# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

**E25**
**SSW**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000082882**

| | | | |
|---|---|---|---|
| Organization: | Dauberger Oil Ind Llc | Client ID: | 253807 |
| Client: | Dauberger Oil Ind Llc | Site Name: | Dauberger 2 Og Well |
| Primary Facility: | Dauberger 2 | Sub Facility: | Dauberger Oil Ind 2 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Active |
| Compliance: | YES | | |

---

**F26**
**SE**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000169711**

| | | | |
|---|---|---|---|
| Organization: | Timberline Energy Inc | Client ID: | 79974 |
| Client: | Timberline Energy Inc | Site Name: | J Mccrea Sr M-5 Well |
| Primary Facility: | J. Mccrea, Sr. M-5 | Sub Facility: | J. Mccrea, Sr. M-5 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Abandoned |
| Compliance: | YES | | |

---

**G27**
**NE**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000010880**

| | | | |
|---|---|---|---|
| Organization: | Pennzoil Quaker State Co | Client ID: | 110995 |
| Client: | Pennzoil Quaker State Co | Site Name: | Plant 2 3 Og Well |
| Primary Facility: | Plant 2 3 | Sub Facility: | Plant 2 3 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Inactive |
| Compliance: | YES | | |

---

**E28**
**SSW**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000024813**

| | | | |
|---|---|---|---|
| Organization: | Dauberger Oil Ind Llc | Client ID: | 253807 |
| Client: | Dauberger Oil Ind Llc | Site Name: | Dauberger Oil Ind 3 Og Well |
| Primary Facility: | Dauberger Oil Ind 3 | Sub Facility: | Dauberger Oil Ind 3 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Active |
| Compliance: | YES | | |

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# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

**G29**
**NE**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000122077**

| | | | |
|---|---|---|---|
| Organization: | Pennzoil Quaker State Co | Client ID: | 110995 |
| Client: | Pennzoil Quaker State Co | Site Name: | Plant 2 1 Og Well |
| Primary Facility: | Plant 2 1 | Sub Facility: | Plant 2 1 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Inactive |
| Compliance: | YES | | |

---

**G30**
**NE**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000074686**

| | | | |
|---|---|---|---|
| Organization: | Pennzoil Quaker State Co | Client ID: | 110995 |
| Client: | Pennzoil Quaker State Co | Site Name: | Plant 2 2 Og Well |
| Primary Facility: | Plant 2 2 | Sub Facility: | Plant 2 2 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Inactive |
| Compliance: | YES | | |

---

**F31**
**SE**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000175772**

| | | | |
|---|---|---|---|
| Organization: | Timberline Energy Inc | Client ID: | 79974 |
| Client: | Timberline Energy Inc | Site Name: | J Mccrea Sr M-9 Well |
| Primary Facility: | J. Mccrea, Sr. M-9 | Sub Facility: | J. Mccrea, Sr. M-9 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Abandoned |
| Compliance: | YES | | |

---

**32**
**SSW**
**1/2 - 1 Mile**

**OIL_GAS** **PAOG70000143474**

| | | | |
|---|---|---|---|
| Organization: | Dauberger Oil Ind Llc | Client ID: | 253807 |
| Client: | Dauberger Oil Ind Llc | Site Name: | Dauberger Oil Ind 4 Og Well |
| Primary Facility: | Dauberger 4 | Sub Facility: | Dauberger Oil Ind 4 |
| Type: | Oil & Gas Location | Subtype: | NonCoal |
| Sub Facility Type: | Well | Site Status: | Active |
| Compliance: | YES | | |

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# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
# RADON

**AREA RADON INFORMATION**

State Database: PA Radon

Radon Test Results

| Zipcode | Num Tests | Min pCi/L | Max pCi/L | Avg pCi/L |
|---|---|---|---|---|
| 16301 | 823 | 0.1 | 280 | 11.7 |

EPA Region 3 Statistical Summary Readings for Zip Code: 16301

Number of sites tested: 169.

Maximum Radon Level: 115.8 pCi/L.
Minimum Radon Level: 0.3 pCi/L.

| pCi/L <4 | pCi/L 4-10 | pCi/L 10-20 | pCi/L 20-50 | pCi/L 50-100 | pCi/L >100 |
|---|---|---|---|---|---|
| 74 (43.79%) | 42 (24.85%) | 19 (11.24%) | 24 (14.20%) | 8 (4.73%) | 2 (1.18%) |

Federal EPA Radon Zone for VENANGO County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

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# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

## HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Pennsylvania Spatial Data Access
Telephone: 610-344-6105

## HYDROGEOLOGIC INFORMATION

AQUIFLOW$^{R}$ Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

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## GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Pennsylvania Groundwater Information System
Source: Department of Conservation and Natural Resources
Telephone: 717-702-2045

## OTHER STATE DATABASE INFORMATION

Pennsylvania Oil and Gas Locations
Source: Pennsylvania Department of Environmental Protection
Telephone: 814-863-0104
An Oil and Gas Location is a DEP primary facility type related to the Oil & Gas Program. The sub-facility types related to Oil and Gas that are included in this layer are:Land Application -- An area where drilling cuttings or waste are disposed by land application; Well-- A well associated with oil and/or gas production; Pit -- An approved pit that is used for storage of oil and gas well fluids. Some sub facility types are not included in this layer due to security policies.

RADON

State Database: PA Radon
Source: Department of Environmental Protection
Telephone: 717-783-3594
Radon Test Results Statistics by Zip Code

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

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# PHYSICAL SETTING SOURCE RECORDS SEARCHED

EPA Region 3 Statistical Summary Readings
Source: Region 3 EPA
Telephone: 215-814-2082
Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

**STREET AND ADDRESS INFORMATION**

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# APPENDIX D

July 11, 1997 PA DEP Letter and Moody Report

DRAFT

Pennsylvania Department of Environmental Protection

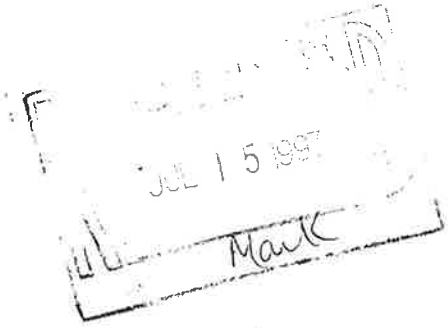
**230 Chestnut Street**
**Meadville, PA 16335-3481**

July 11, 1997

814-332-6648
Fax: 814-332-6121

**Northwest Regional Office**

Mr. David E. Gibbs, P.E., CHMM
Corporate Dirrector of Environmental Affairs
Webco Industries, Inc.
P.O. Box 100
Sand Springs, OK 74063




RE: August 7, 1989 Consent Order & Agreement
Webco's Oil City Tube Works
Oil City, Venango County

Dear Mr. Gibbs:

Reviews have been conducted on the Moody and Associates Inc. "Statistical Analysis of Ground Water Quality Observations" report which was received by the Department on May 5, 1997. This report analyzes the groundwater sampling results of the Oil City Tube Works located in Oil City, Pennsylvania. Based upon that report, the Department hereby terminates Webco's obligations under the Consent Order and Agreement dated August 7, 1989.

The Department does not release Webco Industries, Inc. t/d/b/a Oil City Tube Works from any liability arising from any past, present, or future contamination at this site. In the event significant contamination is found subsequent to this determination, the Department reserves the right to require additional investigation or remediation at the site. The Department reserves the right to enforce those statutes, rules and regulations applicable to environmental compliance by any legal or equitable action.

If you have any questions regarding this matter, please contact me at 814-332-6648.

