UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

MEMORANDUM

DATE: May 24, 2010

SUBJECT: Technical Data Review, Del Norte Pesticide Storage Area Superfund Site, Third Five Year Review

FROM: Kevin Mayer, EPA Project Manager, SFD-7-2

TO: Cynthia Wetmore, Engineer, SFD 8-4

1. Introduction and Purpose

EPA requested data analysis assistance from the Seattle District, U.S. Army Corps of Engineers in review of the technical project data for the statutorily required Third Five-Year Review (FYR) for the Del Norte Pesticide Storage Area Superfund Site. FYRs are required under the Comprehensive Environmental Resource Compensation and Liability Act (CERCLA) to determine the protectiveness of the implemented remedy. For the Del Norte Superfund Pesticide Storage Area Site, the data review focuses entirely on groundwater monitoring data. This memorandum documents the technical data review and evaluation for the third FYR for the site.

An August 29, 2000 Amendment to the Record of Decision (ROD Amendment) concluded that the groundwater plume was technically impracticable to remediate to cleanup goals. A pump and treatment system that had been operating for approximately seven years was no longer effective at reducing concentrations of the contaminant 1,2-Dichloropropane (1,2- DCP) and that 1,2-DCP levels remained stable whether or not the system was operating. Groundwater monitoring since the second Five-Year Review indicates that residual 1,2-DCP levels remain above the Maximum Contaminant Level (MCL) of 5 micrograms per liter (µg/L). Exposure to the remaining on-site 1,2-DCP contamination, however, is being adequately controlled by land and well use restrictions and development policies of Del Norte County, the landowner of the property.

Sampling conducted at the site through October 2009 indicates that contaminant levels appear to have declined naturally in the final two monitoring wells where contamination is still detectable, although the downward trend is not apparent over the most recent years. Monitoring Well (MW) 104 had levels of DCP of 2.0 ppb, and MW 105 had levels of DCP of 6.5 ppb on October 12, 2009.

This memorandum summarizes an analysis of the Del Norte Pesticide Site groundwater data collected from 1990 to 2009, with particular emphasis on the period after the active treatment was discontinued in late 1997. This analysis assesses the 1,2-DCP concentration trend in wells MW-104 and MW-105 with a recommendation for future sampling. Richard Garrison and Dr. Thomas Georgian of the U.S. Army Corps of Engineers provided substantial guidance for this analysis.

2. Time Period of Data

The period of review is 1997 through 2009, the sampling period following closure of operation of the pump and treatment system in October 1997. The end period for this data review is through the October 2009 site sampling event.

3. Background

The Del Norte County Pesticide Storage Area Site is located one mile northwest of Crescent City, next to the Jack McNamara Field airport. Del Norte County operated the Pesticide Storage Area as a repository for pesticide and herbicide containers generated by the local agriculture and forestry industry from 1970 until 1981. The Site was intended to be an interim or emergency storage area for pesticide containers, which previously had been triple-rinsed and punctured. Unfortunately, the pesticide and herbicide containers were improperly handled and wastes and rinse water were improperly disposed of into an unlined sump. Approximately 1,600 drums that held the wastes and rinse water were recovered and recycled by the County Agricultural Department. Groundwater and soil were found to be contaminated with various pesticides, herbicides, and volatile organic compounds (VOCs).

In September 1985, U.S. EPA selected a remedy to address the Site contamination. In 1987, the U.S. EPA removed 300 cubic yards of contaminated soils that were considered to be the source of groundwater contamination. An air stripping groundwater treatment system was built in 1989 and successfully lowered the pesticide 1,2Dichloropropane (1,2-DCP) level from 2,000 parts per billion (ppb) to 38 ppb in the groundwater prior to discharge to the municipal wastewater treatment system. After 1994, because there was no further reduction of 1,2-DCP via the air stripping treatment system, U.S. EPA selected an alternate cleanup remedy of monitored natural attenuation. A February 2000 Fact Sheet labeled "U.S. EPA proposes plan to select an alternate cleanup remedy," discussed the reasons for discontinuing the air stripping groundwater treatment system and changing to an alternate cleanup remedy.

