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January 29, 2010

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Edward Hansen NMOCD 1220 South St. Francis Drive Santa Fe, New Mexico 87505 Via E-mail

RE: NMOCD Case #: AP-59 F-35 SWD & G-35 SWD, T17S, R35E Updated Proposed Abatement Plan Amendment

Dear Mr. Hansen,

This letter presents updates to the data regarding ground water restoration at the abovementioned sites and proposes an amendment to the Abatement Plan (submitted December, 2005; Minor Modification submitted April 11, 2006, Proposed Abatement Plan Amendment May 23, 2008). Plate 1 presents a site vicinity map with well locations. Tables presenting all collected data for all wells associated with this site are attached.

Summary

Plate 1 shows the three well locations at F-35 and four well locations at G-35. Depending on the drill date, there are 31 to 11 quarters of ground water data for each well. Our evaluation of data permits the following conclusions:

- 1. Ground water beneath and down gradient from the former tanks exhibits chloride and TDS concentrations that are suitable for mature livestock but ground water quality does not yet meet ground water standards.
- 2. Ground water beneath and within about 100 feet of the former tanks exhibits Benzene concentrations above ground water standards.
- 3. Chloride and TDS concentrations are decreasing over time beneath the former tanks and remain relatively constant down gradient from the former tanks.
- 4. Although the past five sampling events show decreasing concentrations of benzene at both sites, additional data is required to confirm that natural restoration is an effective abatement strategy.
- 5. Natural restoration is an effective abatement strategy for chloride and TDS at this site.

Ground Water Chloride and TDS

As shown in Figure 1, concentrations of TDS and chloride declined at the F-35 source area (MW-1) from 2002-2005 and then the rate of decline decreased from 2005-present day. MW-1 is the pumping recovery well at the F-35 site.



Figure 2 presents the chloride data from F-35 MW-3 (1,000 feet down gradient) and MW-2, about 400 feet cross-gradient. The observed fluctuations in ground water data for MW-3 shallow and deep would be consistent with episodic introduction of chlorides during historic operations at the F-35 SWD facility up-gradient. Although the most recent sampling event shows an increase in chloride concentration in MW-3 Deep, this concentration is similar to those observed in September and November 2007 and does not exceed WQCC standards. We anticipate chloride in this well will drop again as it has in past quarters.



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Figure 3 presents chloride and TDS concentrations over time in MW-1 at the G-35 site. In the most recent sampling event, chloride and TDS in MW-1 were 332 mg/L and 896 mg/L respectively. The projected trend suggests that ground water may meet WQCC standards for chloride in the next four quarters of sampling.



Figure 4 shows the chloride concentrations over time at the well approximately 50 feet down gradient from the excavation (MW-4) and the deep and shallow wells 300 feet down gradient (MW-3). TDS in these wells follows a similar trend. In the most recent sampling event, chloride and TDS in MW-4 were 660 mg/L and 1,420 mg/L respectively. The projected trend suggests that ground water in MW-4 could meet standards by 2011.



Plate 2 presents our interpretation of chloride impact to local ground water caused by historic operations at F-35 and G-35 using chloride data collected in the October 2009 sampling event.

Prediction of Benefit from the Vadose Zone Remedy

Our Vadose Zone Remedy Report (October 2006) predicted that the vadose zone would drain (allow a continued flux of chloride and hydrocarbons to ground water) for 10-18 months after remedy installation (August 2007) if initial conditions were "wet" (this would make the remedy effective in June 2008 – February 2009). During the twenty-six months since the installation of the vadose zone remedy, ground water chloride concentrations have decreased from 1,500 mg/L in May of 2007 (before remedy installation) to 940 mg/L in October 2009 at F-35. An exponential trendline fit to all chloride data collected at this well indicates an ongoing decline in chloride concentrations in this well, see Figure 5. Although the data show no dramatic decrease in the concentration trend that suggests a benefit from the infiltration barrier at this time, the continual decrease in chloride at the source area is a satisfactory finding.



