

1R - 427-17

REPORTS

DATE:

12-22-10

Hansen, Edward J., EMNRD

From: Katie Jones [kjones@riceswd.com]
Sent: Friday, February 18, 2011 1:18 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; lpg@texerra.com
Subject: EME Jct. K-33-1 (AP-60) and Sarah Phillips EOL (1R427-17) Termination Request Addendum
Attachments: EME Jct. K-33-1 and Sarah Phillips Termination Request Addendum - Figure 7.pdf

Mr. Hansen,

Attached is a revised Figure 7 to replace Figures 7a and 7b (pages 10 and 11) of the EME Jct. K-33-1 (AP-60) and Sarah Phillips EOL (1R427-17) Termination Request. ROC also requests to plug and abandon MW-1, MW-2, MW-3, and MW-4 located at Jct. K-33-1 and MW-1 located at Sarah Phillips EOL using a cement grout with 1 to 3% bentonite and a 3 foot cap of cement. If you have any questions or require any additional information, please contact Hack Conder at (575)631-6432 or myself at (575)393-9174.

Thank you.

Katie Jones
Environmental Project Coordinator
RICE *Operating Company*

	Lateral Distance (ft) from K-33-1 Jct												Lateral Distance (ft) from K-33-1 Jct												
	-150	-125	-100	-75	-50	-25	25	50	75	100	125	150	-150	-125	-100	-75	-50	-25	25	50	75	100	125	150	
-325	300	300	300	300	300	300	300	300	300	300	300	300	220	220	220	220	220	220	220	220	220	220	220	300	
-300	320	409	424	439	458	460	461	462	464	465	466	374	225	308	323	338	357	359	361	363	365	367	368	354	
-275	439	446	466	486	511	513	515	516	518	520	522	449	311	337	357	377	403	405	408	410	413	415	418	407	
-250	459	482	507	532	564	566	568	570	573	575	577	523	335	366	392	417	448	451	455	458	461	464	467	461	
-225	480	519	549	579	617	619	622	625	627	630	633	598	358	396	426	456	494	498	501	505	509	513	517	514	
-200	500	555	590	625	669	672	675	679	682	685	688	672	382	425	460	495	539	544	548	553	557	562	566	568	
-175	521	591	632	672	712	726	729	733	736	740	743	747	405	454	495	535	585	590	595	600	606	611	616	621	
-150	561	604	640	677	722	730	738	745	750	754	758	752	466	475	511	546	590	610	614	616	621	626	631	628	
-125	569	616	649	682	723	730	738	745	750	754	759	757	478	496	527	557	595	615	619	621	626	631	636	635	
-100	577	628	657	687	723	730	738	745	749	754	759	761	490	517	543	568	600	621	624	626	631	635	640	642	
-75	586	640	666	692	724	730	737	744	749	754	760	766	503	538	559	579	605	626	629	632	636	640	644	649	
-50	594	653	674	697	724	731	737	744	749	754	760	771	515	560	575	591	610	631	634	637	641	645	649	656	
-25	602	665	683	702	724	731	737	743	749	755	760	776	527	581	591	602	615	636	639	642	646	649	653	663	
25	610	677	691	707	725	731	737	743	749	755	761	767	539	602	607	613	620	641	644	647	651	654	657	661	
50	618	690	700	712	725	726	727	729	735	741	747	753	551	623	623	624	625	631	635	643	646	648	651	653	
75	626	685	694	705	717	718	719	721	728	735	742	743	563	622	623	624	625	631	634	642	644	646	648	651	
100	634	680	688	698	708	710	711	713	721	729	737	734	576	622	623	624	625	630	634	641	642	644	646	648	
125	642	676	683	691	700	702	703	705	714	723	732	725	588	622	623	624	626	630	633	639	641	642	644	646	
150	650	652	654	656	659	661	663	665	679	693	707	721	600	620	622	624	627	629	631	633	637	641	644	648	

Figure 7 – Average annual groundwater chloride concentrations (mg/kg) for 2007 (left) and 2010 (right). These data indicate that the source of the moderately elevated groundwater chloride concentrations observed near the EME K-33-1 and Sarah Phillips junction boxes in 2007 is from the regional chloride plume known to exist to the west of these sites. The data also indicate that chloride concentrations are gradually diminishing over time due to natural attenuation. [The regional direction of groundwater flow is from NW to SE. North is “up”. Maps are approximations to actual scale].

Texerra

75 Wuthering Heights Drive Colorado Springs, CO 80921

Tel: 719-339-6791 E-mail: lpg@texerra.com

December 22nd, 2010

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

RECEIVED

JAN - 3 2011

Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87504

RE: **Groundwater Monitoring Report & Remediation Termination Request**
Rice Operating Company EME SWD System
Sarah Phillips Jct – NMOCD Case Number 1R-427-17
K-33-1 Jct - NMOCD AP-60

Sent via E-mail and U.S. Certified Mail: No. 7008 1140 0001 3068 8715

Mr. Hansen:

This letter presents and interprets groundwater chloride monitoring data collected for the above-referenced projects over the past several years. In this report we are aggregating the groundwater monitoring data from both the EME K-33-1 and the EME Sarah Phillips sites because of their close proximity (Figures 1, 2 & 3). The location of the K-33-1 and Sarah Phillips sites relative to the known regional chloride plume south of Monument is shown in Figure 4.