The Del Norte Pesticide Storage Area was deleted from the National Priorities List in July 2002. However, because the remedy for the Site allowed contaminants in groundwater to remain above drinking water standards indefinitely,

The current Site remedy consists of containing the contaminated groundwater, semi-annual groundwater monitoring, and land use restrictions. The Site groundwater contamination appears to be deceasing through natural physical chemical and/or biological processes. The land use restrictions ensure that the groundwater is not used for drinking water as long as contaminants remain above safe standards. California U.S. EPA is currently the lead at the site and will continue to monitor levels of contaminants in the groundwater at the Site until they are below the drinking water standards (MCL).

4. Data Utilized

The primary constituent of concern that remains in groundwater at the Del Norte Pesticide Storage Site is 1,2-DCP. All available groundwater monitoring data associated

with the Site from the period of review of 1990 through 2009 are presented in the EPA Superfund Record of Decision Amendment and Technical Impracticability Waiver for the Del Norte County Pesticide Storage Area, Crescent City, CA (EPA/AMD/R09-00/113), dated August 29, 2000 and presented in the Thirteenth Semiannual Groundwater Monitoring Report, October 2009 (See Table 3). The end period for this data review is through the October 2009 site sampling event.

5. Groundwater Analytical Data

Ground water levels and contaminant sampling were conducted from four monitoring wells at the Site following closure of the pump and treatment system in October 1997. These wells are near (MW-105) and downgradient (MW-26, MW-104, and MW-107) of the source area.

Data from MW-105 shows 1,2-DCP values that have remained above MCL to present. The data were evaluated to determine historic trend. Concentrations of 1,2-DCP from MW-104 have been below MCL from April 2003 to present. These data were evaluated for trends with recommendation for sampling frequency.

These data were analyzed using the Kendall tau coefficient test, a non-parametric test used to measure the statistical dependence between two datum points, and a trend line fitted to the data plots using the LOWESS method of least squares regression, and a regression analysis. These tests were performed using the statistical software package Minitab with the Ktau macro. The concentrations of 1,2-DCP were a factor of 3 to 6 times higher at the beginning of the pump and treat remedy from March through July 1990 than at any time thereafter (see Table 3). The data prior to October 1997 were not considered in this analysis

MW-105

As highlighted in Table 1, the absolute value of Kendall's tau is closer to one than zero. This indicates good correlation (trend). A statistical test for Kendall's tau indicates there is correlation between concentration and time or decreasing trend at either the 95% or 90% level of confidence. The p-value for Kendall's tau shown in bold print below is less than 0.05 - 0.1, suggesting a stable trend. The data were grouped according to seasonality, wet versus dry season sampling. The p-values for each were greater than 0.05, indicating no statistical significance to the seasonal trends.

Table 1. Kendall Tau Descriptive Statistics: 1,2-DCP MW-105

Variable	N	Mean	Median	StDev	SE Mean
Time	16	38350	38500	5887	1328
12DCP MW-105	16	10.84	9.35	25.3	6.90

Variable	Minimum	Maximum	Q1	Q3
Time	35957	40098	37573	39524
12DCP MW-105	4.2	26.0	6.28	11.0

Row	CORRTYPE	CORR_VAL	P_VALUE
1	**KENDALL'S TAU_A**	**-0.500**	**0.0077740**
2	KENDALL'S TAU_B	-0.504	0.0077740

Grouped by Season

Row	SEA2	N_SEA	S_TAU	TAU_A	Z_S	P_VALUE	INTRCEPT	SLOPE
1	dry	7	-10	-0.476190	-1.36720	0.171563	92.6165	-0.0021631
2	wet	6	5	0.333333	0.75147	0.452370	-48.8843	0.0014332