At G-35, chloride and TDS concentrations fluctuated widely from 2002-2005 (see Figure 3). From 2005 to the present day, concentration declines have been relatively steady. Chloride declined from 873 mg/L to 332 mg/L in May 2007 to October 2009. Figure 6 shows chloride in ground water in the well at G-35 from January 2006 to October 2009 with an exponential trendline.



Again, the data does not show a clear demonstration that the infiltration barrier created a measurable benefit at this time. Nevertheless, the data support a conclusion that ground water will meet standards at these sites in the next one to four years without further action.

Ground Water Chemistry - Hydrocarbons

The impact of the vadose zone remedy (the infiltration barrier and ventilation wells) along with natural degradation should result in decreases in hydrocarbon concentrations in the three wells with detectible concentrations of VOCs: MW-1 and MW-4 at G-35 and MW-1 at F-35. In these wells, Benzene has been the constituent with concentrations exceeding WQCC standards while concentrations for Toluene, Ethyl Benzene and Total Xylenes have generally met standards.

At G-35, a decreasing benzene concentration trend is evident in both MW-1 and MW-4. From 2001-2005, benzene concentrations were generally just above or just below 1 mg/L and after 2005, benzene concentrations were generally below 0.5 mg/L. About 15 months after installation of the vadose zone remedy, the data show a steady decline in benzene concentrations. While the chloride and TDS concentrations did not suggest a dramatic benefit from the remedy, these data may be indicative of a decreasing flux of benzene from the vadose zone to ground water.





The chloride and benzene data suggest that the flux of constituents from the vadose zone to ground water began declining in 2006 at the G-35 site.

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At the F-35 site, Benzene in MW-1 has remained over the standard with the exception of a "non-detect" in June of 2008. Figure 9 shows the last eight quarters of data for Benzene in MW-1, excluding the June 2008 data point as an anomaly. In the coming months the flux of constituents should decline in response to the installation of the infiltration barrier.



Predicted Benefit of Point-of-Use Treatment System

Declining concentrations of chloride at F-35 in MW-1 combined with the lack of use for potable water suggest this system has no environmental benefit.

Proposed Abatement Plan Amendment

We conclude that natural restoration is an effective remedy for these sites and we propose shutting down the system at F-35 and foregoing a treatment system at G-35 as previously proposed in the 2005 Abatement Plan. This amendment, together with allowing the vadose zone remedy, natural attenuation, and dilution and dispersion to continue to decrease concentrations of constituents of concern is protective of fresh water, public health, human safety, property and the environment. We propose this abatement plan amendment at this site because:

- The rate of ground water restoration at G-35 (natural restoration) is about the same as F-35 where a relatively small volume of water is being removed and treated (100 gpd). Active pumping and treating is providing no measurable benefit,
- Observed Chloride, TDS and Benzene in ground water, though fluctuating, is declining with time in every impacted well.

- There are no ground water supply wells jeopardized by impacted ground water, and we believe it highly unlikely that the area impacted by these past releases will become a place of withdrawal for domestic use or irrigation between the present time and the time when natural restoration returns ground water to standards.
- Down gradient monitoring wells (F-35 MW-3 and G-35 MW-3) may be used as a water supply to cattle if necessary.

With your approval of this proposed amendment to the Abatement Plan for F-35 and G-35, ROC will:

- a. Discontinue operation of the point source treatment system at F-35
- b. Forego plans for another extraction or treatment system at G-35
- c. If there is a need for a nearby water supply, install a solar pump and cattle trough at F-35 MW-3
- d. Continue monitoring on a quarterly basis for 2010
- e. Prepare an annual report in January 2011 with recommendations

Given the expected efficacy of the vadose zone remedy and the other reasons listed above, we believe this to be the path forward that yields the highest environmental benefit and does not cause a violation of NMOCD rules through implementation of a remedy that does not provide the appropriate balance of protection of fresh water, property, public health, human safety and the environment. We propose to continue monitoring ground water at these sites to document the drop in levels of constituents of concern in ground water. We hope to dismantle the system at F-35 and use as many components as possible in other locations.