The chloride concentration of groundwater that encounters and flows across the K-33-1 and Sarah Phillips locations is presented Figure 5a. The baseline groundwater chloride concentration has dropped from approximately 750 mg/kg to approximately 550 mg/kg over the last nearly four years. Nearly identical patterns in groundwater chloride concentrations over time have been observed in the K-33-1 near source, down-gradient monitor well (MW-1, Figure 5b) and in the (farther) down-gradient monitor well (MW-3, Figure 5c). A far up-gradient monitor well (MW-4, Figure 5d) illustrates lower concentrations but a similar pattern of decline over time, dropping from approximately 320 mg/kg to approximately 280 mg/kg over the past three years. Groundwater chloride data from the near source, down-gradient monitor well at the Sarah Phillips location (Figure 6) illustrates a pattern strikingly similar to the near source down-gradient monitor well at the K-33-1 location. These data are presented in plain view in Figure 7, where it is evident that the center of mass of the groundwater chloride plume has moved down-gradient and had become more dilute (through natural groundwater dispersion) over the past three years. In fact the largest declines (in dark blue) are in and near the center of mass of the plume, indicating that there has been little or no downward migration of residual soil chlorides into groundwater.

EME Sarah Phillips & K-33-1

Taken together, these data are indicative of a groundwater chloride plume that has migrated across the Sarah Phillips and K-33-1 locations from an up-gradient source and that is gradually moving down-gradient and decreasing in concentration over time. The average, aggregate rate of decline in groundwater chloride concentrations among all of the monitor wells is approximately 5% per year. We may expect, then, that the groundwater chloride concentrations below and proximal to these locations to diminish below 250 mg/kg in approximately 20 years (Figure 8).

It having been demonstrated that the observed impacts on groundwater quality beneath the Sarah Phillips and K-33-1 locations have apparently been caused by historical up-gradient land use practices which are gradually diminishing over time, and that natural vegetation is becoming reestablished across these sites (Figure 9), we respectfully request that NMOCD grant remediation termination or similar closure status to these projects.

ROC is the service provider (agent) for the EME Salt Water Disposal System and has no ownership of any portion of pipeline, well or facility. The EME SWD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Please do not hesitate to contact either myself or Rice Operating Company if you have any questions or need additional information.

Sincerely,

A handwritten signature in dark ink, appearing to be 'L. Peter Galusky, Jr.', written in a cursive style.

L. Peter Galusky, Jr. Ph.D.

Copy: Rice Operating Company

EME Sarah Phillips & K-33-1

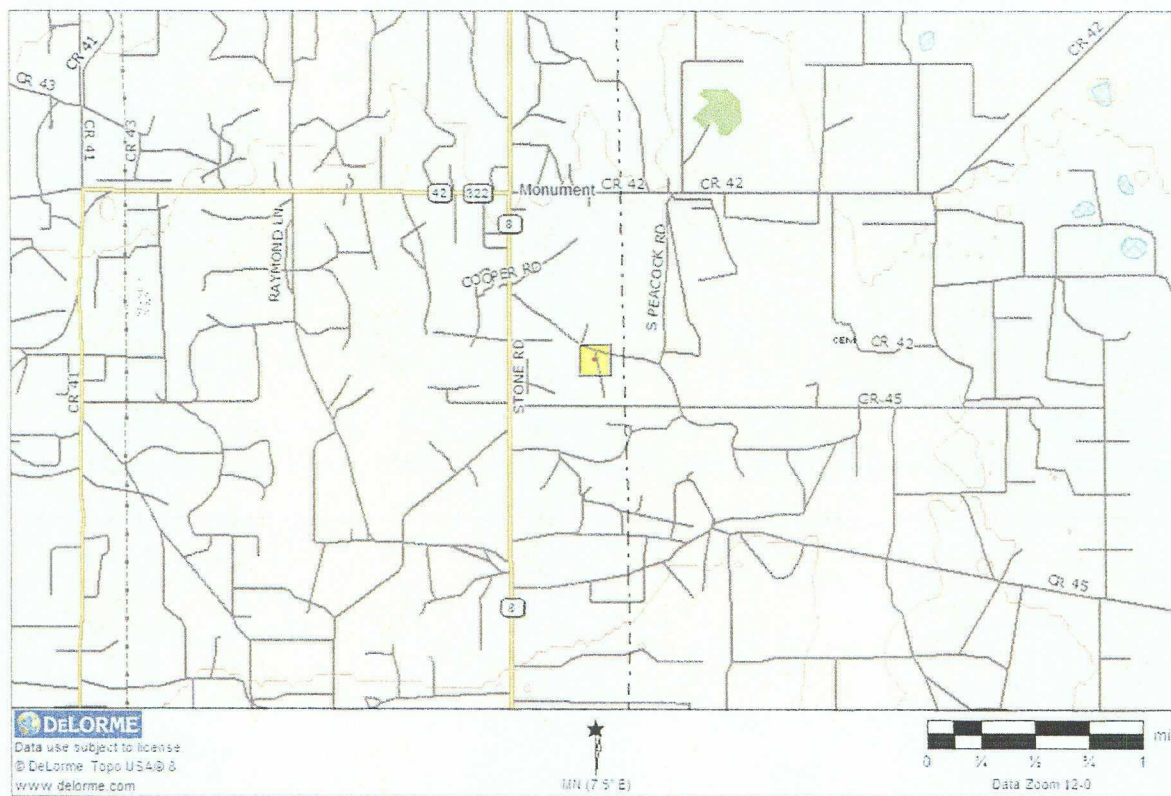


Figure 1 – Location of EME Sarah Phillips & K-33-1 sites (yellow box). The prevailing direction of groundwater flow is toward the southeast (lower right).

