Acre</u>
Switchgrass	Blackwell	25.00	2.0
Western Wheatgrass	Barton	18.75	1.5
Sideoats Gramma	El Reno	18.75	1.5
Big Bluestream	Kaw	12.50	1.0
Little Bluestream	Aldous	12.50	1.0
Indiangrass	Osage	12.50	1.0
		100.0	8.0

### 3. 2009 INSPECTION RESULTS

#### 3.1 Native Soil Cover

3.1.1 Observed Condition – As has been noted in previous inspections, the native grasses are mature, healthy and in excellent condition on a majority of the landfill.

#### 3.1.2 Deficiencies Noted/Recommendations

- The grasses on the landfill were burned on April 22, 2009 which provided an excellent opportunity to observe and record the location of depressions on the landfill surface. The coordinates of photographs taken of observed differential settlement, ponded areas and eroded areas during this inspection are provided in Table 1 and the locations are plotted on Figure 1. The photographs are included in Attachment A to this report. These areas will be included in the next cover repair project that is currently scheduled for 2013.

- Repairs to the eastern half of the landfill were accomplished during June and July 2008 and those areas were seeded in January and April 2009. During this inspection, it was noted that native grass planted as a part of those repairs were beginning to show signs of development.
- Four species of State of Kansas noxious weeds have been observed on the landfill during previous inspections: *Sericea lespedeza* (*Lespedeza cuneata* (Dumount) G. Don), Field bindweed (*Convolvus arvensis* L.), Johnsongrass (*Sorghum halepense* (L.) Pers.), and musk thistle (*Cardus nutans* L.). Because of the recent burn, it was not possible to positively locate and identify those species during this inspection. An Oak Ridge Institute for Science and Education (ORISE) researcher who is investigating different methods of noxious weed surveying and prediction models inspected the landfill for the presence of *Sericea lespedeza* during the fall of 2008. The results of his inspection are shown on figure 2.

**Table 1**  
**Location of Photographs**  
**2009 Southwest Funston Landfill Inspection**  
**May 11, 2009**

Photo No.	Latitude	Longitude
SFL2009-1	39.08881	-96.74163
SFL2009-2	39.08936	-96.74098
SFL2009-3	39.08844	-96.74034
SFL2009-4	39.08672	-96.73954
SFL2009-5	39.08647	-96.73941
SFL2009-6	39.08579	-96.73784
SFL2009-7	39.08625	-96.73729
SFL2009-8	39-08139	-96.73773
SFL2009-9	Not Recorded	Not Recorded
SFL2009-10	Not Recorded	Not Recorded

Coordinates are NAD 83, Zone 14, Decimal Degrees

### 3.2 Kansas River Bank Stabilization

3.2.1 Observed Condition - The bank stabilization structure is performing as designed. There is no evidence of erosion, sloughing, or scour of the revetment. The current condition of the rock revetment is shown in photographs SFL2009-9 and SFL2009-10 at Attachment A.

### 3.2.2 Deficiencies Noted/Recommendations – None

**3.3 Signage** – Signs have been placed at the primary and secondary access gates and along Well House Road warning that access to the landfill is restricted and that potentially hazardous conditions may be present. During this inspection it was noted that the information on the signs was current.

**3.4 Monitoring Wells** – The monitoring wells were not specifically included in this inspection. They are inspected during each sampling event. During the March/April 2009 sampling event, the majority of all outstanding deficiencies in the monitoring wells were repaired. The details of those repairs were reported in the Daily Quality Control Reports that are included as Attachment B to this report.

