Table 1. List of field parameters and laboratory analytes measured in ground water samples for the Site Investigation of the San Mateo Creek Basin, New Mexico.

A. Field parameters**:** Electrical conductivity (EC); pH; temperature; dissolved oxygen (DO); oxidation-reduction potential (ORP or Eh).

B. Laboratory analytes through CLP:

Analyte	**Minimum required analytical detection limit (µg/L)**	**Analyte**	**Minimum required analytical detection limit (µg/L)**
pH laboratory	NS	Chromium (Cr)	50[1]
Calcium (Ca)	5000	Cobalt (Co)	50[1]
Magnesium (Mg)	5000	Copper (Cu)	1,000[1]
Sodium (Na)	5000	Iron (Fe)	300[2]
Potassium (K)	5000	Mercury (Hg)	2[1, 5]
Carbonate (CO_3)	NS	Manganese (Mn)	50[2]
Bicarbonate (HCO_3)	NS	Nickel (Ni)	200[1]
Sulfate (SO_4)	250,000[2]	Lead (Pb)	156
Chloride (Cl)	250,000[1, 2]	Magnesium	5,000
Nitrate + nitrite (NO_3+NO_2)	10,000[3]	Molybdenum (Mo)	1,000[1]
Fluoride (F)	1,600[1]	Silver (Ag)	50[1]
Aluminum (Al)	200[4]	Selenium (Se)	50[1, 5]
Antimony (Sb)	6[5]	Thallium (Tl)	2[5]
Arsenic (As)	10[5]	Uranium (U)	30[1, 5]
Barium (Ba)	1000[1]	Vanadium (V)	50
Beryllium (Be)	4[5]	Zinc (Zn)	5,000[1]
Cadmium (Cd)	5[5]		

C. Laboratory analytes through SLD:

Analyte	**Minimum required analytical**
Gross Alpha	15 pCi/L[5]
Radium-226 + 228 (^{226}Ra + ^{228}Ra)	5[5]
Gross Beta	NS

D. Laboratory analytes through either CLP or SLD:

Analyte	**Minimum required analytical**
Total Dissolved Solids	500,000

[1]New Mexico Water Quality Commission ("NMWQCC") ground water quality standard. [2]Federal secondary maximum contaminant level ("SMCL"). [3]NMWQCC ground water quality standard and Federal primary maximum contaminant level ("MCL") for nitrate. [4]Maximum SMCL for aluminum. [5]Federal MCL. [6]Federal lead treatment technology action level.

DRAFT

9881658

Table 2. Anaconda Bluewater Mill uranium mill tailings chemical water quality, Bluewater area, New Mexico (Perkins and Goad, 1980).

Sample date	10/26/77	11/17/78	11/07/79
TSS (mg/L)	20.5		52
TDS (mg/L)	17, 850		37,275
Conductivity (umohs)	19,635	54,285	65,714
pH	2.15		0.87
As (mg/L)	0.62	3.0645	3.07
Ba (mg/L)	0.55	0.187	0.241
Se (mg/L)	0.006	0.0702	6.966
Mo (mg/L)	0.16	0.6936	0.955
NH_3 (mg/L)	56.9	105.25	106.0
Na (mg/L)	2,118.3	1,738	1111.0
Cl (mg/L)	3,111.9	2,354.3	1,252.2
SO_4 (mg/L)	8,521.6	22,792	33,812
Ca (mg/L)		688.0	320.0
K (mg/L)		100.62	126.4
Cd (mg/L)		0.0972	0.096
NO_3+NO_2 (mg/L)		14.11	<0.01
Mg (mg/L)		0.554	1,440
V (mg/L)		43.9	48.96
Zn (mg/L)		12.390	<0.250
Al (mg/L)			1120
Pb (mg/L)		0.0554	1.440
Gross Alpha (pCi/L)		45,000 +/- 2,000	2,200 +/- 100
Ra-226 (pCi/L)	1,800 +/- 100	50 +_/- 2	15 +/- 4
Ra-228 (pCi/L)	0 +/- 2		
Pb-210 (pCi/L)	1,200 +/- 100		
U (mg/L)	53.0	47.62	18.5

DRAFT

Table 3. National Uranium Resource Evaluation (NURE) ground water sample uranium concentration values from the Bluewater, Milan, and Dos Lomas 7.5 minute quadrangles.