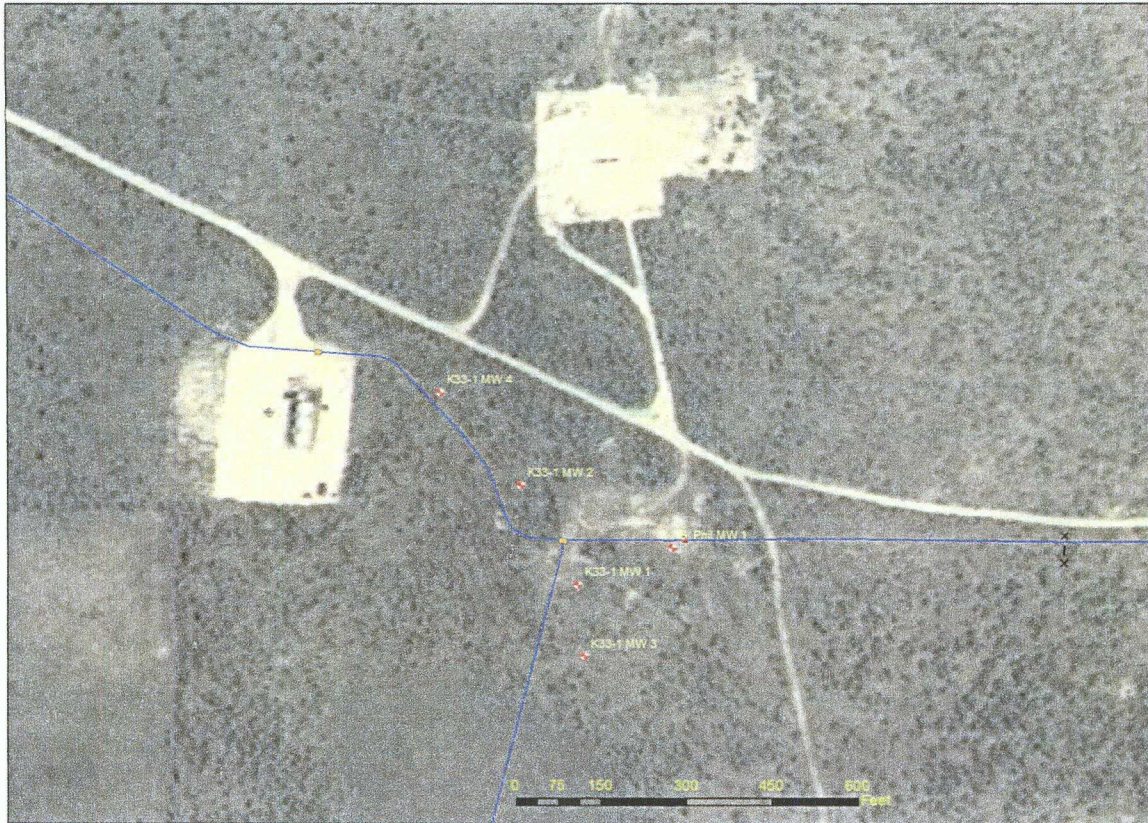


Figure 2 – Aerial photograph showing locations of Sarah Phillips and K-33-1 sites and monitor wells. The up-gradient monitor well (K-33-1 MW-2) provides data on the baseline quality of groundwater as it encounters and flows across the K-33-1 and Sarah Phillips locations.

EME Sarah Phillips & K-33-1

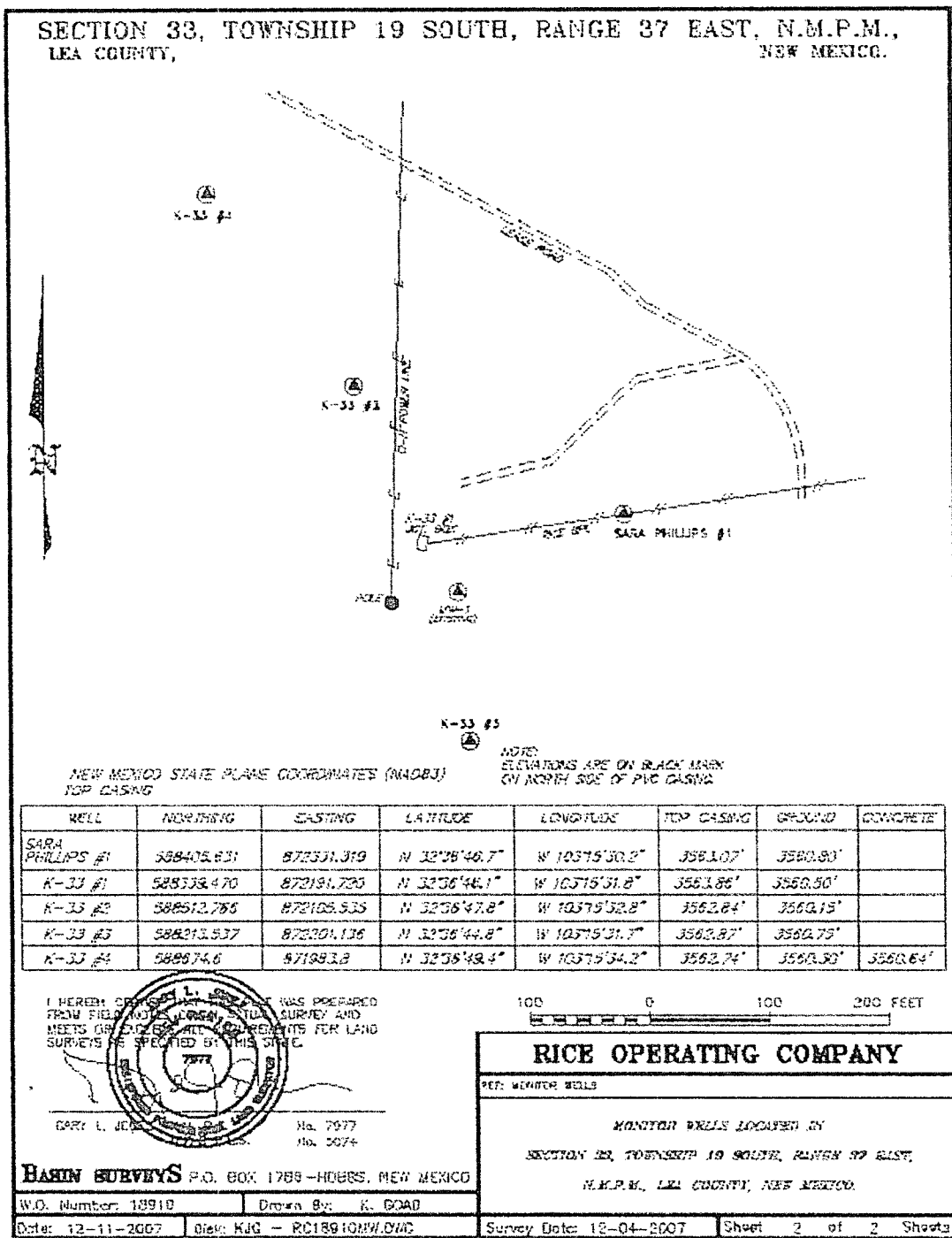


Figure 3 – Surveyed plat showing locations of groundwater monitor wells at EME K-33-1 and Sarah Phillips locations.

