

Summary of New LANL Groundwater Data Loaded in December 2006

January 3, 2007

**Executive Summary**

**Key findings include:**

- **Mortandad Canyon results for fluoride in alluvial wells MCO-5 and MCO-6 and for nitrate from intermediate wells MCOI-4 and MCOI-6; the fluoride consistent with earlier values and nitrate showing upward trends;**
- **A reanalyzed nitrate result from R-23i, confirming the earlier result that is much higher than the field duplicate and apparently from incorrect field preservation;**
- **Perchlorate results in Mortandad Canyon wells that are consistent with prior measurements but exceed the Consent Order screening level of 4  $\mu\text{g/L}$ ;**
- **Cr results from MCOI-6 that have declined from 50-60  $\mu\text{g/L}$  to 40s over 1.3 years, and the As result in R-14 that is near the MDL;**
- **Results that exceed EPA screening criteria for dioxane using the less-sensitive VOA analysis for MCOI-4 and MCOI-6 (SVOA dioxane results are much lower) and for bis(2-ethylhexyl)phthalate; the latter compound is a common sampling or analytical laboratory contaminant.**

**Introduction**

This report provides preliminary information to NMED concerning recent groundwater data. This report highlights constituents that exceed 50% of an applicable regulatory standard in groundwater samples taken from several wells or springs (listed on four accompanying tables), which provide surveillance of the groundwater zones indicated in the tables.

In the tables, information is given for sample date, detection limits, values for regulatory standards, analytical and secondary validation qualifiers. All data have been through secondary validation, as indicated on the tables by a preliminary flag of N.



## LANL Groundwater Data Loaded in December 2006

The following discussion provides information on prior occurrence of the constituents at the given locations.

### **General Chemistry Results**

Fluoride concentrations in Mortandad Canyon alluvial wells MCO-5 and MCO-6 are about 70% of the NM GW Standard of 1.6 mg/L. These values are consistent with data collected from these wells for the past five years.

NO<sub>3</sub>-N concentrations in Mortandad Canyon intermediate wells MCOI-4 and MCOI-6 show upward trends, respectively, of 13 mg/L to 17 mg/L and 14 mg/L to 20 mg/L, from 6/05 to 10/06.

A reanalysis of a sample from Pajarito Canyon intermediate well R-23i had a nitrate (as N) result of 818 mg/L, 1000 times the value in the field duplicate (and 80 times the groundwater standard). This result confirmed the earlier result and also suggests some sampling or analytical error, perhaps incorrect field preservation with nitric acid. The TDS results for these duplicate samples were 133 mg/L and 139 mg/L, confirming that the higher nitrate result is not valid.

Perchlorate concentrations in Mortandad Canyon alluvial wells MCO-5 and MCO-6 and intermediate wells MCOI-4 and MCOI-6 are above the Consent Order screening value of 4 µg/L and some are above the EPA's drinking water equivalent level of 24.5 µg/L. The concentrations are consistent with past values measured at these locations, about 25 µg/L in alluvial groundwater and 160 µg/L in intermediate groundwater.

For perchlorate concentrations near 160 µg/L, the results obtained by EPA:314.0 have more precision than those by SW846 6850 Modified. Results by the latter method are less precise because they were measured with a 200-fold dilution to bring the concentrations into the instrument calibration range.

Mortandad Canyon regional well R-15 perchlorate results have been stable at 6 µg/L since 6/04; earlier results suggested an increasing trend (see Figure 1).

### Metals Results

Several wells and springs generally have dissolved concentrations of aluminum, iron, or manganese that were more than 50% of groundwater standards. These metals are derived from soil or aquifer materials or related to well-drilling impact on sample quality.