Bluewater 7.5' Quadrangle sample number	**Sample location surface gamma reading converted to ppm uranium**	**Uranium concentration value in water sample (ppb - ug/L)**
1081331	n/a	5.24
1081398	n/a	0.98
1081709	2	0.43
1081710	4	0.57
Milan 7.5' Quadrangle sample number		
1081306	n/a	3.63
1081399	3	5.9
1081400	7	5.01
1081401	n/a	3.33
1081697	16	6.76
1081698	4	8.55
1081699	6	3.15
1081700	5	69.72
1081701	7	1.67
1081702	8	0.96
1081703	8	0.59
1081704	4	0.63
1081705	8	1.0
1081706	12	0.81
1081707	14	1.53
Dos Lomas 7.5' Quadrangle sample numbers		
1081334	20	27.90
1081337	9	32.83
1081342	n/a	38.26
1081738	3	26.15
1081739	5	49.48
1081742	2	17.91

DRAFT

Table 4. Summary of analytical data for uranium mining industrial discharges into the Arroyo del Puerto surface water system, San Mateo Creek area, Grants Mineral Belt, New Mexico (after EPA, 1975).

Table 3

SUMMARY OF ANALYTICAL DATA FOR INDUSTRIAL DISCHARGES
GRANTS MINERAL BELT SURVEY
February 26-March 6, 1975

Station Description	Average Flow (mgd)	Number Composite Samples	Gross Alpha (pCi/l)			Radium 226 (pCi/l)			Uranium (mg/l)			Total Suspended Solids (mg/l)			Selenium (mg/l)			Vanadium (mg/l)		
			Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
Kerr-McGee I-X Tailings Bypass	0.64	3	600	430	510	157	148	151	4.2	1.3	2.5	31	16	25	0.07	0.03	0.05	1.0	0.7	0.9
Kerr-McGee Sec 30W Mine Dischg	1.36	3	1,400	1,300	1,400	174	154	163	6.7	5.9	6.2	26	17	22	0.04	0.03	0.03	0.8	0.7	0.7
Kerr-McGee Sec 19 Mine Discharge	0.15	1	--	--	72	-	-	9.3	-	-	0.23	-	-	16	-	-	<0.01	-	-	0.6
Kerr-McGee Sec 35 Mine Discharge	3.77	3	3,000	2,400	2.700	68	32	51	26	14	19	120	86	100	0.08	0.04	0.07	1.0	0.6	0.8
Kerr-McGee Sec 36 Mine West Discharge	2.07	3	850	570	680	178	101	131	3.4	2.6	3.0	44	33	38	0.01	<0.01	<0.01	1.0	0.8	0.9
Kerr-McGee Sec 36 Mine East Discharge	0.14	3	580	510	560	72	59	65	2.5	2.3	2.4	32	27	29	0.03	<0.01	0.01	0.8	0.4	0.6
Kerr-McGee Seepage below Tailings Pond	-	1	-	-	144,000	-	-	65	-	-	160	-	-	38	-	-	0.70	-	-	5.6
Ranchers Exploration-Johnny M Mine Discharge	0.46	1	-	-	20	-	-	1.6	-	-	0.12	-	-	7	-	-	<0.01	-	-	<0.3
United Nuclear Corp. Ion-Exchange Discharge	0.08	3	2,300	1,400	1,800	39	14.3	31	11	5.9	7.8	7	3	5	0.12	0.02	0.08	0.5	<0.3	0.3

Table 5. Summary of analytical data from stream station surface water samples along the Arroyo del Puerto and San Mateo Creek drainages, Grants Mineral Belt, New Mexico (after EPA, 1975).

Table 3

SUMMARY OF ANALYTICAL DATA FOR SURFACE WATER SAMPLING

Station Description	Number of Samples	Gross Alpha (pCi/l)			Radium-226 (pCi/l)			Uranium (mg/l)			Selenium (mg/l)			Vanadium (mg/l)		
		Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
Arroyo del Puerto downstream of Kerr-McGee Mill	3	1,700	1,400	1,500	50	45	47	12	5.0	7.7	0.16	0.13	0.15	1.0	0.6	0.8
Arroyo del Puerto near the mouth	3	1,500	750	1,100	7.2	6.1	6.5	6.6	4.7	5.8	0.07	0.01	0.04	1.9	0.5	1.1
San Mateo Creek at Highway 53 Bridge	1	-	-	1,000	-	-	1.09	-	-	4.7	-	-	0.02	-	-	<0.3

DRAFT

Table 6. Well construction information for the Bluewater set of wells sampled in this investigation (p. 1 of 3).