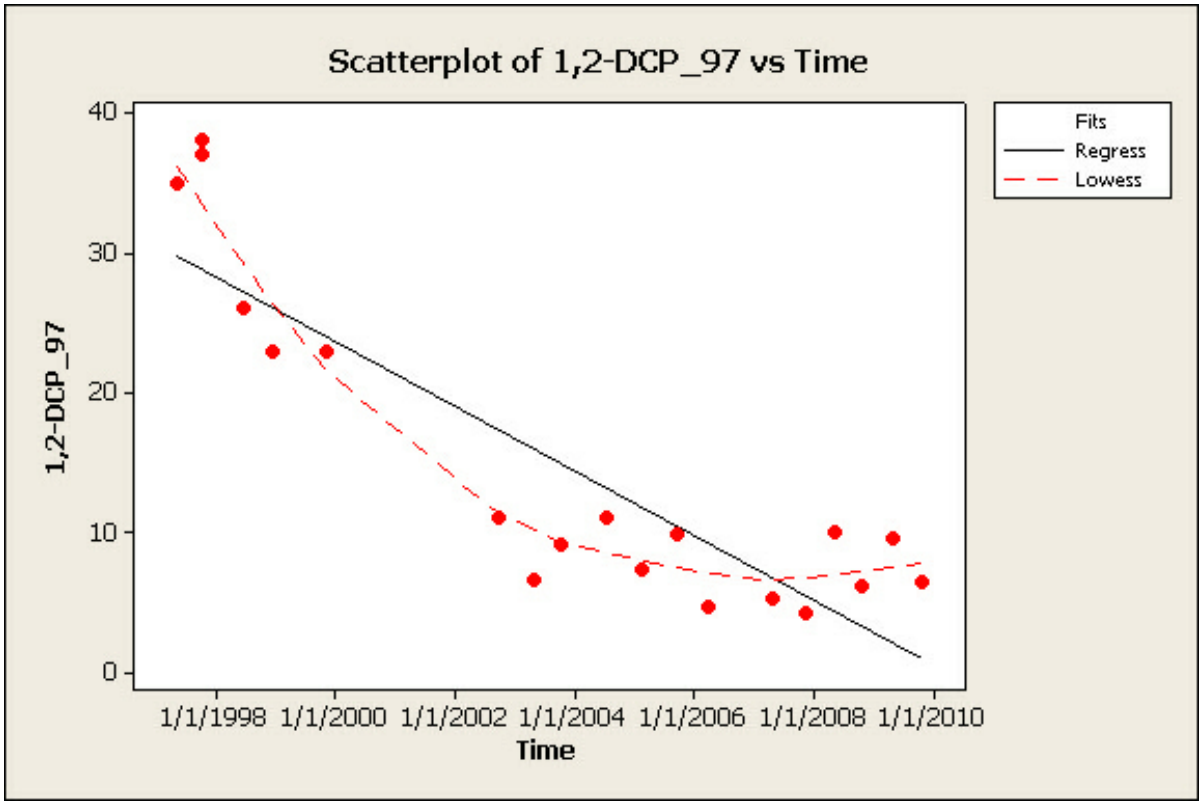

Figure 1. Scatter Plot, Regression Line, and LOWESS Curve, MW-105

The LOWESS Curve in red and regression line for MW-105 (Figure 1) shows decreasing concentrations. A fitted line plot with 90 percent confidence intervals is shown in Figure 2.