Sincerely,

Craig Lobins

Craig Lobins
Acting Program Manager
Environmental Cleanup Program

SCL/lsl

cc: Mr. Mark B. Miller, P.G.
Mary Susan Davies
Bob Voegele
NWRO - Case File

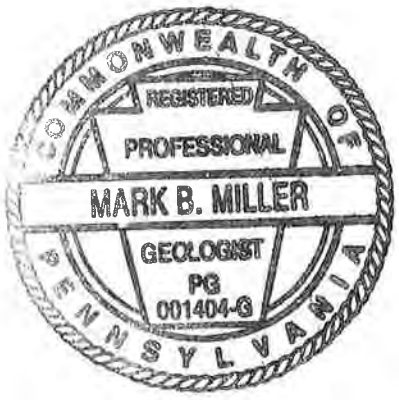
# Statistical Analysis of Ground Water Quality Observations

**Oil City Tube Works**
**Oil City, Pennsylvania**

*Prepared For:*

Mr. David E. Gibbs, P.E., CHMM
**WEBCO Industries, Inc.**
Post Office Box 100
Sand Springs, Oklahoma, 74063

April 15, 1997




*Submitted By:*

William L. Miller
Geologist

Mark B. Miller WLM.
Mark B. Miller, P.G.
Geologist

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# STATISTICAL ANALYSIS OF GROUND WATER QUALITY OBSERVATIONS: OIL CITY TUBE WORKS

## INTRODUCTION:

Moody and Associates, Inc. (Moody's) has reviewed the recently collected ground water quality data for the Oil City Tube Works (OCTW) site located in Oil City, Pennsylvania. This report discusses the volatile organic compounds (VOC) found in the ground water beneath the OCTW, the direction of ground water flow and the statistical comparison between the VOC concentrations observed at the present recovery system and at the upgradient property boundary.

## BACKGROUND:

On May 7, 1996, a Site Characterization Plan was submitted to the Pennsylvania Department of Environmental Protection (PaDEP). This Plan outlined an investigation to be conducted to determine if VOCs were moving onto the Oil City Tube Works property upgradient from the on-site remediation system. The Plan was approved by the PaDEP.

A series of eight monitoring wells were installed along the northeast boundary of the OCTW property during May 1996. The locations and top of casing elevations of the monitoring wells are shown on FIGURE 1. These wells were developed and sampled in May and June 1996. The collected ground water samples were analyzed for VOCs.

A report was prepared and submitted to the PaDEP on August 27, 1996, summarizing the findings. The analytical results indicated that VOCs were moving onto the OCTW property in the area of MW-12 and MW-13. These VOCs are subsequently detected and treated by the current remediation system.

The August 1989, Consent Order and Agreement set cleanup standards for VOCs in ground water at the OCTW site. These standards cannot be achieved due to the VOCs entering this site from an off-site source.

In a letter dated October 29, 1996, the PaDEP requested additional information be provided before the August 7, 1989, Consent Order and Agreement could be amended. Specifically, the PaDEP requested that all monitoring wells be surveyed to a common datum so that an accurate ground water contour map could be generated. The PaDEP also requested that a minimum of four rounds of ground water samples be collected from

the monitoring wells, which would allow statistical testing to evaluate the possible off-site location of the source of the VOC contamination observed at the remediation system.

Two additional rounds of ground water samples were collected in November 1996, and February 1997, and tested for VOCs. The analytical laboratory results for the four rounds of samples are attached to this report as APPENDIX D.

## GROUND WATER FLOW:

The ground water elevations in all monitoring wells were measured on February 19, 1997. The ground water elevations were used to prepare a ground water table map, shown as the attached FIGURE 2. Ground water flow directions were determined by solving a three-point problem, which is a method of determining the orientation of a plane (the water table) from three points, using the ground water elevations measured at MW-11, MW-6 and MW-22. The results of the three-point problem are also shown on FIGURE 2, and indicate that ground water is flowing to the southwest across the site.

The ground water samples from the upgradient wells showed significant VOC contamination in the area of MW-12 and MW-13. Elevated concentrations of trichloroethene, 1,2-dichloroethylene and vinyl chloride were detected in these two monitoring wells. These same compounds are found in ground water samples collected at the on-site recovery well. The results of the ground water flow direction calculations indicate that the area of MW-12 and MW-13 is directly upgradient of the recovery well.

## STATISTICAL EVALUATION OF UPGRADIENT AND DOWNGRADIENT WELLS:

Since the VOC contaminated ground water entering the property at MW-12 and MW-13 is directly upgradient of the recovery well and the observed compounds in these wells and the recovery well are similar in type and concentrations, it is possible that the source of the ground water contamination treated at the recovery well is not on-site, but is off-site, upgradient from the site property line. To test this possibility, a series of statistical tests were conducted on the ground water quality results for the three wells for the three VOCs listed above. The statistical tests were conducted using the GRITS/STAT; A Ground Water Information Tracking System with Statistical Analysis Capability, version 5.0 computer software published by the United States Environmental Protection Agency. In order to compare contaminant levels over similar time periods, the recovery well ground water results from samples collected in March, June, September, November 1996 and February 1997, were compared to the results for MW-12 and MW-13. The recovery well was set as the downgradient well and MW-12 and MW-13 were set as the upgradient wells. Statistical tests comparing the ground water concentrations observed at

the three wells were run for the each of the three VOCs identified above. The results of the statistical test evaluations of 1,2-dichloroethylene concentrations are attached as APPENDIX A, the trichloroethene evaluation as APPENDIX B and the vinyl chloride evaluation as APPENDIX C.

For each of the three VOCs considered, 1,2-dichloroethylene (1,2-DCE), trichloroethene (TCE) and vinyl chloride (VC), a series of statistical test results are presented. A data set summary is included listing the sampling dates, observed concentrations in parts per billion, the minimum and maximum values, the mean, and the standard deviation of the original data set and the natural logarithm of the original data for each well.

The first statistical test performed on the data was to test for a statistically normal distribution of the data. These tests indicated that the original data for VC and the natural logarithm of the original data, called log transformed, for 1,2-DCE and TCE were normally distributed. In the subsequent tests, the original VC and the log transformed 1,2-DCE and TCE data were utilized. Probability plots, another method of assessing normality, were also run on the data and are included. Generally, a normal distribution will plot along the line shown in the probability plot.

The datasets listed above were found to show a normal distribution. The variance of the data was reviewed using a box plot, which is a quick and convenient way to visualize the spread of data. The box plots of the normally distributed datasets are included. The box plots of the residuals of the normal datasets are also shown and are recommended as a prerequisite to performing the parametric test methods. A second evaluation of the variance within the samples is shown using Levene's Test for Homogeneity of Variance. Parametric tests assume that the variances of the different wells are all more or less equal. As shown in the results for the Levene's tests, the datasets for the three VOCs satisfy this requirement.

Parametric tests can be performed on sample populations that show a normal distribution. These tests determine if the samples from the wells are statistically similar. If the results of these tests show the observed concentrations to be dissimilar, contamination is assumed and any well(s) with dissimilar results are indicated. The One-Way Parametric Analysis of Variance was run for each of the three VOCs. This test determined that there was no significant difference between the concentrations at the upgradient wells and the recovery well and thus no evidence of additional contamination from on-site activities.

The One-Way ANOVA test considers all observed concentrations as a group. Two other tests were run which compares the upgradient samples to the downgradient samples. The Wilcoxon Rank-Sum Test and the Cochran Approximation to the Behrens-Fisher Student's T-Test (CABF-T Test) were used to compare the upgradient and downgradient wells. Neither test identified significant additional contamination by the three VOCs in the recovery well.

Finally, the Kruskal-Wallace Test was run on the datasets. The Kruskal-Wallace Test is a nonparametric ANOVA test which tests the hypothesis that all upgradient and downgradient wells have the same median concentration of a constituent. If this hypothesis is rejected, the software will indicate which downgradient wells show statistical evidence of contamination. The results of this test indicate that there is no significant evidence of additional contamination.