Thank you for your time and consideration.

Sincerely, R.T. Hicks Consultants, Ltd.

Katie Lee Project Scientist

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мw	Sample Date	СІ	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
					(mg/	'L)		_
WQ	CC Standard	250	1000	0.01	0.75	0.75	0.62	600
1	1/10/2002	568	1284	0.011	0.022	0.034	0.055	23
1	5/15/2002	1950	3260	0.414	0.057	0.131	0.065	2.1
1	8/19/2002	1950	3850	0.705	0.598	0.209	0.253	7
1	11/11/2002	3630	6740	0.921	0.078	0.154	0.131	5.8
1	2/28/2003	2730	4770	0.713	0.01	0.018	0.027	24.6
1	5/22/2003	3860	7320	0.583	0.002	0.12	0.027	5.3
1	8/21/2003	5010	8850	0.689	0.004	0.307	0.032	3.5
1	11/19/2003	1930	3590	0.012	0.002	0.09	0.003	20.9
1	2/18/2004	2579	5000	0.059	< 0.002	0.35	0.007	1.49
1	5/27/2004	1899	4188	1.17	0.308	0.357	0.319	2.15
1	9/7/2004	4700	8270	1.11	0.0525	0.346	0.1382	17.7
1	11/24/2004	5200	_10400	0.881	0.0226	0.133	0.0717	799
1	3/21/2005	5750	9190	2.76	0.247	0.399	0.2862	136
1	5/11/2005	5890	10700	2490	466	672	693	9.75
1	8/15/2005	4430	6960	1.07	0.226	0.396	0.2417	126
1	10/25/2005	2360	4420	0.799	0.0607	0.146	0.0839	166
1	1/23/2006	1960	3540	0.141	J[0.00537]	0.078	0.0229	80.5
1	4/25/2006	1540	3280	0.749	0.0143	0.093	0.0282	67.4
1	10/25/2006	1350	2800	0.394	0.0204	0.0774	0.0438	45.2
1	1/9/2007	873	1950	0.188	<0.001	0.0883	0.00764	34.6
1	5/24/2007	873	1820	0.143	0.00735	0.0664	0.0227	41.2
1	9/20/2007	800	1738	0.189	0.004	0.082	0.029	22.2
1	11/20/2007	320	969	0.003	<0.002	<0.002	<0.006	35.3
1	2/4/2008	540	1380	0.159	0.061	0.087	0.058	23.1
1	4/29/2008	440	1150	0.109	0.02	0.074	0.038	_ 22.4
1	7/29/2008	860	2160	0.915	0.261	0.74	0.649	<10
1	10/23/2008	680	1790	0.785	0.192	0.531	0.45	<10
1	1/26/2009	500	1330	0.62	0.044	0.372	0.173	<10
1	4/27/2009	550	1300	0.216	0.004	0.212	0.11	14.9
1	8/6/2009	384	1090	0.091	0.016	0.086	0.109	14.8
1	10/23/2009	332	896	0.04	0.001	0.086	0.037	10.9

Vacuum G-35 SWD

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Vacuum	1 G-35 SWD							
A ATA P	Counte Date	с С	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
	sample uate					(mg/L)		
Wacc	Standard	250	1000	0.01	0.75	0.75	0.62	600
2	6/6/2006	17.4	286	<0.001	[0.000839]	j[0.000385]	0.0044	24.7
2	10/25/2006	13.4	264	<0.001	<0.001	<0.001	<0.001	22.8
2	1/9/2007	13.7	322	<0.001	j[0.000540]	<0.001	<0.001	21.7
2	5/24/2007	17.2	254	<0.001	<0.001	<0.001	<0.001	20.1
2	9/20/2007	16	262	<0.002	<0.002	<0.002	<0.006	25.6
2	11/20/2007	16	283	<0.002	<0.002	<0.002	<0.006	25
2	2/4/2008	16	296	<0.002	<0.002	<0.002	<0.006	23
2	4/29/2008	16	283	<0.002	<0.002	<0.002	<0.006	23.8
2	7/29/2008	16	312	<0.001	<0.001	<0.001	<0.003	24
2	10/23/2008	16	386	<0.001	<0.001	<0.001	<0.003	24.6
2	1/28/2009	16	282	XXX	XXX	XXX	XXX	24
2	4/27/2009	16	288	XXX	XXX	XXX	XXX	21.6
2	8/6/2009	16	296	XXX	XXX	XXX	XXX	21.2
2	10/23/2009	116	666	XXX	XXX	XXX	XXX	71