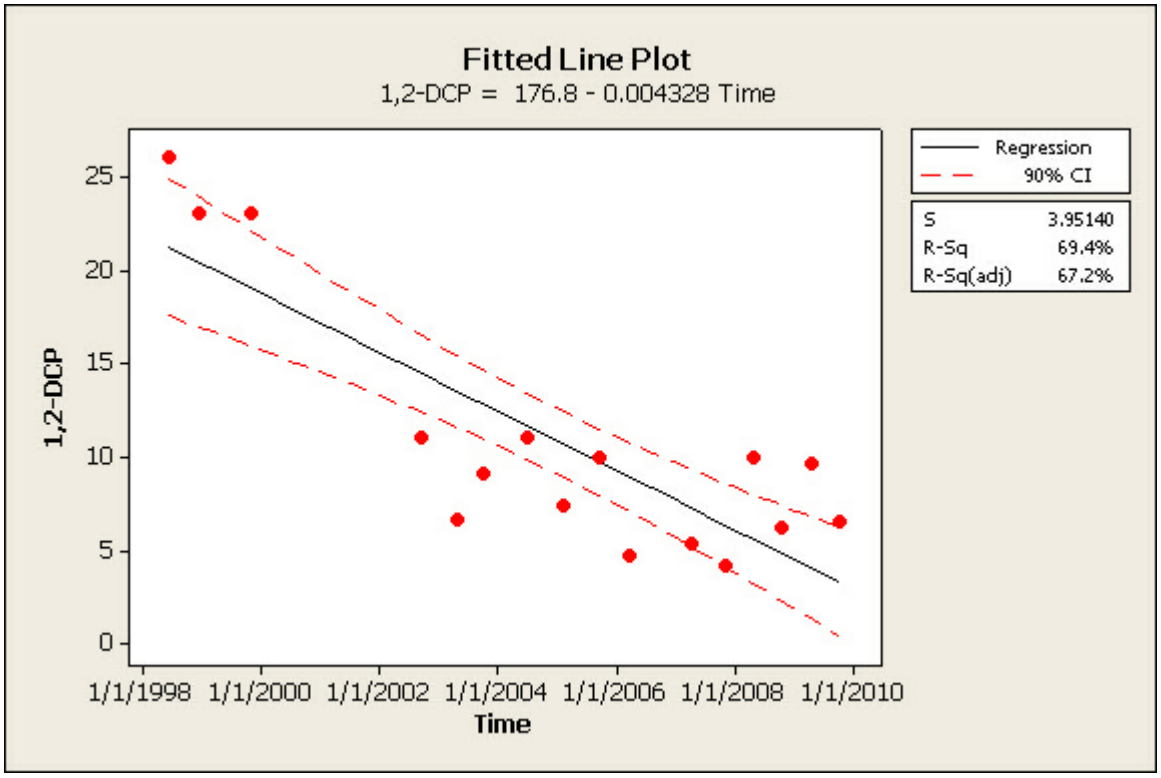

Figure 2. Regression Analysis – Fitted Line Plot, MW-105
(Does not included the three samples from 1997 shown in Fig. 1)

MW-104

A Mann-Kendall Statistical analysis shows that the concentration trend of 1,2-DCP in monitoring well, MW-104 is probably decreasing with a confidence in trend of 92 per cent.. The data was grouped according to seasonality, wet versus dry season sampling. The p-values for each were less than 0.5, indicating decreasing statistical trends for each season. Figure 3 shows the smoothed LOWESS curve, and the fitted line plot with 90 per cent confidence interval is presented in Figure 4.

Table 2. Kendall Tau Descriptive Statistics: 1,2-DCP MW-104

Grouped by Season

Row	SEA2	N_SEA	S_TAU	TAU_A	Z_S	P_VALUE	INTRCEPT	SLOPE
1	dry	6	-9	-0.600000	-1.50294	0.132855	45.4439	-0.0011050
2	wet	6	-11	-0.733333	-1.87867	0.060289	33.8136	-0.0008326