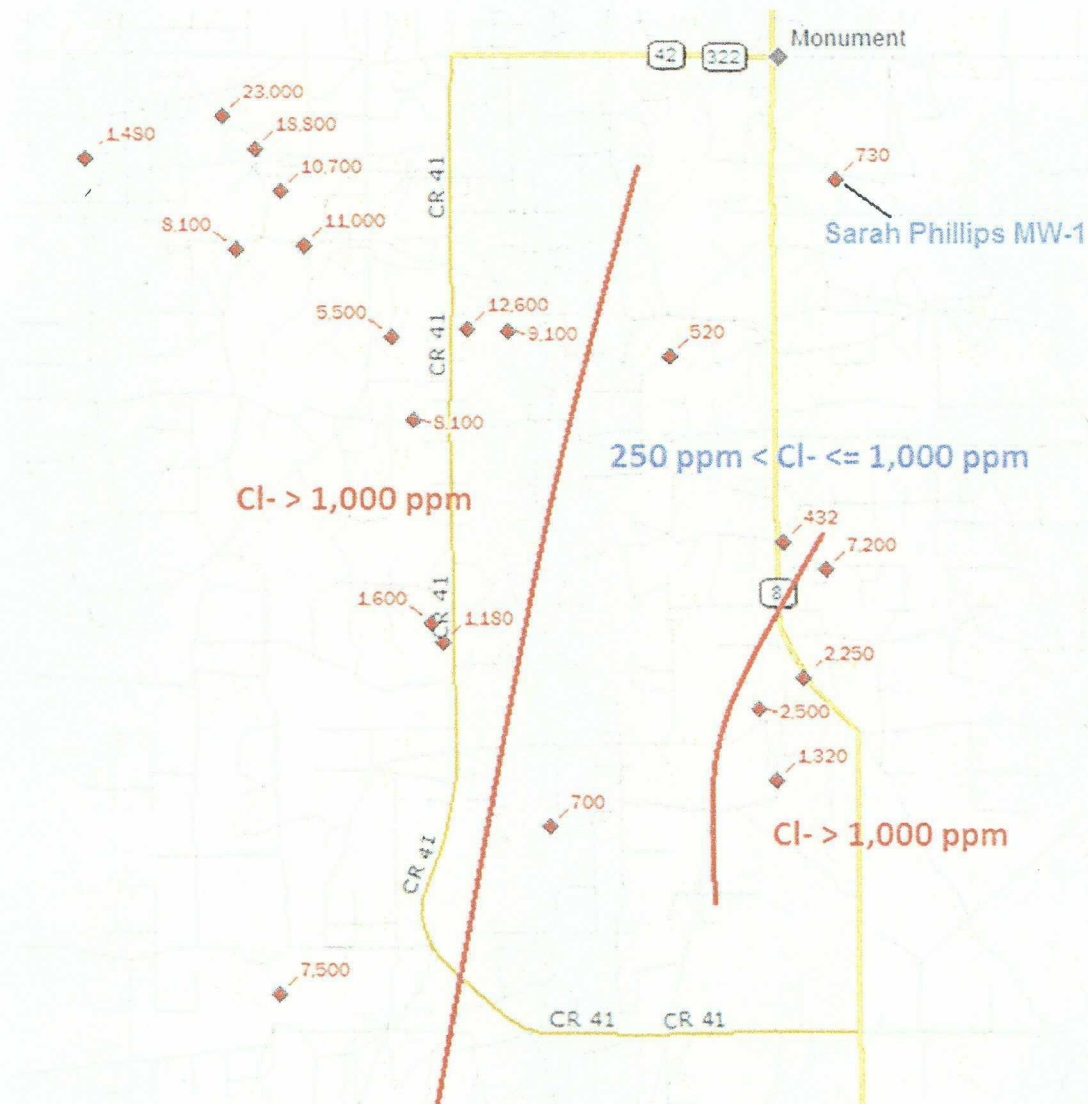


Figure 4 – Groundwater chloride concentrations in “up-gradient” wells (4th qtr, 2009) at various Rice Operating Company locations. The groundwater south of Monument is clearly “regionally impacted” from historical land use activities not caused by Rice operations. The 2ndth Qtr 2009 chloride concentration of the near-source monitor well at the Sarah Phillips location is shown in the upper right portion of the figure. The Sarah Phillips and K-33-1 sites appear to be just north of this regional plume but are likely affected by similar regional, historical land use factors.