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Vacuum G-	35 SWD							
ANA/	Comple Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
AAIAI						(mg/L)		
WQCC Stai	ndard	250	1000	0.01	0.75	0.75	0.62	600
3 Deep	1/9/2007	313	830	<0.001	0.0136	<0.001	<0.001	46.5
3 Deep	5/24/2007	648	1090	<0.001	j[0.000320]	<0.001	<0.001	34.7
3 Deep	9/20/2007	570	1442	<0.002	<0.002	<0.002	<0.006	34
3 Deep	11/20/2007	570	1312	<0.002	<0.002	<0.002	<0.006	42.5
3 Deep	2/5/2008	820	1710	<0.002	<0.002	<0.002	<0.006	32.7
3 Deep	4/29/2008	930	1920	<0.002	<0.002	<0.002	<0.006	36.7
3 Deep	7/29/2008	1010	2110	<0.001	<0.001	<0.001	<0.003	40
3 Deep	10/22/2008	670	1710	<0.001	<0.001	<0.001	<0.003	<10
3 Deep	1/28/2009	1560	3000	XXX	XXX	XXX	XXX	31
3 Deep	4/27/2009	1080	2770	XXX	XXX	XXX	XXX	19.2
3 Deep	8/6/2009	1090	2110	XXX	XXX	XXX	XXX	26.8
3 Deep	10/23/2009	720	1930	XXX	XXX	XXX	XXX	14.4
NAVA	Cample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
						(mg/L)		
3 Shallow	1/9/2007	311	804	<0.001	0.0191	<0.001	<0.001	48.9
3 Shallow	5/24/2007	599	1070	<0.001	j[0.000380]	<0.001	<0.001	34.5
3 Shallow	9/20/2007	500	1373	<0.002	<0.002	<0.002	<0.006	39.1
3 Shallow	11/20/2007	776	1670	<0.002	<0.002	<0.002	<0.006	40.4
3 Shallow	2/5/2008	670	1590	<0.002	<0.002	<0.002	<0.006	34.3
3 Shallow	4/29/2008	750	1790	<0.002	<0.002	<0.002	<0.006	31.8
3 Shallow	7/29/2008	760	1870	<0.001	<0.001	<0.001	<0.003	27
3 Shallow	10/22/2008	464	1570	<0.001	<0.001	<0.001	<0.003	68.6
3 Shallow	1/28/2009	710	1690	XXX	XXX	XXX	XXX	24.3
3 Shallow	4/27/2009	630	1790	XXX	XXX	XXX	XXX	18.8
3 Shallow	8/6/2009	710	1680	XXX	XXX	XXX	XXX	16.5
3 Shallow	10/23/2009	600	1320	XXX	XXX	XXX	XXX	17.3
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A NAV	Comple Date	ច	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
	odilipie udie					(mg/L)		
WQCC &	Standard	250	1000	0.01	0.75	0.75	0.62	600
4	5/24/2007	1200	2050	0.0521	0.0582	0.017	0.02819	43.2
4	9/20/2007	1600	3262	0.146	0.058	0.023	0.042	17.8
4	11/20/2007	1600	3256	0.036	0.034	0.01	0.017	26
4	2/4/2008	2680	5140	0.411	0.151	0.082	0.092	9.94
4	4/29/2008	1800	3370	0.529	0.222	0.15	0.176	11.2
4	7/29/2008	1420	2620	0.208	0.086	0.041	0.06	20
4	10/23/2008	1040	2110	0.189	0.137	0.078	0.109	21.5
4	1/26/2009	730	1650	0.196	0.16	0.048	0.059	21.9
4	4/27/2009	940	1970	0.097	0.033	0.037	0.032	20.9
4	8/6/2009	770	1750	0.079	0.055	0.046	0.069	16.9
4	10/23/2009	660	1420	0.018	0.012	0.012	0.01	13.6