At MCOI-6 the filtered and unfiltered Cr have declined from 50-60  $\mu\text{g/L}$  to values in the mid-40s  $\mu\text{g/L}$  over 1.3 years

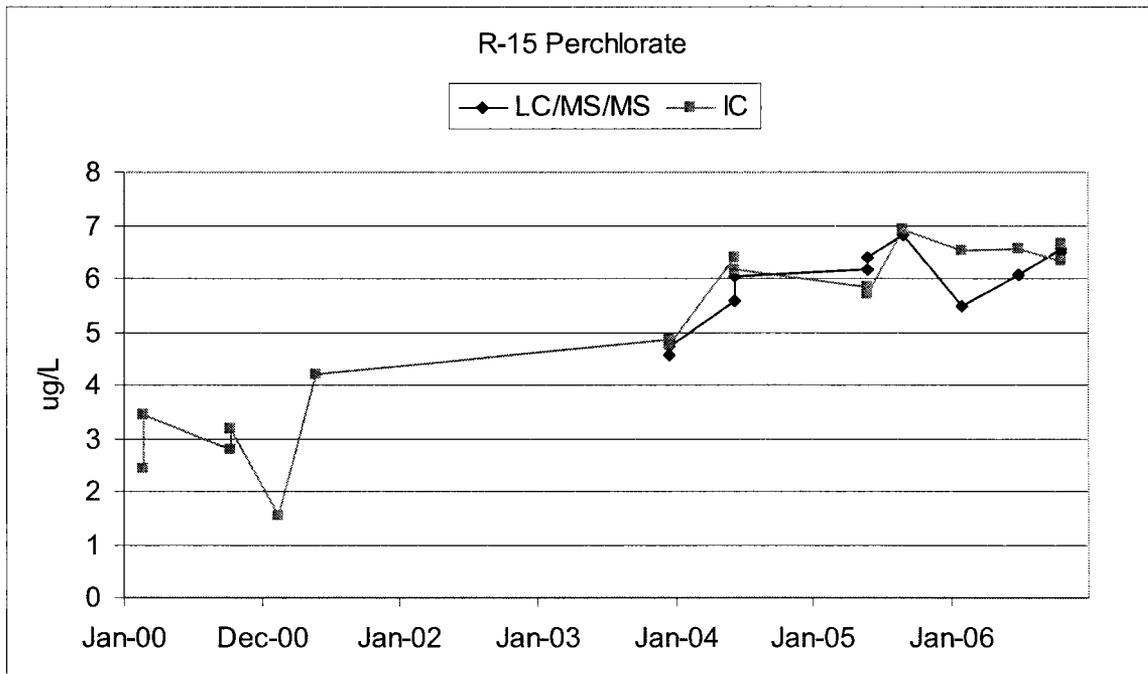


Figure 1. Perchlorate histories for R-15. Data prior to 2002 are borehole samples and analyzed by the less-sensitive ion chromatography method with a detection limit of 4  $\mu\text{g/L}$ .

As in several recent samples, arsenic was detected in Mortandad Canyon regional aquifer well R-14 in filtered samples but was nondetect in unfiltered; the result was near the MDL of 6  $\mu\text{g/L}$ . Based on chemical considerations the filtered concentration should be lower than that in the unfiltered sample, the reverse of what we observe. Future arsenic samples will be analyzed with a more sensitive method.

## **Organic Results**

A number of low-level organic compound detections often occur that are sporadic and likely result from contamination during sampling or analysis, with numerous compounds found in trip, field, or equipment blanks. Such compounds include bis(2-ethylhexyl)phthalate, acetone, toluene, methylene chloride, and carbon disulfide.

Dioxane results from two Mortandad Canyon intermediate wells differed depending on method sensitivity; using the more sensitive SVOA method, samples from MCOI-4 were nondetect and from MCOI-6 were 24 µg/L. Results from the less-sensitive VOA method were higher (43 µg/L to 50 µg/L, and J-flagged or estimated) and were 70% to 80% of the EPA cancer  $10^{-5}$  excess risk level of 61 µg/L.

The bis(2-ethylhexyl)phthalate concentrations in duplicate samples from MCOI-6 were 130% to 160% of the EPA MCL. The source of this compound is not known, and it was not found in the associated trip blank. Based on the very low mobility of the compound, one possible explanation is that it comes from contamination during sampling or analysis. This compound has, however, been found in 4 of 5 samples from this well at concentrations ranging from 2 µg/L to 12 µg/L.