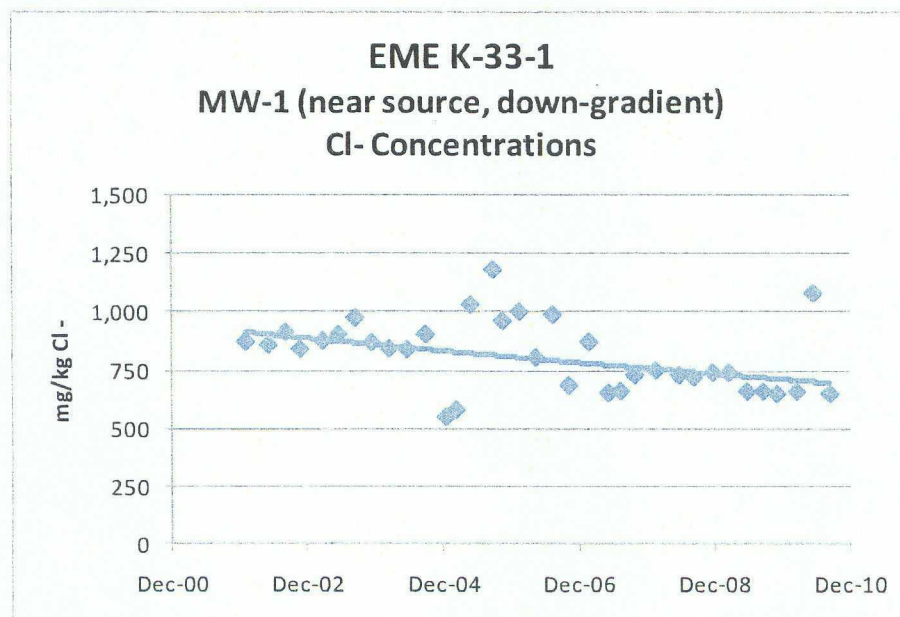
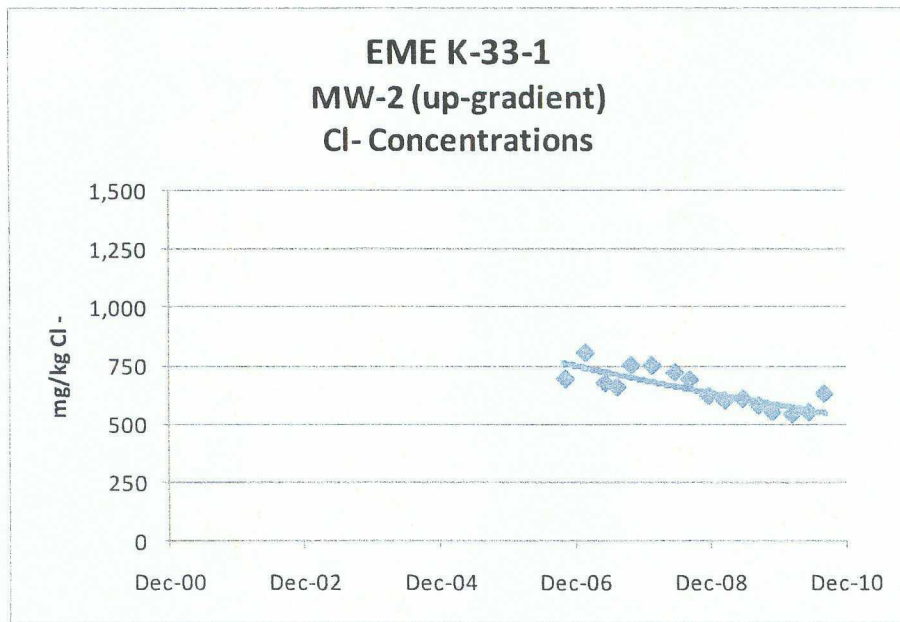


Figure 5 – EME K-33-1 groundwater monitoring data. **5a** (upper graph) – upgradient monitor well data. **5b** (lower graph) – near source down-gradient monitor well data.

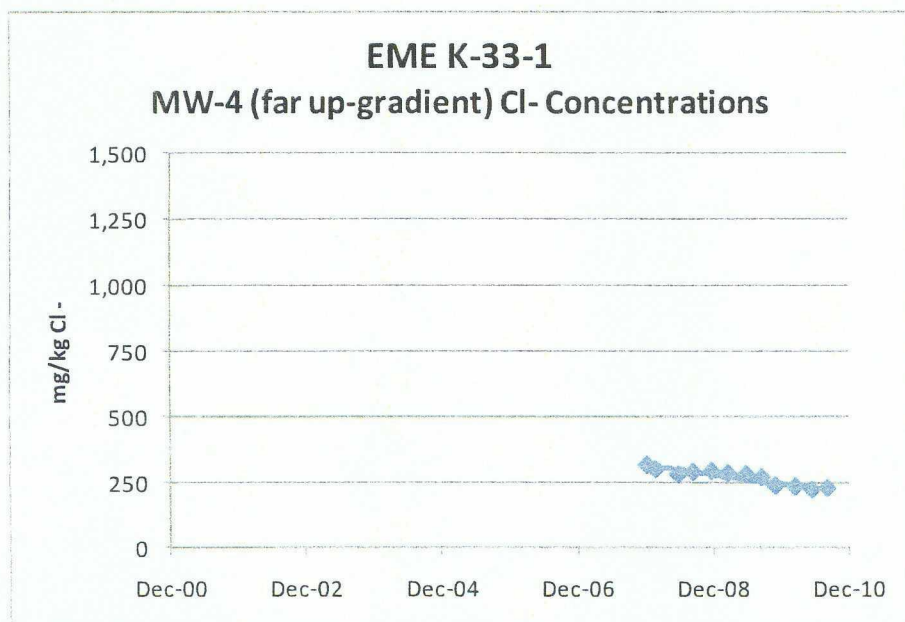
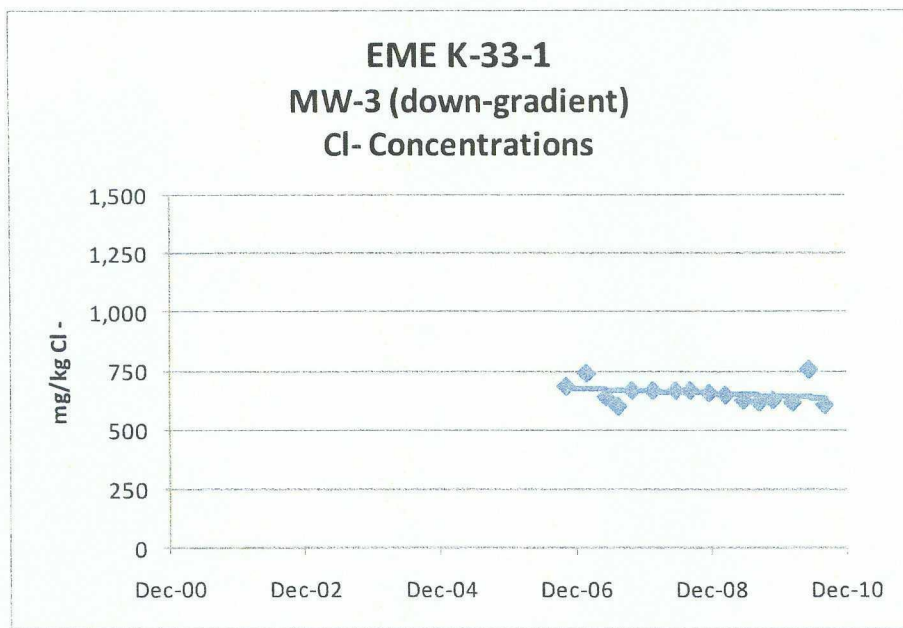