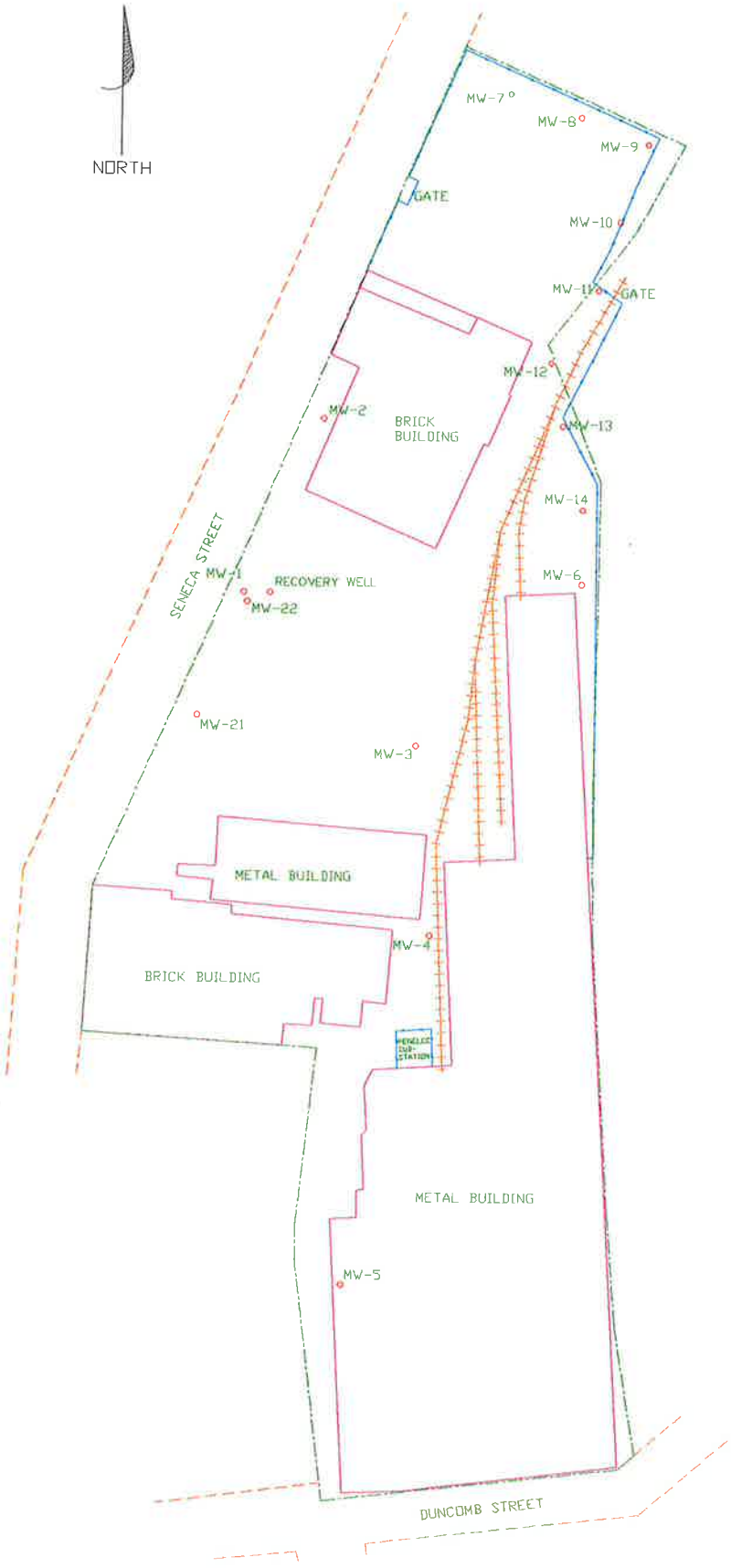
## CONCLUSIONS:

Monitoring wells MW-12 and MW-13, installed at the Oil City Tube Works property boundary, show ground water moving onto the OCTW property to be contaminated by volatile organic compounds.

These two monitoring wells are directly upgradient from the on-site recovery well, which exhibits ground water contamination by the same volatile organic compounds at the same general concentrations.

Based on a series of statistical tests performed on ground water quality analyses on samples collected from these three wells over the past year, the concentrations observed in the three wells are statistically similar. There is no statistical evidence of additional contamination of ground water from the OCTW site.

The volatile organic compound contamination from trichloroethene, 1,2-dichloroethylene and vinyl chloride observed at the recovery well is due to contaminated ground water moving onto the site from adjoining property and not from on-site activities.




| POINT | ELEVATION |
|---|---|
| MW-1 | 999.71 |
| MW-2 | 1001.67 |
| MW-3 | 1002.56 |
| MW-4 | 999.74 |
| MW-5 | 998.91 |
| MW-6 | 1002.43 |
| MW-7 | 1003.09 |
| MW-8 | 1001.84 |
| MW-9 | 1004.65 |
| MW-10 | 1004.29 |
| MW-11 | 1004.36 |
| MW-12 | 1001.49 |
| MW-13 | 1001.10 |
| MW-14 | 1002.59 |
| MW-21 | 1000.55 |
| MW-22 | 1000.52 |
| REC WELL | 1000.57 |

NOTE: TEMPORARY BENCH MARK ON CORNER OF CONCRETE AT MW-2 ASSUMED ELEVATION OF 1000.00 FT.

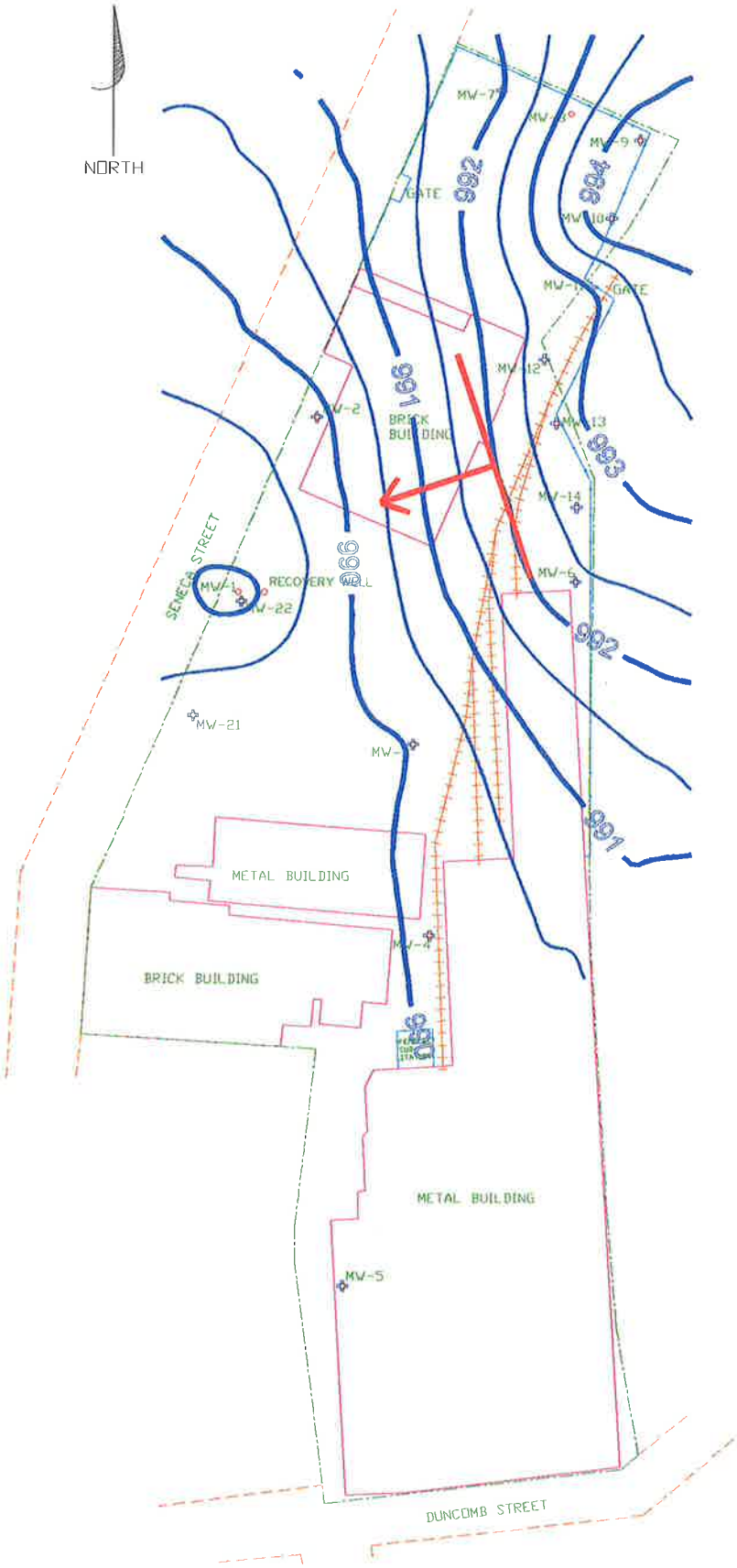
SCALE: 1" = 150'

FIGURE 1

SITE MAP SHOWING LOCATIONS OF NEW MONITORING WELLS

WEBCO INDUSTRIES
OIL CITY TUBE WORKS
OIL CITY, PENNSYLVANIA

Moody and Associates, Inc.




GROUND WATER CONTOUR

STRIKE AND DIP DIRECTION OF GROUND WATER FLOW

STATIC GROUND WATER ELEVATIONS MEASURED ON FEB. 19, 1997.