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result>standard																												
																		Lvl Type Code	EPA PRIM DW STD	EPA PRIM DW STD	NM GW LIM	NM GW LIM						
																		Scr Lvl	Ratio (Result/Scr Level)		Scr Lvl	Ratio (Result/Scr Level)						
Analyte	Hdr 1	Zone	Location Name	Well Class	Port Depth	Start Date	Source Org	Fid Pr	Fid Q	Lab S	Sample Id	Symbol	Std Result	Std	Std	Std	Load Date	Lab Co	Lab	Con	Con	Pret	Uri					
F(-1)	Mortandad	Alluvial	MCO-5	SINGLE	21	10/24/06	ESH-18HCF			CS	GF060900G5CM01		1.08	0	mg/l	12/14/06	GELC					N	14098371				1.6	0.68
F(-1)	Mortandad	Alluvial	MCO-5	SINGLE	21	10/24/06	ESH-18HCF			CS	GU060900G5CM01		1.07	0	mg/l	12/14/06	GELC					N	14100811				1.6	0.67
F(-1)	Mortandad	Alluvial	MCO-6	SINGLE	27	10/30/06	ESH-18HCF			CS	GF061000G6CM01		1.22	0	mg/l	12/18/06	GELC					N	14161721				1.6	0.76
F(-1)	Mortandad	Alluvial	MCO-6	SINGLE	27	10/30/06	ESH-18HCF			CS	GU061000G6CM01		1.22	0	mg/l	12/18/06	GELC					N	14164401				1.6	0.76
NO3+NO2-N	Mortandad	Interme	MCOI-4	SINGLE	499	10/24/06	ESH-18HCF			CS	GF061000GMC401		17.4	0.1	mg/l	12/18/06	GELC		J	113b	N	14108401		10		1.74	10	1.74
NO3+NO2-N	Mortandad	Interme	MCOI-4	SINGLE	499	10/24/06	ESH-18HCF			CS	GU061000GMC401		16.2	0.1	mg/l	12/18/06	GELC		J	113b	N	14110331		10		1.62	10	1.62
NO3+NO2-N	Mortandad	Interme	MCOI-6	SINGLE	686	10/25/06	ESH-18HCF		FD	CS	GF061000GMC620		18.3	0.1	mg/l	12/18/06	GELC		J	113b	N	14115341		10		1.83	10	1.83
NO3+NO2-N	Mortandad	Interme	MCOI-6	SINGLE	686	10/25/06	ESH-18HCF			CS	GF061000GMC601		18.2	0.1	mg/l	12/18/06	GELC		J	113b	N	14114491		10		1.82	10	1.82
NO3+NO2-N	Mortandad	Interme	MCOI-6	SINGLE	686	10/25/06	ESH-18HCF		FD	CS	GU061000GMC620		18.7	0.1	mg/l	12/18/06	GELC		J	113b	N	14121021		10		1.87	10	1.87
NO3+NO2-N	Mortandad	Interme	MCOI-6	SINGLE	686	10/25/06	ESH-18HCF			CS	GU061000GMC601		17.3	0.1	mg/l	12/18/06	GELC		J	113b	N	14117791		10		1.73	10	1.73