Bluewater Site Investigation wells

Sample ID	LATITUDE (NAD83)	LONGITUDE (NAD83)	OSE well permit no.	Well Depth (ft)	screened depth (ft)	lithology opposite perforations	Depth to water at completion (ft)/ Comments	Ref. i record no.	HMC well no.	Well depth (ft)	Completion interval depth (ft)	SA top elevation (Ref.	Latest water level elevation	Date	Ref. Error! Bookmark not defined. page	Comments
BWSI-00																Field blank
BWSI-02	35.225595	-107.888629		498					965							
BWSI-03	35.227344	-107.888396							986	467	420-467	6134	6426	08/23/2008	8.0-6	
BWSI-04	35.229749	-107.888762							991	500			6424.18	08/26/2008	8.0-6	
BWSI-05	35.258875	-107.972292	B-461	518			147	20								
BWSI-06	35.231733	-107.923966							938			6449	6432.3	12/17/2008	8.0-6	
BWSI-07	35.265414	-107.994713	B-1521	255	220-225	limestone	100	7								
BWSI-08	35.265967	-107.975864	B-1541	265	200-220	white sandstone	82	5								
BWSI-09	35.248517	-107.976643	B-1662	345			175	6								
BWSI-10	35.256567	-107.966417														
BWSI-11	35.255950	-107.967767														
BWSI-12	35.242589	-107.963738	B-1637	260		white sandstone	240	9								
BWSI-13	35.239510	-107.961517	B-1663	280	240-280	brown sandstone	180	8								
BWSI-14	35.252936	-107.981026	B-1688	380	340-380	red sandstone	140	11								
BWSI-15	35.218020	-107.912511	B-49	188			94	14	911	188					8.0-6	
BWSI-16	35.213846	-107.912278	B-50	175				15	998	145					8.0-7	
BWSI-17	35.233128	-107.944206														
BWSI-18	35.242809	-107.924478							936	160	100-160				4.1-21	Listed by HMC as alluvial well
BWSI-19	35.236342	-107.932447	B-518	250	210-250	sandstone, gravel, conglomerate	140	1								
BWSI-20	35.233410	-107.912254	B-50A	330		limestone and	75	16	545							

Table 6. Well construction information for the Bluewater set of wells sampled in this investigation (p. 2 of 3).

[Table 4	E (NAD83)	LONGITUDE (NAD83)	OSE well permit no.	Well Depth (ft)	screened depth (ft)	lithology opposite perforations	Depth to water at completion (ft)/ Comments	Ref. i record no.	HMC well no.	Well depth (ft)	Completion interval depth (ft)	SA top elevation (Ref.	Latest water level elevation	Date	Ref. Error! Bookmark not defined. page	Comments
						sandstone										
BWSI-21	35.203787	-107.908264	B-18	275			152	17								
BWSI-22	35.203835	-107.915436	B-19	275			152	18								
BWSI-23	35.234271	-107.888866	B-44	542			96	13	949	551	505-551	6102	6431.7	02/13/2008	8.0-6	
BWSI-24	35.261930	-107.974420	B-637	587			137	19								
BWSI-25	35.271106	-107.957824														Site monitor well L(SG)
BWSI-26	35.268777	-107.938559	B-876/B-410-0-14	400	159-280			4								Site monitor well S(SG)
BWSI-27	35.271529	-107.938604	B-410-0-22	355	152-350	limestone and sandstone	147.6	3								Site monitor well OBS-3
BWSI-28	35.266163	-107.907318	B-410-0-10	330	234-333?	fine grained sandstone, dolomite, limestone, claystone	Lost circulation precluded completion through entire San Andres	2								Site monitor well I(SG)
BWSI-29	35.242032	-107.855229	B-28	1000			137	23	#!1 Deepwell	1000	919-999	5629	6484.68	12/12/2007	8.0-6	
BWSI-30	35.239529	-107.864253	B-28-S	980			135	24	#2 Deepwell	870		5776	6366.86	05/04/2005	8.0-6	
BWSI-32	35.255295	-107.861760							928	864		5795	6428.3	12/22/2008	8.0-6	
BWSI-33	35.225191	-107.876176	B-28-S-329	978	703-978		113	21	943	978	703-978	5852	6422.61	12/29/2008	8.0-6	
BWSI-34	35.247480	-107.923981	B-28-S-247	275			152	22	951	275	241-275	6346	6423.42	12/29/2008	8.0-6	
BWSI-35	35.279927	-107.831931	B-1458	702	682-702	red shale & clay, limestone	156	10								

Table 6. Well construction information for the Bluewater set of wells sampled in this investigation (p. 3 of 3).