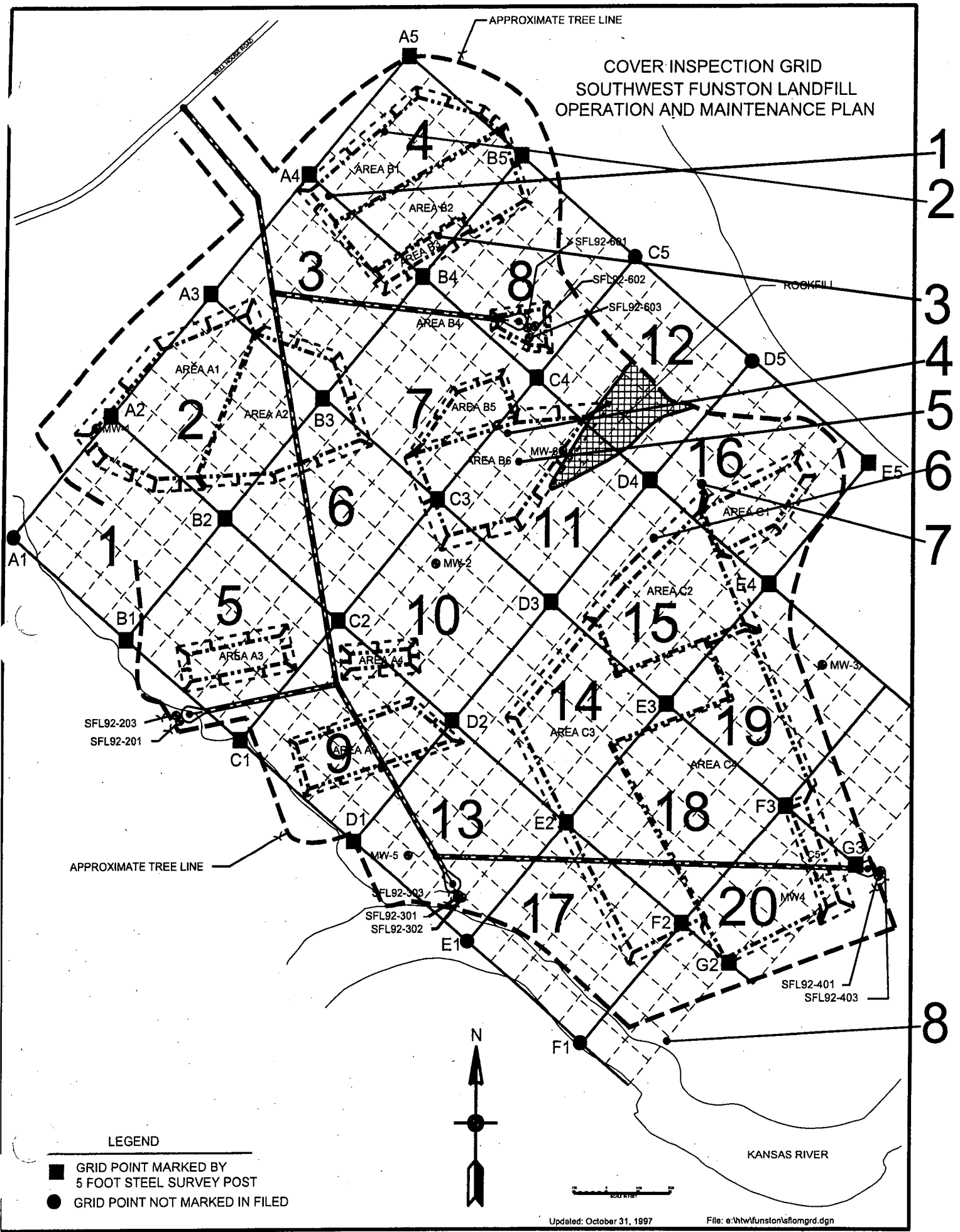


Figure 1 - Location of photographs taken during May 11, 2009 inspection.



**Figure 2 Funston Landfill Serecia Infestation 2008**



<b>Plants Per Point</b>		Heavy Infestation	9 Pts (32%)	<b>28 Total Data Points</b>	Food Plots	
1 - 5	16 - 20	Moderate Infestation	4 Pts (14%)		Fire Breaks	
6 - 9	21 - 30	Light Infestation	15 Pts (54%)	0 40 80 160 240		
10 - 15	31 - 50	Treatment	0 Pts (0%)	Meters		



**Attachment A**

**Photographs**

**2009 Inspection**

**Southwest Funston Landfill**

**Fort Riley, Kansas**

**May 11, 2009**



Photograph SFL2009-1 – View looking east of differential settlement/ponding in northeast quadrant of landfill (11May 09).



Photograph SFL2009-2 – View looking east of standing water in northeast quadrant of landfill (11 May 09).





Photograph SFL2009-3 – View looking east at newly repaired area in northeast quadrant of landfill (11 May 09).



Photograph SFL2009-4 – View looking west of differential settlement/ponding in east central portion of landfill (11 May 09).





Photograph SFL2009-5 – View looking west of differential settlement in central portion of east half of landfill (11 May 09).



Photograph SFL2009-6 – View looking east of standing water in east central section of the landfill (11 May 09).





Photograph SFL2009-7 – Differential settlement/ponding at east central edge of landfill (11May 09).



Photograph SFL2009-8 – Back cut erosion at downstream end of revetment (11 May 09).





Photograph SFL2009-9 – Upstream reach of rock revetment (11May 09).



Photograph SFL2009-10 – Downstream reach of rock revetment (11 May 09).