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This report contains all LC/MS/MS results and all IC detections (Note lower IC MDL for EES-6)																													
Sample with result > 24.5 (EPA Drinking Water Equivalent Level)																													
Sample with result > 4 CO Screening Level																													
Sample with 0.6 < result < 4 (NMED background upper limit and CO Screening Level)																													
Fl	H	UI	Hdr	Zor	Location Name	Well Class	Port Depth	Start Date	Fid C	Fid P	Lab	Anal	Anyl Meth Code	Symbol	Std Result	Std Mdl	Std U	Diluti	Lab C	Cond	Conc	Prelir	Load Date	Lab Code	Source Ori	Comments	Sample Id	Anyl Suite	Uri
W	#	#	Morta	Alt	MCO-5	SINGLE	21	10/24/06	F	CS	CIO4	EPA:314.0			21.3	4	ug/L	1				N	12/14/06	GELC	ESH-18HDRO	GF060900G5CM01	GENINOR	14098321	
W	#	#	Morta	Alt	MCO-5	SINGLE	21	10/24/06	F	CS	CIO4	SW846 6850 Modified			22.7	2	ug/L	40	J	LMS	N	12/14/06	GELC	ESH-18HDRO	GF060900G5CM01	GENINOR	14098231		
W	#	#	Morta	Alt	MCO-6	SINGLE	27	10/30/06	F	CS	CIO4	EPA:314.0			24.5	4	ug/L	1				N	12/18/06	GELC	ESH-18HDRO	GF061000G6CM01	GENINOR	14161601	
W	#	#	Morta	Alt	MCO-6	SINGLE	27	10/30/06	F	CS	CIO4	SW846 6850 Modified			24.7	2	ug/L	40	J	LMS	N	12/18/06	GELC	ESH-18HDRO	GF061000G6CM01	GENINOR	14161581		
W	#	#	Morta	Inte	MCOI-4	SINGLE	499	10/24/06	F	CS	CIO4	SW846 6850 Modified			163	10	ug/L	200	J	LMS	N	12/18/06	GELC	ESH-18HDRO	GF061000GMC401	GENINOR	14108281		
W	#	#	Morta	Inte	MCOI-6	SINGLE	686	10/25/06	F	CS	CIO4	EPA:314.0			160	20	ug/L	5				N	12/18/06	GELC	ESH-18HDRO	GF061000GMC601	GENINOR	14114461	
W	#	#	Morta	Inte	MCOI-6	SINGLE	686	10/25/06	F	CS	CIO4	SW846 6850 Modified			188	10	ug/L	200	J	LMS	N	12/18/06	GELC	ESH-18HDRO	GF061000GMC601	GENINOR	14114821		
W	#	#	Morta	Inte	MCOI-6	SINGLE	686	10/25/06	FD	F	CS	CIO4	EPA:314.0		159	20	ug/L	5				N	12/18/06	GELC	ESH-18HDRO	GF061000GMC620	GENINOR	14115311	
W	#	#	Morta	Inte	MCOI-6	SINGLE	686	10/25/06	FD	F	CS	CIO4	SW846 6850 Modified		184	10	ug/L	200	J	LMS	N	12/18/06	GELC	ESH-18HDRO	GF061000GMC620	GENINOR	14115221		
W	#	#	Morta	Rel	R-15	SINGLE	959	10/24/06	F	CS	CIO4	EPA:314.0			6.65	4	ug/L	1	J			N	12/19/06	GELC	ESH-18HDRO	GF061000G15R01	GENINOR	14193821	
W	#	#	Morta	Rel	R-15	SINGLE	959	10/24/06	F	CS	CIO4	SW846 6850 Modified			6.5	0.5	ug/L	10	J	LMS	N	12/19/06	GELC	ESH-18HDRO	GF061000G15R01	GENINOR	14193731		
W	#	#	Morta	Rel	R-15	SINGLE	959	10/24/06	FD	F	CS	CIO4	EPA:314.0		6.34	4	ug/L	1	J			N	12/19/06	GELC	ESH-18HDRO	GF061000G15R20	GENINOR	14194281	
W	#	#	Morta	Rel	R-15	SINGLE	959	10/24/06	FD	F	CS	CIO4	SW846 6850 Modified		6.55	0.5	ug/L	10	J	LMS	N	12/19/06	GELC	ESH-18HDRO	GF061000G15R20	GENINOR	14194191		