CONTOUR INTERVAL: 0.5 FEET

SCALE: 1" = 150'

FIGURE 2

SITE MAP SHOWING GROUND WATER ELEVATION CONTOURS WITH FLOW DIRECTION DETERMINED WITH A THREE POINT PROBLEM USING MW-12, MW-6, AND MW-22

WEBCO INDUSTRIES
OIL CITY TUBE WORKS
OIL CITY, PENNSYLVANIA

Moody and Associates, Inc.

# APPENDIX A

## 1,2-DICHLOROETHYLENE EVALUATION

Data Set Summary

Report Printed: 04-09-1997 12:12

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Well ID:mw-12

| Sample Date | Observation | Ln |
|---|---|---|
| May 21 1996 | 3100.000 ppb | 8.039 |
| Jun 24 1996 | 3800.000 ppb | 8.243 |
| Sep 27 1996 | 72.000 ppb | 4.277 |
| Feb 19 1997 | 1900.000 ppb | 7.550 |

Well ID:mw-12 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

| | | | |
|---|---|---|---|
| Minimum: | 72.000 ppb | Ln Minimum: | 4.277 |
| Maximum: | 3800.000 ppb | Ln Maximum: | 8.243 |
| Mean: | 2218.000 ppb | Ln Mean: | 7.027 |
| Std. Dev.: | 1631.675 ppb | Ln Std. Dev.: | 1.857 |

Well ID:mw-13

| Sample Date | Observation | Ln |
|---|---|---|
| May 21 1996 | 660.000 ppb | 6.492 |
| Jun 24 1996 | 640.000 ppb | 6.461 |

| | | |
|---|---|---|
| Sep 27 1996 | 190.000 ppb | 5.247 |
| Feb 19 1997 | 260.000 ppb | 5.561 |

Well ID:mw-13 Summary Statistics

| | | | |
|---|---|---|---|
| Observations (N): | 4 | | |
| Nondetects (%ND): | 0 | | |
| Minimum: | 190.000 ppb | Ln Minimum: | 5.247 |
| Maximum: | 660.000 ppb | Ln Maximum: | 6.492 |
| Mean: | 437.500 ppb | Ln Mean: | 5.940 |
| Std. Dev.: | 247.167 ppb | Ln Std. Dev.: | 0.633 |

Well ID:recwell

| Sample Date | Observation | Ln |
|---|---|---|
| Mar 12 1996 | 650.000 ppb | 6.477 |
| Jun 21 1996 | 160.000 ppb | 5.075 |
| Sep 27 1996 | 160.000 ppb | 5.075 |
| Nov 22 1996 | 160.000 ppb | 5.075 |
| Feb 19 1997 | 250.000 ppb | 5.521 |

Well ID:recwell Summary Statistics

| | | | |
|---|---|---|---|
| Observations (N): | 5 | | |
| Nondetects (%ND): | 0 | | |
| Minimum: | 160.000 ppb | Ln Minimum: | 5.075 |
| Maximum: | 650.000 ppb | Ln Maximum: | 6.477 |
| Mean: | 276.000 ppb | Ln Mean: | 5.445 |
| Std. Dev.: | 212.673 ppb | Ln Std. Dev.: | 0.609 |

Normality Tests

Report Printed: 04-09-1997 12:24

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Normality Test on Observations for wells listed below:

Well:mw-12 Position:Upgradient Observations:4

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 72.000 | 3800.000 | 2218.000 | 1631.675 |
| Log: | 4.277 | 8.243 | 7.027 | 1.857 |

Well:mw-13 Position:Upgradient Observations:4

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 190.000 | 660.000 | 437.500 | 247.167 |
| Log: | 5.247 | 6.492 | 5.940 | 0.633 |

Well:recwell Position:Downgradient Observations:5

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 160.000 | 650.000 | 276.000 | 212.673 |
| Log: | 5.075 | 6.477 | 5.445 | 0.609 |

Pooled Statistics
Observations: 13

| Statistic | Original Scale | Log Scale |
|---|---|---|
| Mean: | 923.231 | 6.084 |
| Std Dev: | 1227.982 | 1.248 |
| Skewness: | 1.501* | 0.489 |
| Kurtosis: | 0.736 | -0.940 |
| Minimum: | 72.000 | 4.277 |
| Maximum: | 3800.000 | 8.243 |
| CV: | 1.330 | 0.205 |

Shapiro-Wilk Statistics

| Scale | Test Statistic | 5% Critical Value | 1% Critical Value |
|---|---|---|---|
| Original: | 0.6972* | 0.8660 | 0.8140 |
| Log: | 0.9143 | 0.8660 | 0.8140 |

* Indicates statistically significant evidence of non-normality.
c150v*c10g2P
GRIT/STAT Version 5.01

Probability Plot Statistics

Report Printed: 04-09-1997 12:14

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.2428 | 4.2767 | 7.0270 | 1.8565 |
| mw-13 | 4 | 0 | 6.4922 | 5.2470 | 5.9404 | 0.6327 |
| recwell | 5 | 0 | 6.4770 | 5.0752 | 5.4448 | 0.6085 |

Group Statistics

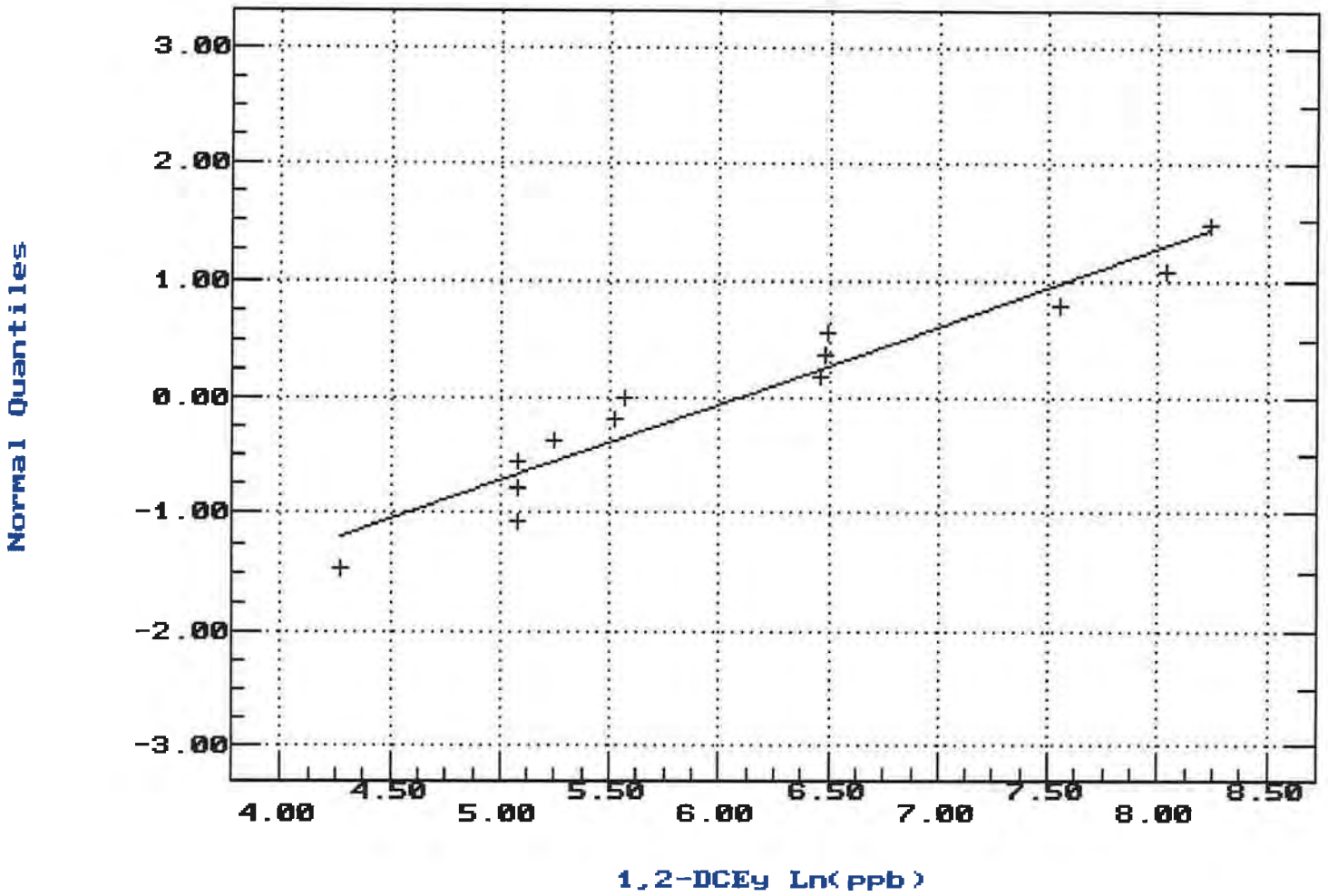
Data Mode:Log Transformed
Wells:All Wells
Test:Observations