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Vacuum G-35 SWD

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Vacuum F	-35 S\	ND
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		CI	TDS	Benzene	Toluene	Ethyl	Total	Sulfate
MW	Sample Date		100	Denzenie	Toraono	Benzene	Xylenes	Ganaco
					(mg/L)		
WQC	C Standard	250	1000	0.01	0.75	0.75	0.62	600
1	1/10/2002	5,200	9,425	0.05	0.053	0.05	0.09	5
1	5/15/2002	3,720	7,050	0.744	0.207	0.51	0.309	3.2
1	8/19/2002	3,630	6,040	0.705	0.172	0.112	0.076	10.7
1	11/11/2002	3,720	6,020	1.21	0.343	0.835	0.431	2.8
1	2/28/2003	2,200	4,040	0.909	0.84	0.321	0.124	26.2
1	6/5/2003	2,300	4,180	0.632	0.134	0.061	0.067	20.3
1	8/21/2003	2,060	4,000	0.617	0.36	0.202	0.192	4.9
1	11/19/2003	2,000	3,760	0.797	0.301	0.264	0.248	5.1
1	2/18/2004	1,819	3,932	0.349	0.038	0.121	0.027	0.19
1	5/27/2004	1,759	4,008	0.726	0.176	0.268	0.215	8.7
1	9/7/2004	1,040	3,000	0.429	0.221	0.143	0.2247	19.9
1	11/24/2004	1,260	2,740	0.0489	0.313	0.209	0.2507	51
1	3/21/2005	1,220	2,210	2.2	1.61	0.848	1.283	110
1	5/11/2005	1,490	2,970	686	451	374	176.2	24.6
1	8/15/2005	1,340	2,890	0.819	0.393	0.666	0.584	69.5
1	10/25/2005	1,080	2,540	0.779	0.243	0.394	0.3062	72.7
1	1/23/2006	886	2,080	0.447	0.222	0.28	0.3006	88.2
1	4/25/2006	1,420	3,040	0.227	0.0956	0.174	0.16.14	62.5
1	10/24/2006	1,460	3,190	0.462	0.489	0.23	0.745	45.2
1	1/9/2007	1,510	2,980	0.486	0.577	0.185	0.333	67.2
1	5/23/2007	1,500	2,850	0.557	0.387	0.323	0.681	44.4
1	9/19/2007	1,380	2,902	0.902	0.706	0.582	1.14	23.2
1	11/19/2007	1,260	2,642	0.719	0.203	0.429	0.665	44.2
1	2/15/2008	1,240	2,650	0.305	0.099	0.218	0.563	49.7
1	6/3/2008	1,460	2,840	<0.002	<0.002	<0.002	<0.006	25.4
1	7/28/2008	1,120	2,510	0.051	0.023	0.066	0.172	35
1	10/23/2008	1,150	2,580	0.193	0.013	0.232	0.526	27
1	1/28/2009	1,150	2,440	0.431	0.044	0.332	0.362	16.8
1	4/28/2009	980	1,970	0.26	0.038	0.234	0.282	15.2
1	8/5/2009	740	1,660	0.063	0.024	0.116	0.236	18.7
1	10/26/2009	940	1,890	0.034	0.019	0.136	0.177	15.6