Sample ID	LATITUDE (NAD83)	LONGITUDE (NAD83)	OSE well permit no.	Well Depth (ft)	screened depth (ft)	lithology opposite perforations	Depth to water at completion (ft)/ Comments	Ref. i record no.	HMC well no.	Well depth (ft)	Completion interval depth (ft)	SA top elevation (Ref.	Latest water level elevation	Date	Ref. Error! Bookmark not defined. page	Comments
[Table 4																
BWSI-38																Field blank
BWSI-39																Field duplicate associated with BWSI-09
BWSI-40																Field duplicate associated with BWSI-16
BWSI-41	35.23204621	-107.9146644							994	144	95-110		6458.8	11/14/2008	4.1-21	Listed by HMC as alluvial well
BWSI-42																Field duplicate associated with BWSI-41
BWSI-T																Field blank

i. New Mexico Office of the State Engineer. Downloaded well records.

DRAFT

Table 7. Well construction information for the San Mateo Creek set of wells sampled in this investigation (p. 1 of 5).

Sample ID	Alternative well IDs	Reference/ page	Water Level (ft-BGS)	Reference/ page	Well Depth (ft)		Reference/ page	Screened interval		Reference/ page		Lithology/ stratigraphic unit opposite screened interval		Reference/ page	Notes
SMC-00															
	Field Blank collected at SMC-01 well location														
SMC-01	BWSI-34	Error! Bookmark not defined.[1]/ 19	150	**Error! Bookmark not defined./8. 0-6**	275		**Error! Bookmark not defined./8. 0-6.**	241-275		**Error! Bookmark not defined./8. 0-6**		limestone/dolomite/chalk		20-Mar	
							20-Mar								
	HMC-951														
	B28-S-247	[2]	152	[3]/20											
SMC-03	B00686*		81	21-Mar	138		21-Mar	120-134		21-Mar		sandstone/ gravel/		21-Mar	
												conglomerate			
SMC-04					340		[4]/1								
SMC-05	B-01072*		180	22-Mar	280		2-Apr	484-510		22-Mar		sandstone/ gravel/		22-Mar	
					510		22-Mar					conglomerate			
SMC-06	**Field Blank** collected at SMC-07 well location														
SMC-07					1200		[5]/2								
	14.9.18.243	[6]/99	744	Jun-99	800		Jun-99						Westwater Canyon	Jun-99	
SMC-08			~28	[7]/1	~200		2-Jul								
SMC-09															
SMC-10	HMC-914		42	**Error! Bookmark not defined./4. 1-20**	93		**Error! Bookmark not defined./4. 1-20**						alluvium	**Error! Bookmark not defined./4. 1-20**	

Table 7. Well construction information for the San Mateo Creek set of wells sampled in this investigation (p. 2 of 5).

Sample ID	Alternative well IDs	Reference/ page	Water Level (ft-BGS)	Reference/ page	Well Depth (ft)		Reference/ page	Screened interval		Reference/ page		Lithology/ stratigraphic unit opposite screened interval		Reference/ page	Notes
	12.9.7.343**	Jun-96	3 (11/30/195	Jun-96	98		Jun-96						sand and gravel (alluvium)	Jun-96	
		[8]/91		Aug-91			Aug-91							Aug-91	
SMC-11	HMC-920		33	Error! Bookmark not defined./4. 1-20									alluvium	Error! Bookmark not defined./4. 1-20	
	12.10.12.433	Jun-96	.6 (11/30/19	Jun-96	100		Jun-96						alluvium	Jun-96	
		Aug-92		Aug-92			Aug-92							Aug-92	
SMC-12	HMC-950		26	Error! Bookmark not defined./4. 1-21	81		Error! Bookmark not defined./4. 1-21						alluvium	Error! Bookmark not defined./4. 1-21	
	12.10.12.221	Jun-96	.7 (07/26/19	Jun-96	91		Jun-96						alluvium	Jun-96	
		Aug-91		Aug-91			Aug-91							Aug-91	
SMC-13	HMC-921		39	Error! Bookmark not defined./4. 1-21	73		Error! Bookmark not defined./4. 1-21						alluvium	Error! Bookmark not defined./4. 1-21	
	B00415 O-13*		50	23-Mar	74		23-Mar								
SMC-14	21.10.14.212	Jun-96	0.1 (07/1956	Jun-96									alluvium	Jun-96	
	HMC-922		51	Error! Bookmark not defined./4. 1-21		96	Error! Bookmark not defined./4. 1-21						alluvium	Error! Bookmark not defined./4. 1-20	
			59	Error! Bookmark not defined./34		101	[9]Error! Bookmark not defined./34								
SMC-15	nt blank post SMC-13														
SMC-16															pump set at ~200' (Ref. 9, p. 46)
SMC-17			65.5	Sep-46	>400		Sep-46								