| | |
|---|---|
| Observations: | 13 |
| Mean: | 6.0841 |
| Std Dev: | 1.2485 |
| Minimum: | 4.2767 |
| Maximum: | 8.2428 |
| Median: | 5.5607 |
| Skewness: | 0.4888 |
| Correlation Coef: | 0.9619 |
| R(α=0.01,N): | 0.895 |
| R(α=0.05,N): | 0.931 |

| Ln | ppb | Order | Prob | Quantile |
|---|---|---|---|---|
| 4.2767 | | 1 | 7.143 | -1.465 |
| 5.0752 | | 2 | 14.286 | -1.068 |
| 5.0752 | | 3 | 21.429 | -0.792 |
| 5.0752 | | 4 | 28.571 | -0.566 |
| 5.2470 | | 5 | 35.714 | -0.366 |
| 5.5215 | | 6 | 42.857 | -0.180 |

| | | | |
|---|---|---|---|
| 5.5607 | 7 | 50.000 | 0.000 |
| 6.4615 | 8 | 57.143 | 0.180 |
| 6.4770 | 9 | 64.286 | 0.366 |
| 6.4922 | 10 | 71.429 | 0.566 |
| 7.5496 | 11 | 78.571 | 0.792 |
| 8.0392 | 12 | 85.714 | 1.068 |
| 8.2428 | 13 | 92.857 | 1.465 |

Probability Plot of Ln-transformed 1,2-DCEy Concentrations
Selected Background and Compliance Wells Mar 12, 1996 To Feb 19, 1997



Box-Plot Summary

Report Printed: 04-09-1997 12:50

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

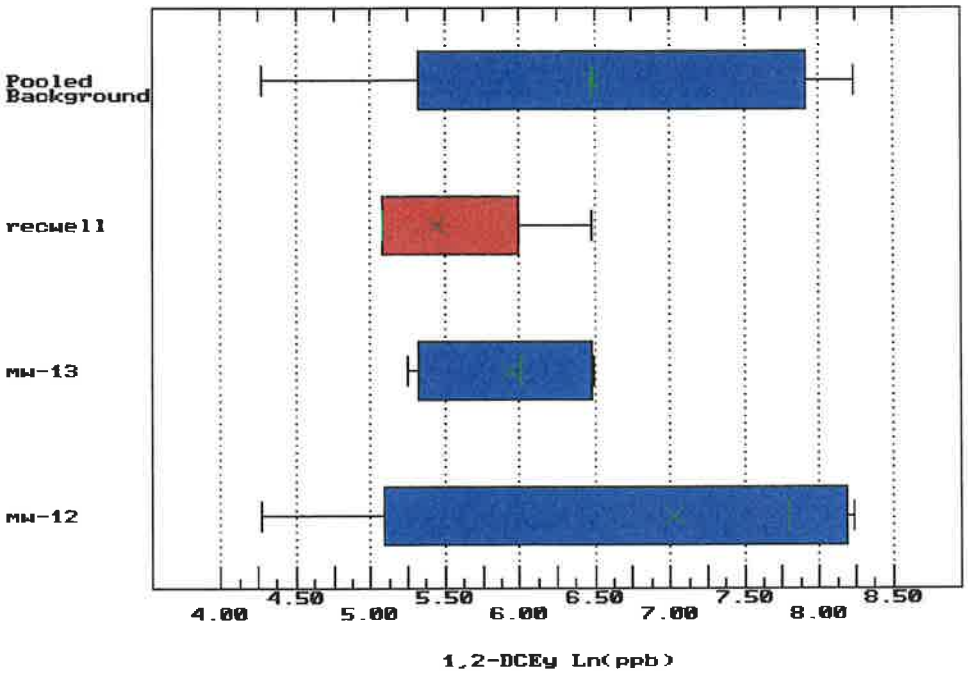
CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

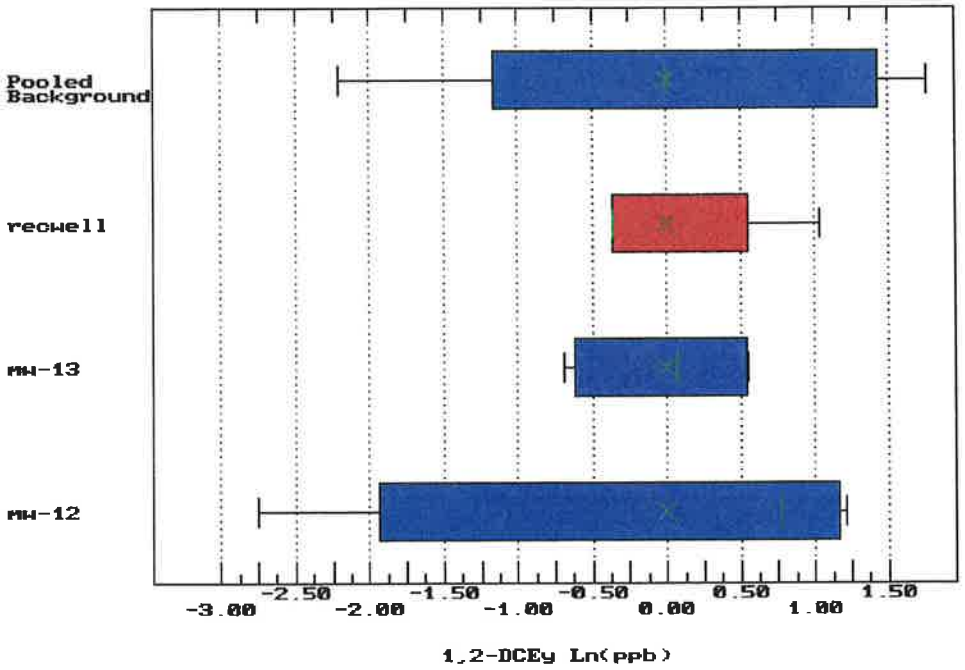
Ln Transformed 1,2-DCEy Observations-Units:Ln(ppb)

| Well ID | 25th %Tile | Median | 75th %Tile | Std Dev | IQR |
|---|---|---|---|---|---|
| mw-12 | 5.095 | 7.794 | 8.192 | 1.857 | 3.097 |
| mw-13 | 5.325 | 6.011 | 6.485 | 0.633 | 1.159 |
| recwell | 5.075 | 5.075 | 5.999 | 0.609 | 0.924 |

Box Plot of Ln-transformed 1,2-DCEy Concentrations
Facility OCT -Selected Wells-03/12/96 To 02/19/97




Box Plot of Ln-transformed 1,2-DCEy Residuals
Facility OCT -Selected Wells-03/12/96 To 02/19/97




Levene's Test for Homogeneity of Variance

Report Printed: 04-09-1997 12:20

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.24 | 4.28 | 7.03 | 1.86 |
| mw-13 | 4 | 0 | 6.49 | 5.25 | 5.94 | 0.63 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 6.48 | 5.08 | 5.44 | 0.61 |

| Source of Variation | Sum of squares | Degrees of freedom | Mean squares | Computed F |
|---|---|---|---|---|
| Between wells | 0.81 | 1 | 0.81 | 1.88 |
| Within wells | 4.73 | 11 | 0.43 | |
| Total | 5.54 | 12 | | |

Tabulated F at $\alpha$= 0.050 4.84
Since the computed F does not exceed the tabulated F, the assumption of equal variances may be accepted.

One-Way Parametric Analysis of Variance

Report Printed: 04-09-1997 12:52

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.24 | 4.28 | 7.03 | 1.86 |
| mw-13 | 4 | 0 | 6.49 | 5.25 | 5.94 | 0.63 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 6.48 | 5.08 | 5.44 | 0.61 |

Data Mode:Log Transformed

| Source of Variation | Sum of squares | Degrees of freedom | Mean squares | Computed F |
|---|---|---|---|---|
| Between wells | 3.321 | 1 | 3.321 | 2.375 |
| Within wells | 15.384 | 11 | 1.399 | |
| Total | 18.705 | 12 | | |

Tabulated F($\alpha$= 0.050): 4.844
Since the calculated F does not exceed the tabulated F, there is no significant difference between the concentrations at the selected wells and thus no evidence of contamination.