**Attachment B**

**Daily Quality Control Reports**

**March/April 2009 Sampling Event**

**Southwest Funston Landfill**

**Fort Riley, Kansas**







# DAILY QUALITY CONTROL REPORT

Site: SFL – Fort Riley	Project Manager: R. Stenson	Quality Control: F. Bader	Page No.: 1 of 1
Date: 4-1-09	Week No.: 1	Hours on Site: 10	Work Order & Task: W912DQ-08-D-0031-0001 - Groundwater
Written By: Phillip Riley		Reviewed By: R. Stenson 4-1-09	
Weather/Temperature: Clear to partly cloudy, temp 25 - 55.			
Location of Work: Southwest Funston Landfill			
Project Personnel: Phillip Riley, Matthew Chidlow		Equipment:	Visitors/Affiliation:
• Field Team Leader: Phillip Riley		QED Bladder pump controller	NONE
• CQC Manager:		QED : Interface probe	
• SSHO: Phillip Riley		Hach 2100P Turbidimeter	
• Others: Andrea Austin of Fort Riley		YSI #556 Water Quality Instrument	
Work Performed by CTI:			
<p>Check in at gate, proceed to the equipment storage room and install fittings and tubing on the replacement QED T 1100 bladder pumps. Proceed to SFL to install the pumps into wells SFL92-603 and SFL92-303. Functionally tested each pump and confirmed operation. Received a rental YSI Model 556 instrument from vendor. This instrument was calibrated by the vendor prior to delivery. Calibrated the equipment and tested the response of the colorimeter kit to a standard Fe<sup>2+</sup> solution. Performed low flow groundwater sampling at wells SFL92-303, SFL94-03A, SFL94-02A and SFL94-04B. Calibrated the Dissolved Oxygen sensor to 100% at each location. Placed purge water into sanitary manhole #96. SFL94-04B turbidity stability was not achieved but the measured value dropped below 30 NTU as required by the method. A noticeable improvement to the purge water quality was observed at SFL94-02A. The pump inlet is now above the bottom of the well and the colloidal material observed during the 2008 sampling event was absent. Note: Wells SFL94-03A, SFL94-02A and SFL94-04B were not scheduled to be sampled today. Due to rain forecast overnight and on 4-2-09, these wells were sampled in order to ensure safe access to the wells and reduce the possibility of weather impact on project completion.</p>			
Safety Observations/Violations/Comments:			
NONE			
Calibration of Field Equipment (See Calibration Logs in File):			
YSI Model 556 calibrated by the vendor 4-1-09, Hach 2100P turbidimeter calibrated on site.			
Checked response of the Ferrous Iron test kit against a standard solution.			
Certification:			
I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specification, except as may be noted above.			
Signature: _____ Phillip Riley			

# DAILY QUALITY CONTROL REPORT

Site: SFL - Fort Riley	Project Manager: R. Stenson	Quality Control: F. Bader	Page No.: <u>1</u> of <u>1</u>
Date: 4-2-09	Week No.: 1	Hours on Site: 9.5	Work Order & Task: W912DQ-08-D-0031-0001 - Groundwater
Written By: Phillip Riley		Reviewed By: R. Stenson	
Weather/Temperature: Sleet, snow and wind in AM, to clear and 50 in afternoon.			
Location of Work: Southwest Funston Landfill			
Project Personnel: Phillip Riley, Matthew Chidlow		Equipment:	Visitors/Affiliation:
• Field Team Leader: Phillip Riley		QED Bladder pump controller	Ryan Weiser KDHE
• CQC Manager:		QED : Interface probe	
• SSHO: Phillip Riley		Hach 2100P Turbidimeter	
• Others: Andrea Austin of Fort Riley		YSI #556 Water Quality Instrument	
Work Performed by CTI:			
<p>Check in at gate, proceed to building # 407 to meet with Dr. Shields and visit the PSF and AGL sites. Discuss the projects and requirements. Proceed to SFL to continue the groundwater sampling. Calibrate the field water quality instruments and begin at well SFL92-401. Continue at well SFL92-403. The purged groundwater parameters reach the required level of stability noticeably quicker than in 2008. This is likely a result of the corrected pump inlet positions, the pump inlet screens are now located above the bottom of the wells. At 1300, met with Ryan Weiser of KDEH and Andrea Austin of Fort Riley to collect split samples at SFL92-603. Mr. Weiser and Ms Austin observed the entire groundwater purge and sample process, the samples were collected at 1355. Conducted sampling at wells SFL92-601 and SFL97-903 with no problems. Collected MS/MSD sample at SFL92-601. Note: calibrated the Dissolved Oxygen sensor to 100% at each location. Placed purge water into sanitary manhole #96. This completes the SFL well repair and groundwater sampling projects. The samples are securely packed on ice awaiting shipment to the laboratories on 4-3-09.</p>			
Safety Observations/Violations/Comments:			
NONE			
Calibration of Field Equipment (See Calibration Logs in File):			
YSI Model 556 and Hach 2100P turbidimeter were calibrated on site.			
Checked response of the Ferrous Iron test kit against a standard solution.			
Certification:			
I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specification, except as may be noted above.			
Signature: _____		Phillip Riley	

Photograph of SFL (30 November 2009)-1: View looking south at the entrance to the Southwest Funston Landfill-site access controls replaced/updated in September-October 2009: Warning Signage, Locked Gates, and Concrete Barriers





Photograph of SFL (23 November 2009)-2: Landfill cover repair of differential settlement/ponding in northeast quadrant of the Southwest Funston Landfill in September –October 2009





Photograph of SFL (30 November 2009)-3: Landfill cover repair of differential settlement/ponding at east central edge of landfill





Photograph of SFL (23 November 2009)-4: Rock armoring of the landfill upper riverbank slope of rubble areas to cover slate, tar material, and 4% Chrysotile asbestos tiles in October 2009





Photograph of SFL (23 November 2009)-5: Two-hundred-fifty (250) linear feet of rock armoring of the landfill-upper riverbank slope to cover the exposed rubble of slate, tar materials, and 4% Chrysotile asbestos tiles in October 2009