Figure 5 (cont'd) – EME K-33-1 groundwater monitoring data. **5c** (upper graph) – down-gradient monitor well data. **5d** (lower graph) – far up-gradient monitor well data.

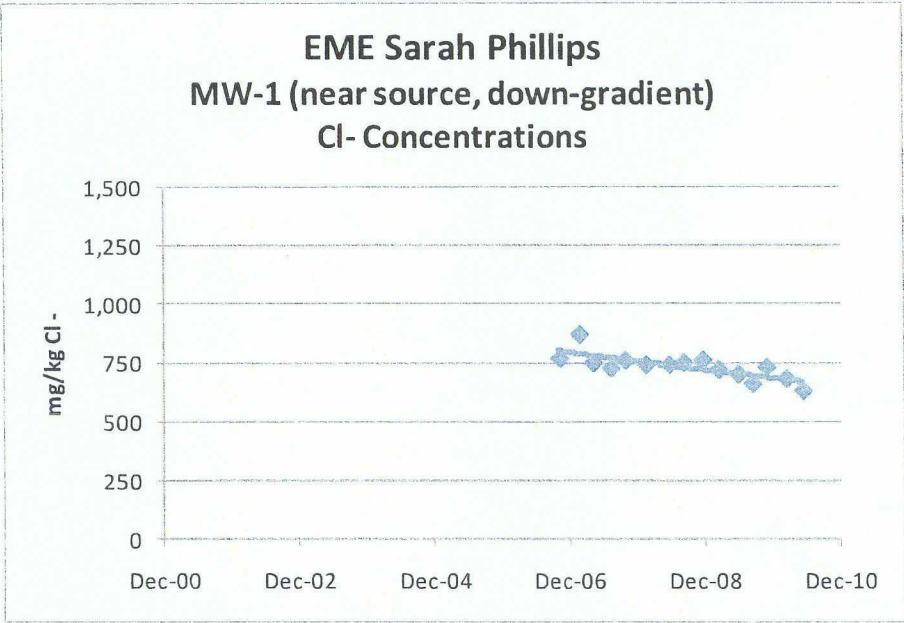


Figure 6 – EME Sarah Phillips down-gradient monitor well data.