Wilcoxon Rank-Sum Test

Report Printed: 04-09-1997 12:48

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.24 | 4.28 | 7.03 | 1.86 |
| mw-13 | 4 | 0 | 6.49 | 5.25 | 5.94 | 0.63 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 6.48 | 5.08 | 5.44 | 0.61 |

| Well | Date | Observation | Rank |
|---|---|---|---|
| mw-12 | 05/21/96 | 8.0392 | 12.0 |
| mw-12 | 06/24/96 | 8.2428 | 13.0 |
| mw-12 | 09/27/96 | 4.2767 | 1.0 |
| mw-12 | 02/19/97 | 7.5496 | 11.0 |
| mw-13 | 05/21/96 | 6.4922 | 10.0 |
| mw-13 | 06/24/96 | 6.4615 | 8.0 |
| mw-13 | 09/27/96 | 5.2470 | 5.0 |
| mw-13 | 02/19/97 | 5.5607 | 7.0 |

| | | | |
|---|---|---|---|
| | Background Data Rank-Sum: | | 67.0 |
| recwell | 03/12/96 | 6.4770 | 9.0 |
| recwell | 06/21/96 | 5.0752 | 3.0 |
| recwell | 09/27/96 | 5.0752 | 3.0 |
| recwell | 11/22/96 | 5.0752 | 3.0 |
| recwell | 02/19/97 | 5.5215 | 6.0 |
| | Compliance Data Rank-Sum: | | 24.0 |

| | |
|---|---|
| Background Data Pts m: | 8 |
| Compliance Data Pts n: | 5 |
| Wilcoxon Statistic W: | 9.0000 |
| Expected Value E(W): | 20.0000 |
| Std Dev SD(W): | 6.8313 |
| Std Dev (Ties) SD'(W): | 6.7937 |
| Approx Z-Score Z: | -1.6928 |
| Significance Level $\alpha$: | 0.01 |
| $Z\alpha$: | 2.3263 |

Since the Approx. Z-Score does not exceed $Z\alpha$ there is no significant evidence of contamination at the compliance well.

CABF-T Test

Report Printed: 04-09-1997 12:51

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.24 | 4.28 | 7.03 | 1.86 |
| mw-13 | 4 | 0 | 6.49 | 5.25 | 5.94 | 0.63 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 6.48 | 5.08 | 5.44 | 0.61 |

| | Background/Upgradient | Compliance/DownGradient |
|---|---|---|
| Wells | mw-12 mw-13 | recwell |
| Observations | 8 | 5 |
| Mean | 6.4837 | 5.4448 |
| Variance | 1.9861 | 0.3703 |
| Standard Error | 0.5677 | |
| Degrees of Freedom | 10.2093 | |
| Significance Level(α) | 0.0100 | |

t-Statistic: -1.8299 Critical Value: 2.7534
Since the t-statistic does not exceed Critical Value, the hypothesis of equal

medians is not rejected.

Kruskal-Wallace Test

Report Printed: 04-09-1997 12:52

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:1,2-DCEy 1,2-Dichloroethene (-ethylene)

CAS Number: 540-59-0
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 8.24 | 4.28 | 7.03 | 1.86 |
| mw-13 | 4 | 0 | 6.49 | 5.25 | 5.94 | 0.63 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 6.48 | 5.08 | 5.44 | 0.61 |

| Well ID | Date | Observation | Rank |
|---|---|---|---|
| mw-12 | 05/21/96 | 8.0392 | 12.0 |
| mw-12 | 06/24/96 | 8.2428 | 13.0 |
| mw-12 | 09/27/96 | 4.2767 | 1.0 |
| mw-12 | 02/19/97 | 7.5496 | 11.0 |
| mw-13 | 05/21/96 | 6.4922 | 10.0 |
| mw-13 | 06/24/96 | 6.4615 | 8.0 |
| mw-13 | 09/27/96 | 5.2470 | 5.0 |
| mw-13 | 02/19/97 | 5.5607 | 7.0 |

| | | | |
|---|---|---|---|
| | Background Rank Sum: | | 67.0 |
| | Background Rank Avg: | | 8.4 |
| recwell | 03/12/96 | 6.4770 | 9.0 |
| recwell | 06/21/96 | 5.0752 | 3.0 |
| recwell | 09/27/96 | 5.0752 | 3.0 |
| recwell | 11/22/96 | 5.0752 | 3.0 |
| recwell | 02/19/97 | 5.5215 | 6.0 |
| | Compliance Well Rank Sum: | | 24.0 |
| | Compliance Well Rank Avg: | | 4.8 |

| | |
|---|---|
| H Statistic: | 2.5929 |
| H Adjusted for Ties: | 2.6217 |
| Degrees of Freedom: | 1 |
| Chi-Squared: | 3.8414 |
| Zα/DF: | 1.6449 |

* Indicates significant evidence of contamination

| Well ID | Crit. Diff. | Rank Avg. | Background Rank Avg. | Difference |
|---|---|---|---|---|
| recwell | 3.6317 | 4.80 | 8.38 | -3.57 |

# APPENDIX B

## TRICHLOROETHENE EVALUATION

Data Set Summary

Report Printed: 04-09-1997 11:59

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Well ID:mw-12

| Sample Date | Observation | Ln |
|---|---|---|
| May 21 1996 | 76.000 ppb | 4.331 |
| Jun 24 1996 | 50.000 ppb | 3.912 |
| Sep 27 1996 | 62.000 ppb | 4.127 |
| Feb 19 1997 | 60.000 ppb | 4.094 |

Well ID:mw-12 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

| | | | |
|---|---|---|---|
| Minimum: | 50.000 ppb | Ln Minimum: | 3.912 |
| Maximum: | 76.000 ppb | Ln Maximum: | 4.331 |
| Mean: | 62.000 ppb | Ln Mean: | 4.116 |
| Std. Dev.: | 10.708 ppb | Ln Std. Dev.: | 0.172 |

Well ID:mw-13

| Sample Date | Observation | Ln |
|---|---|---|
| May 21 1996 | 240.000 ppb | 5.481 |
| Jun 24 1996 | 71.000 ppb | 4.263 |

| | | |
|---|---|---|
| Sep 27 1996 | 130.000 ppb | 4.868 |
| Feb 19 1997 | 79.000 ppb | 4.369 |

Well ID:mw-13 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

| | | | |
|---|---|---|---|
| Minimum: | 71.000 ppb | Ln Minimum: | 4.263 |
| Maximum: | 240.000 ppb | Ln Maximum: | 5.481 |
| Mean: | 130.000 ppb | Ln Mean: | 4.745 |
| Std. Dev.: | 77.850 ppb | Ln Std. Dev.: | 0.557 |

Well ID:recwell

| Sample Date | Observation | Ln |
|---|---|---|
| Mar 12 1996 | 120.000 ppb | 4.787 |
| Jun 21 1996 | 150.000 ppb | 5.011 |
| Sep 27 1996 | 110.000 ppb | 4.700 |
| Nov 22 1996 | 110.000 ppb | 4.700 |
| Feb 19 1997 | 120.000 ppb | 4.787 |

Well ID:recwell Summary Statistics

Observations (N): 5
Nondetects (%ND): 0

| | | | |
|---|---|---|---|
| Minimum: | 110.000 ppb | Ln Minimum: | 4.700 |
| Maximum: | 150.000 ppb | Ln Maximum: | 5.011 |
| Mean: | 122.000 ppb | Ln Mean: | 4.797 |
| Std. Dev.: | 16.432 ppb | Ln Std. Dev.: | 0.127 |

Normality Tests

Report Printed: 04-09-1997 12:30

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Normality Test on Observations for wells listed below:

Well:mw-12 Position:Upgradient Observations:4

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 50.000 | 76.000 | 62.000 | 10.708 |
| Log: | 3.912 | 4.331 | 4.116 | 0.172 |

Well:mw-13 Position:Upgradient Observations:4

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 71.000 | 240.000 | 130.000 | 77.850 |
| Log: | 4.263 | 5.481 | 4.745 | 0.557 |

Well:recwell Position:Downgradient Observations:5

| Scale | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|
| Original: | 110.000 | 150.000 | 122.000 | 16.432 |
| Log: | 4.700 | 5.011 | 4.797 | 0.127 |