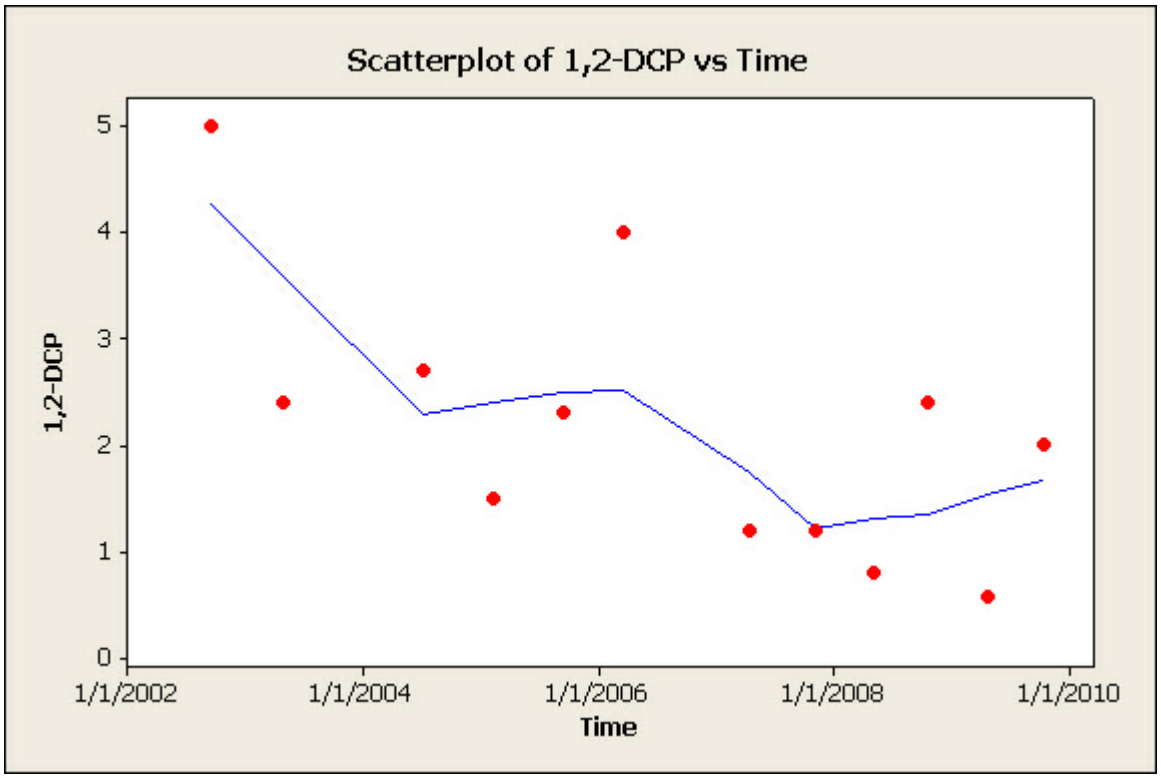

Figure 3. Scatter Plot and LOWESS Curve, MW-104

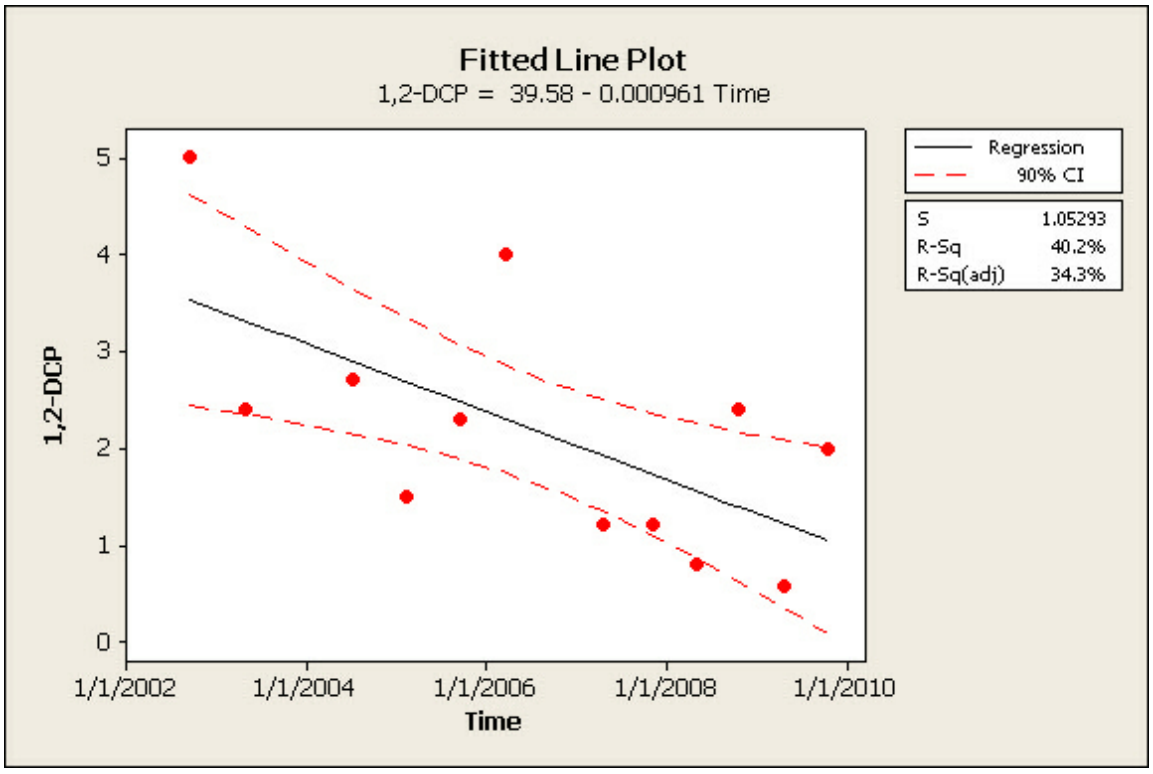

Figure 4. Regression Analysis – Fitted Line Plot, MW-104

6. Analysis and Conclusions

For well MW-105, there is no decreasing (downward) statistical trend for concentration of 1,2-DCP. Therefore, it would not be appropriate to attempt to fit a linear model to extrapolate to the time the concentration in the well will fall below the MCL. Concentration of 1,2-DCP in MW-104 is already below the MCL and there is no statistical indication of any increase.