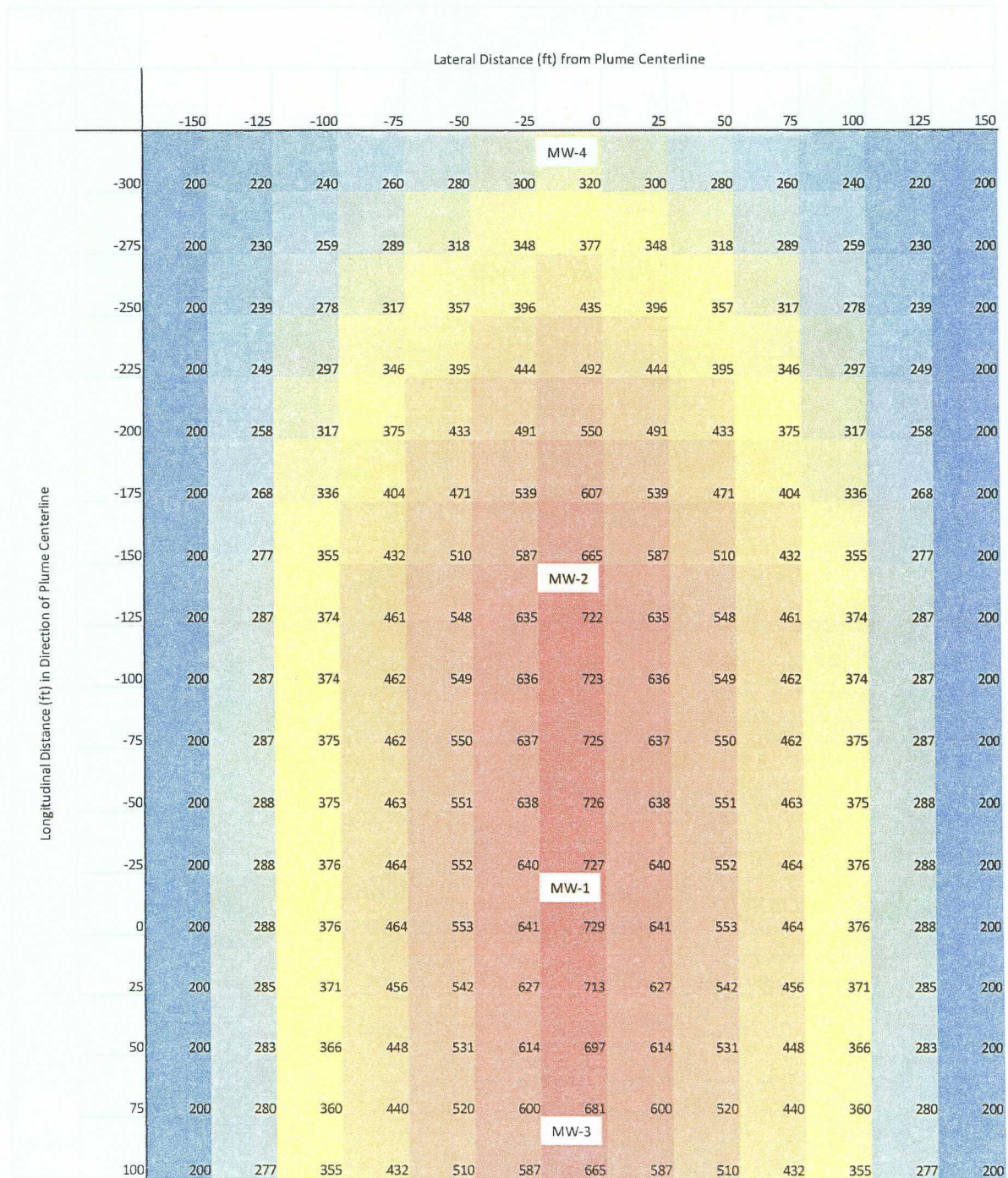


Figure 7a – Measured and interpolated groundwater chloride concentrations: Average 2007 values. [Note that the lateral plume boundaries were assumed to equal a baseline groundwater chloride concentration of 200 mg/kg].

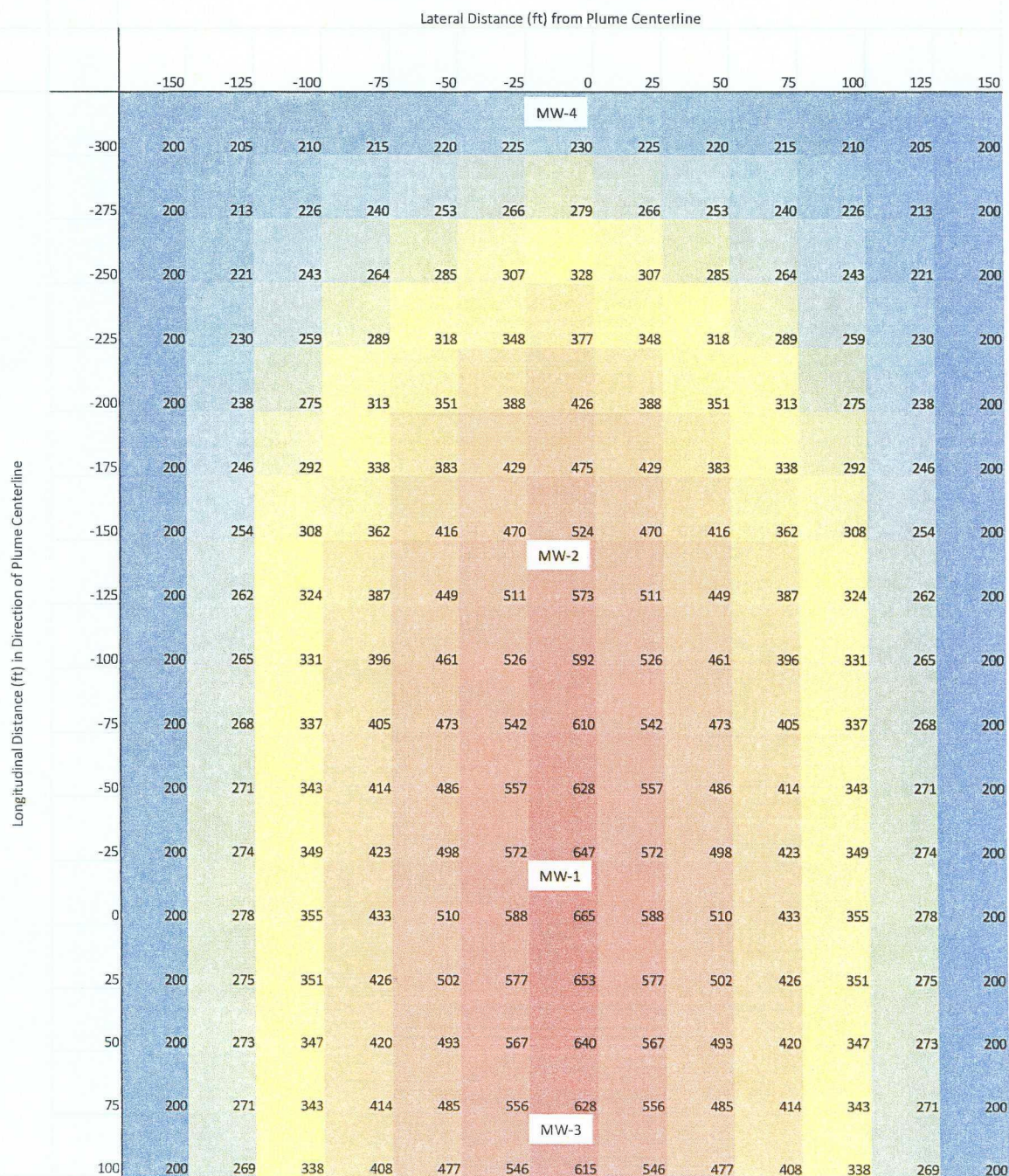


Figure 7b – Measured and interpolated groundwater chloride concentrations: Average 2010 year-to-date values. [Note that the lateral plume boundaries were assumed to equal a baseline groundwater chloride concentration of 200 mg/kg].