Pooled Statistics
Observations: 13

| Statistic | Original Scale | Log Scale |
|---|---|---|
| Mean: | 106.000 | 4.572 |
| Std Dev: | 50.772 | 0.437 |
| Skewness: | 1.367* | 0.366 |
| Kurtosis: | 1.721 | -0.450 |
| Minimum: | 50.000 | 3.912 |
| Maximum: | 240.000 | 5.481 |
| CV: | 0.479 | 0.096 |

Shapiro-Wilk Statistics

| Scale | Test Statistic | 5% Critical Value | 1% Critical Value |
|---|---|---|---|
| Original: | 0.8591* | 0.8660 | 0.8140 |
| Log: | 0.9594 | 0.8660 | 0.8140 |

* Indicates statistically significant evidence of non-normality.
c150v*c10g2P
GRIT/STAT Version 5.01

Probability Plot Statistics

Report Printed: 04-09-1997 12:54

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 4.3307 | 3.9120 | 4.1161 | 0.1716 |
| mw-13 | 4 | 0 | 5.4806 | 4.2627 | 4.7451 | 0.5567 |
| recwell | 5 | 0 | 5.0106 | 4.7005 | 4.7973 | 0.1269 |

Group Statistics

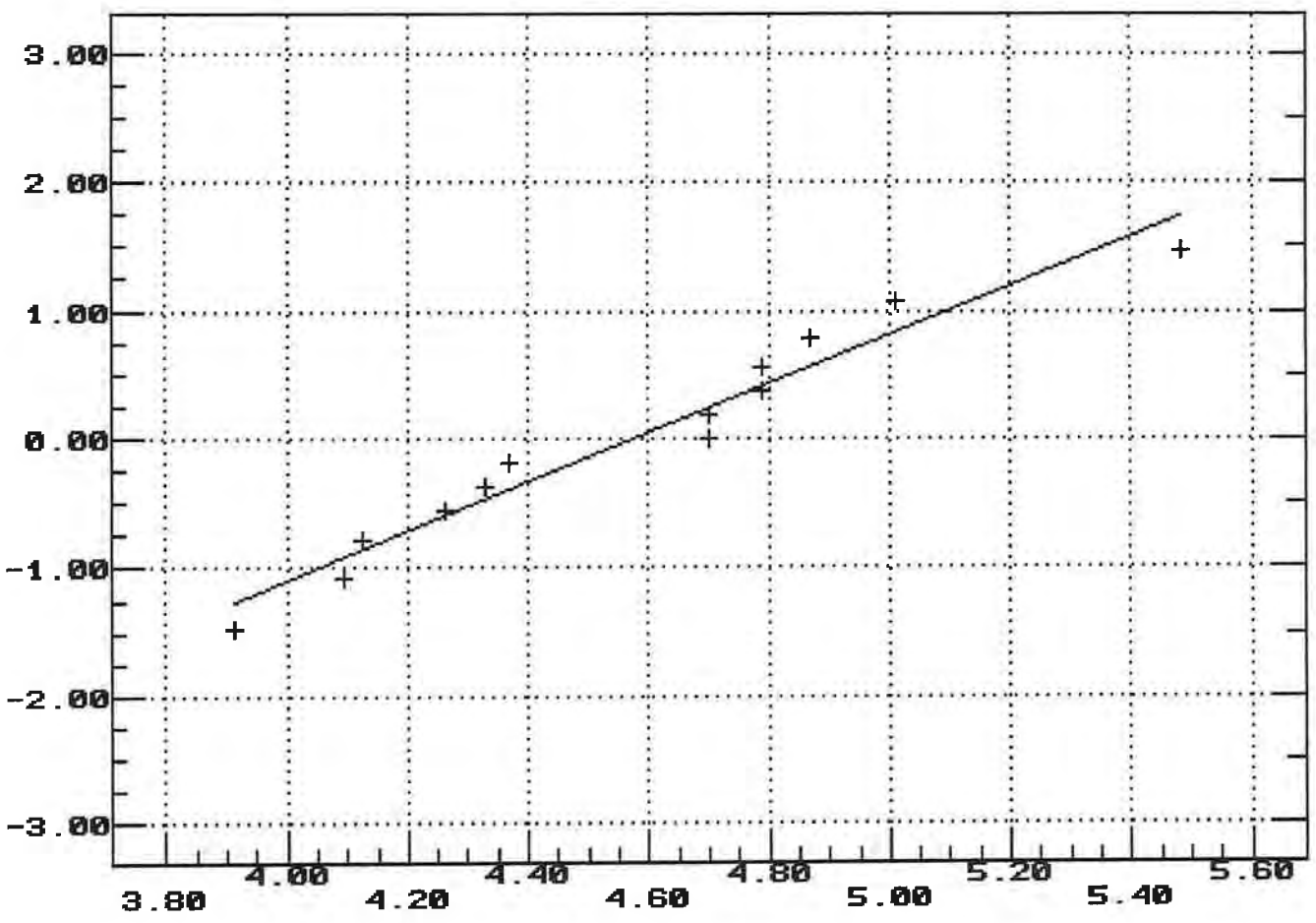
Data Mode:Log Transformed
Wells:All Wells
Test:Observations

| | |
|---|---|
| Observations: | 13 |
| Mean: | 4.5716 |
| Std Dev: | 0.4366 |
| Minimum: | 3.9120 |
| Maximum: | 5.4806 |
| Median: | 4.7005 |
| Skewness: | 0.3655 |
| Correlation Coef: | 0.9785 |
| R(α=0.01,N): | 0.895 |
| R(α=0.05,N): | 0.931 |

| Ln | ppb | Order | Prob | Quantile |
|---|---|---|---|---|
| 3.9120 | | 1 | 7.143 | -1.465 |
| 4.0943 | | 2 | 14.286 | -1.068 |
| 4.1271 | | 3 | 21.429 | -0.792 |
| 4.2627 | | 4 | 28.571 | -0.566 |
| 4.3307 | | 5 | 35.714 | -0.366 |
| 4.3694 | | 6 | 42.857 | -0.180 |

| | | | |
|---|---|---|---|
| 4.7005 | 7 | 50.000 | 0.000 |
| 4.7005 | 8 | 57.143 | 0.180 |
| 4.7875 | 9 | 64.286 | 0.366 |
| 4.7875 | 10 | 71.429 | 0.566 |
| 4.8675 | 11 | 78.571 | 0.792 |
| 5.0106 | 12 | 85.714 | 1.068 |
| 5.4806 | 13 | 92.857 | 1.465 |

Probability Plot of Ln-transformed TCE Concentrations
Selected Background and Compliance Wells Mar 12, 1996 To Feb 19, 1997



Box-Plot Summary

Report Printed: 04-09-1997 12:55

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

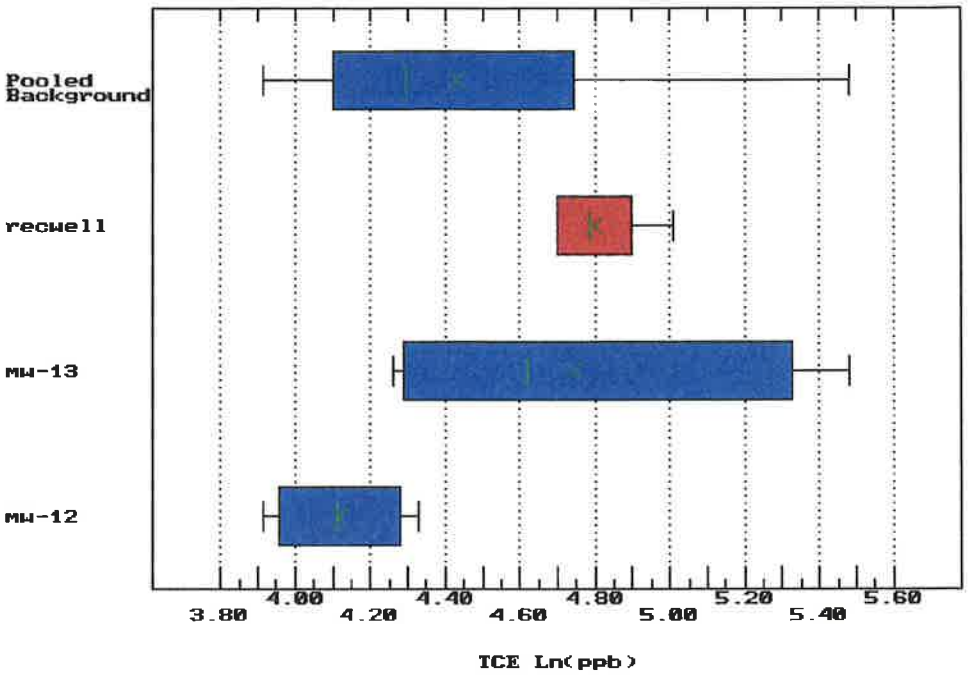
CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