Vacı	um F-35 SWD							
MM	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
						(mg/L)		
Ng	CC Standard	250	1000	0.01	0.75	0.75	0.62	600
2	6/6/2006	97.6	724	<0.001	<0.001	<0.001	<0.001	63.3
2	10/24/2006	89.1	598	<0.001	<0.001	<0.001	<0.001	67.2
2	1/9/2007	101	590	<0.001	<0.001	<0.001	<0.001	69.4
2	5/23/2007	88.3	512	<0.001	<0.001	<0.001	<0.001	61
2	9/19/2007	100	587	<0.002	<0.002	<0.002	<0.006	71.7
2	11/18/2007	96	571	<0.002	<0.002	<0.002	<0.006	85.7
2	2/4/2008	100	652	<0.002	<0.002	<0.002	<0.006	60.6
2	4/28/2008	96	604	<0.002	<0.002	<0.002	<0.006	79.8
2	7/28/2008	96	586	<0.001	<0.001	<0.001	<0.003	62
2	10/23/2008	100	710	<0.001	<0.001	<0.001	<0.003	77.7
5	1/28/2009	96	099	XXX	XXX	XXX	XXX	73.2
2	4/28/2009	100	663	XXX	XXX	XXX	XXX	73.6
2	8/5/2009	104	999	XXX	XXX	XXX	XXX	76.2
2	10/26/2009	20	296	XXX	XXX	XXX	XXX	21.3
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MW	Sample Date	IJ	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
						(mg/L)		
WQCC Sta	andard	250	1000	0.01	0.75	0.75	0.62	600
3 Deep	1/9/2007	133	500	<0.001	0.0103	<0.001	<0.001	86.9
3 Deep	5/23/2007	91.9	452	<0.001	0.00241	<0.001	<0.001	47.5
3 Deep	9/19/2007	204	772	<0.002	<0.002	<0.002	<0.006	72.8
3 Deep	11/19/2007	216	735	<0.002	<0.002	<0.002	<0.006	64.6
3 Deep	2/5/2008	52	393	<0.002	<0.002	<0.002	<0.006	59.8
3 Deep	4/28/2008	104	485	<0.002	<0.002	<0.002	<0.006	65.2
3 Deep	7/28/2008	96	510	<0.001	<0.001	<0.001	<0.003	52
3 Deep	10/22/2008	72	665	<0.001	<0.001	<0.001	<0.003	160
3 Deep	1/28/2009	84	477	XXX	XXX	XXX	XXX	65
3 Deep	4/28/2009	60	416	XXX	XXX	XXX	XXX	61.9
3 Deep	8/5/2009	56	397	XXX	XXX	XXX	XXX	58.4
3 Deep	10/26/2009	208	542	XXX	XXX	XXX	XXX	42
MW	Sample Date	Ū	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
						(mg/L)		
3 Shallow	1/9/2007	144	512	<0.001	0.015	<0.001	<0.001	66
3 Shallow	5/23/2007	117	494	<0.001	0.0013	<0.001	<0.001	56.9
3 Shallow	9/19/2007	192	789	<0.002	<0.002	<0.002	<0.006	73.5
3 Shallow	11/19/2007	104	467	<0.002	<0.002	<0.002	<0.006	66.3
3 Shallow	2/5/2008	212	821	<0.002	<0.002	<0.002	<0.006	60.6
3 Shallow	4/28/2008	116	502	<0.002	<0.002	<0.002	<0.006	63.1
3 Shallow	7/28/2008	164	650	<0.001	<0.001	<0.001	<0.003	58
3 Shallow	10/22/2008	104	690	<0.001	<0.001	<0.001	<0.003	74.3
3 Shallow	1/28/2009	100	445	XXX	XXX	XXX	XXX	65
3 Shallow	4/28/2009	128	579	XXX	XXX	XXX	XXX	74
3 Shallow	8/5/2009	128	560	XXX	XXX	XXX	XXX	70.6
3 Shallow	10/26/2009	108	535	XXX	XXX	XXX	XXX	63.1

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