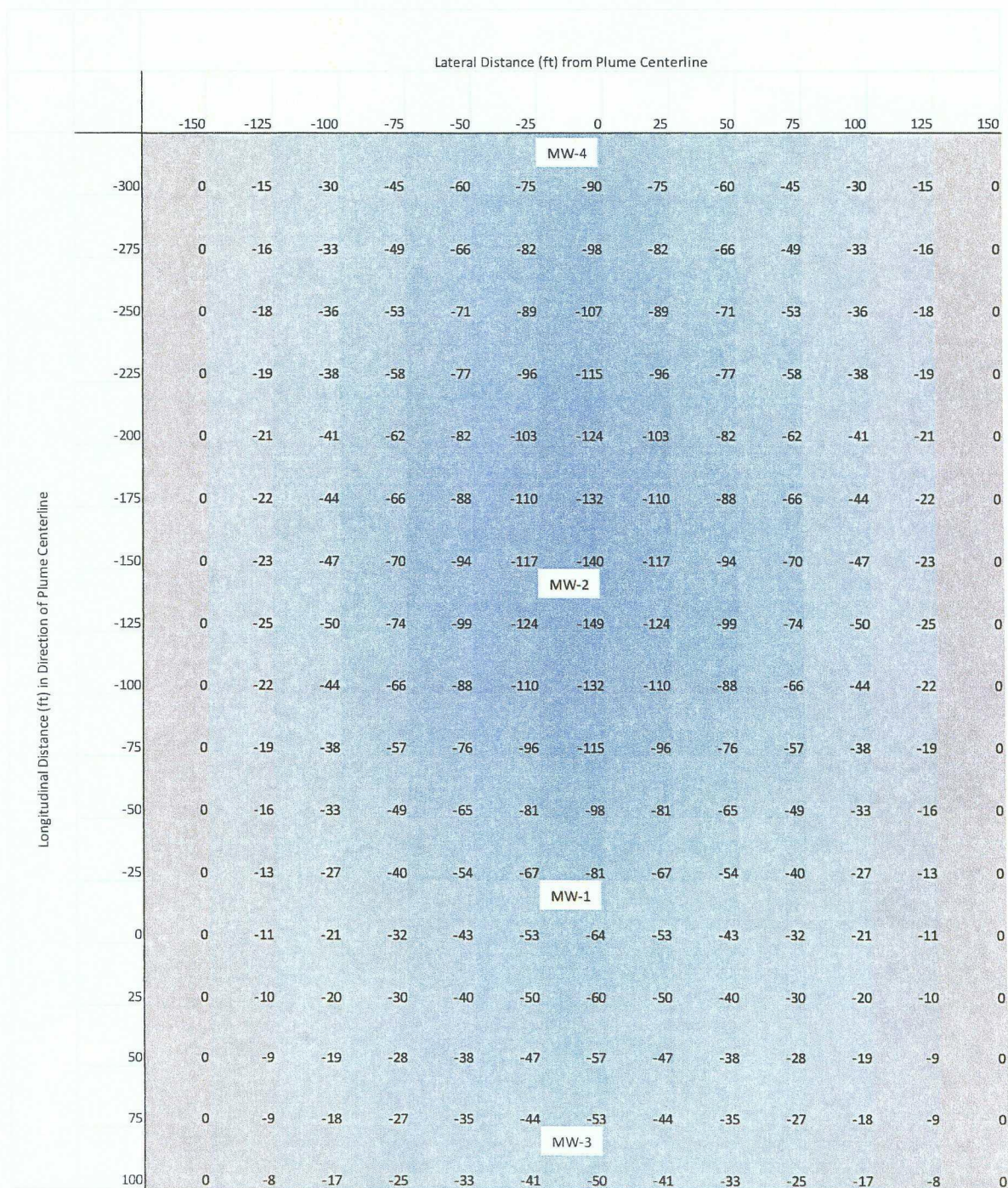


Figure 7c – Change in measured and interpolated groundwater chloride concentrations from 2007 to 2010. All values inside the plume boundaries are negative indicating that groundwater chloride concentrations have declined. The largest declines (in dark blue) are in and near the center of mass of the plume, indicating that there has been little or no downward migration of residual soil chlorides into groundwater.

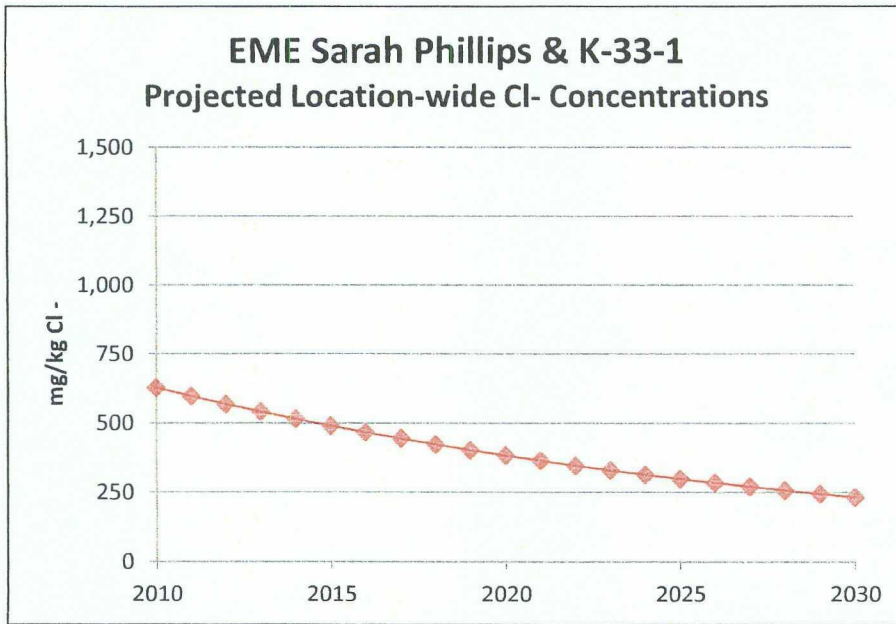


Figure 8 – Projected reduction in maximum (plume center) groundwater chloride concentrations.

EME Sarah Phillips & K-33-1



Figure 9 – Sarah Phillips and K-33-1 locations showing the reestablishment of natural vegetation. **9a** (upper photograph) – K-33-1 MW-1 facing North. **9b** (lower photograph) – Sarah Phillips facing West towards K-33-1.