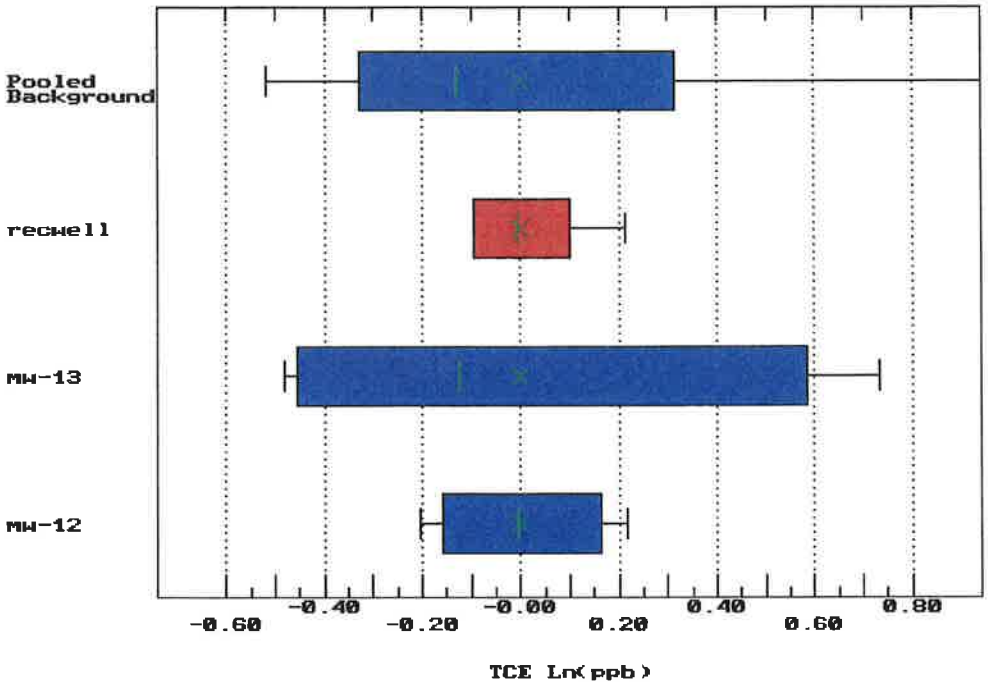
Ln Transformed TCE Observations-Units:Ln(ppb)

| Well ID | 25th %Tile | Median | 75th %Tile | Std Dev | IQR |
|---|---|---|---|---|---|
| mw-12 | 3.958 | 4.111 | 4.280 | 0.172 | 0.322 |
| mw-13 | 4.289 | 4.618 | 5.327 | 0.557 | 1.038 |
| recwell | 4.700 | 4.787 | 4.899 | 0.127 | 0.199 |

Box Plot of Ln-transformed TCE Concentrations
Facility OCT -Selected Wells-03/12/96 To 02/19/97




Box Plot of Ln-transformed TCE Residuals
Facility OCT -Selected Wells-03/12/96 To 02/19/97




Levene's Test for Homogeneity of Variance

Report Printed: 04-09-1997 12:31

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 4.33 | 3.91 | 4.12 | 0.17 |
| mw-13 | 4 | 0 | 5.48 | 4.26 | 4.75 | 0.56 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 5.01 | 4.70 | 4.80 | 0.13 |

| Source of Variation | Sum of squares | Degrees of freedom | Mean squares | Computed F |
|---|---|---|---|---|
| Between wells | 0.11 | 1 | 0.11 | 2.54 |
| Within wells | 0.46 | 11 | 0.04 | |
| Total | 0.56 | 12 | | |

Tabulated F at $\alpha$= 0.050 4.84
Since the computed F does not exceed the tabulated F, the assumption of equal variances may be accepted.

One-Way Parametric Analysis of Variance

Report Printed: 04-09-1997 12:58

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 4.33 | 3.91 | 4.12 | 0.17 |
| mw-13 | 4 | 0 | 5.48 | 4.26 | 4.75 | 0.56 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 5.01 | 4.70 | 4.80 | 0.13 |

Data Mode:Log Transformed

| Source of Variation | Sum of squares | Degrees of freedom | Mean squares | Computed F |
|---|---|---|---|---|
| Between wells | 0.414 | 1 | 0.414 | 2.429 |
| Within wells | 1.874 | 11 | 0.170 | |
| Total | 2.288 | 12 | | |

Tabulated F($\alpha$= 0.050): 4.844
Since the calculated F does not exceed the tabulated F, there is no significant difference between the concentrations at the selected wells and thus no evidence of contamination.

Wilcoxon Rank-Sum Test

Report Printed: 04-09-1997 12:56

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 4.33 | 3.91 | 4.12 | 0.17 |
| mw-13 | 4 | 0 | 5.48 | 4.26 | 4.75 | 0.56 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 5.01 | 4.70 | 4.80 | 0.13 |

| Well | Date | Observation | Rank |
|---|---|---|---|
| mw-12 | 05/21/96 | 4.3307 | 5.0 |
| mw-12 | 06/24/96 | 3.9120 | 1.0 |
| mw-12 | 09/27/96 | 4.1271 | 3.0 |
| mw-12 | 02/19/97 | 4.0943 | 2.0 |
| mw-13 | 05/21/96 | 5.4806 | 13.0 |
| mw-13 | 06/24/96 | 4.2627 | 4.0 |
| mw-13 | 09/27/96 | 4.8675 | 11.0 |
| mw-13 | 02/19/97 | 4.3694 | 6.0 |

| | | | |
|---|---|---|---|
| Background Data Rank-Sum: | | | 45.0 |
| recwell | 03/12/96 | 4.7875 | 9.5 |
| recwell | 06/21/96 | 5.0106 | 12.0 |
| recwell | 09/27/96 | 4.7005 | 7.5 |
| recwell | 11/22/96 | 4.7005 | 7.5 |
| recwell | 02/19/97 | 4.7875 | 9.5 |
| Compliance Data Rank-Sum: | | | 46.0 |

| | |
|---|---|
| Background Data Pts m: | 8 |
| Compliance Data Pts n: | 5 |
| Wilcoxon Statistic W: | 31.0000 |
| Expected Value E(W): | 20.0000 |
| Std Dev SD(W): | 6.8313 |
| Std Dev (Ties) SD'(W): | 6.8125 |
| Approx Z-Score Z: | 1.5413 |
| Significance Level $\alpha$: | 0.01 |
| $Z\alpha$: | 2.3263 |

Since the Approx. Z-Score does not exceed $Z\alpha$ there is no significant evidence of contamination at the compliance well.

CABF-T Test

Report Printed: 04-09-1997 12:56

Facility:OCT Oil City Tube

Address:

City:Oil City ST:PA Zip:16301
County:VENANGO

Contact:
Phone:( ) -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 12 1996
End Date:Feb 19 1997

Data Mode:Log Transformed

Background Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| mw-12 | 4 | 0 | 4.33 | 3.91 | 4.12 | 0.17 |
| mw-13 | 4 | 0 | 5.48 | 4.26 | 4.75 | 0.56 |

Compliance Wells

| Well ID | N | %ND | Max Value | Min Value | Mean | Std Dev |
|---|---|---|---|---|---|---|
| recwell | 5 | 0 | 5.01 | 4.70 | 4.80 | 0.13 |

| | Background/Upgradient | Compliance/DownGradient |
|---|---|---|
| Wells | mw-12 mw-13 | recwell |
| Observations | 8 | 5 |
| Mean | 4.4306 | 4.7973 |
| Variance | 0.2585 | 0.0161 |
| Standard Error | 0.1885 | |
| Degrees of Freedom | 8.3211 | |
| Significance Level(α) | 0.0100 | |

t-Statistic: 1.9455 Critical Value: 2.8700

Since the t-statistic does not exceed Critical Value, the hypothesis of equal medians is not rejected.