As a trend was not detected, the EPA program VSP was used to estimate that seven future yearly rounds should be adequate to detect a downward trend. Alternatively, nine future rounds done every six months should be adequate. This considers a 5 percent false rejection of a null hypothesis of no trend line, a 10 percent false acceptance, a significant difference of one standard deviation of residuals from the regression line, and a linear model for trends.

An examination of the seasonal differences in the data from each well indicates that data trends are similar in either season at both wells. The timing of monitoring well sampling should not affect the results if the sampling frequency was reduced.

Table 3 1,2-DCP Concentrations

TABLE 3
SELECTED GROUNDWATER MONITORING WELL SAMPLE RESULTS
Del Norte County Pesticides Storage Area Site

MW-104		MW-105		MW-25	
Sampling Date	**1,2-DCP (ug/L)**	**Sampling Date**	**1,2-DCP (ug/L)**	**Sampling Date**	**1,2-DCP (ug/L)**
3/24/90	250	3/24/90	220	3/24/90	25
		3/24/90	250		
3/29/90	230				
3/29/90	240				
4/21/90	310	4/21/90	90		
		4/22/90	400		
4/23/90	220	4/23/90	180		
4/23/90	280	4/23/90	230		
4/26/90	430	4/26/90	460		
5/8/90	260	5/8/90	410		
5/22/90	240	5/22/90	330		
		5/22/90	450	5/22/90	23
6/21/90	130	6/21/90	300		
7/26/90	370	7/26/90	260	7/26/90	18
12/6/90	100	12/6/90	73	12/6/90	19
12/6/90	110	12/6/90	73		
		12/6/90	90		
4/18/91	130	4/18/91	91	4/18/91	20
8/28/91	52	8/28/91	57	8/28/91	23
		8/28/91	57		
11/7/91	89	11/7/91	63	11/7/91	23
2/26/92	96	2/26/92	30	2/26/92	11
2/26/92	99				
12/10/92	77	12/10/92	22	12/10/92	11
8/3/93	87	8/3/93	34	8/3/93	13.8
8/3/93	91				
11/17/93	92	11/17/93	72	11/17/93	18
		11/17/93	77		
2/28/94	43	2/28/94	21	2/28/94	8
6/17/94	130	6/17/94	23	6/17/94	6.3
12/14/94	37	12/14/94	12	12/14/94	3.8

No Sample

MW-26		MW-104		MW-105		MW-107	
Sampling Date	**1,2-DCP (µg/L)**	**Sampling Date**	**1,2-DCP (µg/L)**	**Sampling Date**	**1,2-DCP (µg/L)**	**Sampling Date**	**1,2-DCP (µg/L)**
09/18/02	ND	09/18/02	5.0	09/18/02	11.0	09/18/02	ND
04/28/03	ND	04/28/03	2.4	04/28/03	6.6	04/28/03	ND
10/07/03	ND	10/07/03	ND	10/07/03	9.1	10/07/03	Not sampled
07/07/04	ND	07/07/04	2.7	07/07/04	11.0	07/07/04	ND
02/07/05	ND	02/07/05	1.5	02/07/05	7.4	02/07/05	ND
09/14/05	ND	09/14/05	2.3	09/14/05	9.9	09/14/05	ND
03/20/06	ND	03/20/06	4.0	03/20/06	4.7	03/20/06	ND
04/16/07	ND	04/16/07	1.2	04/16/07	5.3	04/16/07	ND
11/05/07	ND	11/05/07	1.2	11/05/07	4.2	11/05/07	ND
04/30/08	ND	04/30/08	0.8	04/30/08	10.0	04/30/08	ND
10/15/08	ND	10/15/08	2.4	10/15/08	6.2	10/15/08	ND
04/22/09	ND	04/22/09	0.6	04/22/09	9.6	04/22/09	ND
10/12/09	Not sampled	10/12/09	2.0	10/12/09	6.5	10/12/09	Not sampled