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Samples where result/screening level > 10																										
Samples where 1 < result/screening level < 10																										
Hdr 1	Zone	Location Name	Well Class	Port Depth	Start Date	Source Org	Analy	Fld Pre	Lab Sa	Fld Qc	Symbol	Std Result	Std Mdl	Std U	Load Date	Lab Code	Lab C	Conc	Conc	Prelim	Samg	Uri	EPA PRIM DW STD Scr Lvl	EPA PRIM DW STD Ratio (Res	NM GW LIM Scr Lvl	NM GW LIM Ratio (Res
#	Sand	Interr R-12	MULTI	468.1	09/29/06	ESH-18HC	Mn	F	CS	SS		109	2	ug/L	12/12/06	GELC				N	GF06	14087701			200	0.55
#	Sand	Interr R-12	MULTI	468.1	09/29/06	ESH-18HC	Mn	F	CS	SS-FD		108	2	ug/L	12/12/06	GELC				N	GF06	14088171			200	0.54
#	Morta	Interr MCOI-8	SINGLE	665	10/20/06	ESH-18HC	Fe	F	CS			800	18	ug/L	12/18/06	GELC				N	GF06	14107581			1000	0.8
#	Morta	Interr MCOI-8	SINGLE	665	10/20/06	ESH-18HC	Mn	F	CS			953	2	ug/L	12/18/06	GELC				N	GF06	14107551			200	4.77
#	Morta	Interr MCOI-6	SINGLE	686	10/25/06	ESH-18HC	Cr	F	CS	FD		41.5	1	ug/L	12/18/06	GELC				N	GF06	14115131			50	0.83
#	Morta	Interr MCOI-6	SINGLE	686	10/25/06	ESH-18HC	Cr	F	CS			41.2	1	ug/L	12/18/06	GELC				N	GF06	14114741			50	0.82
#	Morta	Regid R-14	MULTI	1204.5	10/23/06	ER/WQH	As	F	CS			6.6	6	ug/L	12/18/06	GELC	J			N	GF06	14121391	10	0.66		

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Results from field QC samples																																	
Samples where result/screening level > 10																																	
Samples where 1 < result/screening level < 10																																	
Samples with blank contamination, exceeded holding time, or rejected																																	
																		EPA PRIM	EPA PRIM	EPA TAP	EPA TAP												
																		Lvl	DW STD	DW STD	SCRN LVL	SCRN LVL											
																		Risk	Code	C	C												
																		Scr Lvl	Ratio (Res	Scr Lvl	Ratio (Result/Scr Level)												
Hd	Uti	Hd Zone	Location Name	Well Class	Port	Dept	Start Date	Fid C	Fid P	Lab	Sample Id	Anyl S	Analyte Desc	Analyte	Sous Syn	Std Result	Std Mdl	Std	Diluti	Lab C	Conc	Cont	Preli	Lab C	Anyl	Lab C	Load Date	Uri	Scr Lvl	Ratio (Res	Scr Lvl	Ratio (Result/Scr Level)	
##	##	Md	Interme	MCOI-4	SINGLE		499	10/24/06		UF	CS	GU061000GMC401	VOC	Dioxane[1,4-]	123-91-1	ESH-18H	49.6	20	ug/L	1	J	J	V7b	N	##	SW	GEL	12/18/06	14110991		6.1119577	8.12	
##	##	Md	Interme	MCOI-6	SINGLE		686	10/25/06	FD	UF	CS	GU061000GMC620	SVOC	Bis[2-ethylhexyl]ph	117-81-7	ESH-18H	7.87	2.06	ug/L	1	J	J+	SW	N	##	SW	GEL	12/18/06	14119961	6	1.31	4.8022525	1.64
##	##	Md	Interme	MCOI-6	SINGLE		686	10/25/06	FD	UF	CS	GU061000GMC620	VOC	Dioxane[1,4-]	123-91-1	ESH-18H	43.2	20	ug/L	1	J	J	V7b	N	##	SW	GEL	12/18/06	14118631		6.1119577	7.07	
##	##	Md	Interme	MCOI-6	SINGLE		686	10/25/06		UF	CS	GU061000GMC601	SVOC	Bis[2-ethylhexyl]ph	117-81-7	ESH-18H	9.48	2.06	ug/L	1	J	J+	SW	N	##	SW	GEL	12/18/06	14116341	6	1.58	4.8022525	1.97
##	##	Md	Interme	MCOI-6	SINGLE		686	10/25/06		UF	CS	GU061000GMC601	VOC	Dioxane[1,4-]	123-91-1	ESH-18H	45.9	20	ug/L	1	J	J	V7b	N	##	SW	GEL	12/18/06	14115401		6.1119577	7.51	