Table 7. Well construction information for the San Mateo Creek set of wells sampled in this investigation (p. 3 of 5).

Sample ID	Alternative well IDs	Reference/ page	Water Level (ft-BGS)	Reference/ page	Well Depth (ft)		Reference/ page	Screened interval		Reference/ page		Lithology/ stratigraphic unit opposite screened interval		Reference/ page	Notes
SMC-18			82.3	15-Nov	102		15-Nov								
SMC-20	B-01115	[10]/11	204	25-Mar	478		11/16. 3/25		458-478		25-Mar		sandstone/ gravel/conglomerate	25-Mar	
Strathmore-1		10Error! Bookmark not defined./5			478		5-Oct								
SMC-21															
SMC-22	B-01485*		280	4-Mar		580	4-Mar		500-560		4-Mar		red coarse sandstone, red sandstone	5-Mar	Former supply to mine camp (Ref. 9, p. 44)
						~500	3-Jul								
SMC-23	trathmore-11	5-Oct	80	1-Mar		260	1-Mar		220-260		2-Mar		Jmw	5-Sep	
	B-1636	Sep-31											white sand	3-Mar	
	B-0659*		190	6-Mar		220	6-Mar						sandstone/ Dakota	3/6/2007	
SMC-24	trathmore-1	10Error! Bookmark not defined./5	86	12-Oct		170	12-Oct						Jmw	Error! Bookmark not defined./9	
	B-0659*		190	6-Mar		220	6-Mar						sandstone/ Dakota	3/6/2007	
SMC-25	B-1636*		80	1-Mar		260	1-Mar		220-260		2-Mar		white sand	3-Mar	
13.9.22.111*		Jun-99	220	Jun-99									Westwater Canyon	Jun-99	
SMC-26	Strathmore-115	10Error! Bookmark not defined./5	88	1012		88	5-Oct						Qal	10/9, 12	
						130	12-Oct								
	B-00415-O5*		72	26-Mar		95	26-Mar								

Table 7. Well construction information for the San Mateo Creek set of wells sampled in this investigation (p. 4 of 5).

Sample ID	Alternative well IDs	Reference/ page	Water Level (ft-BGS)	Reference/ page	Well Depth (ft)		Reference/ page	Screened interval		Reference/ page		Lithology/ stratigraphic unit opposite screened interval		Reference/ page	Notes
	B-00415-O6*		73	27-Mar		90	27-Mar						Shallow alluvium/basin fill	3/26, 28	
	B-00415-O7*		74	28-Mar		80	28-Mar								
SMC-28			520	4-May		590	4-May								
SMC-30	B-00815*		260	29-Mar		300	29-Mar		270-290		29-Mar		white sandstone	29-Mar	
SMC-31	B-00524*		260	30-Mar		520	30-Mar		400-480		30-Mar		gray coarse sand	30-Mar	
	13.8.24.341*	Jun-97				250	Jun-97								
	13.8.24.341*	Jun-97	139 (5/1978)	Jun-97		500	Jun-97								
SMC-32	13.9.16.411*	Jun-98				250	Jun-98						Westwater Canyon	Jun-98	Pump set at ~200' (Ref. 9, p. 44)
	13.9.16.413*	Jun-99				250	Jun-99						Westwater Canyon	Jun-99	
SMC-33	B-00415-O8*		30	3/31, 33, 34		54	31-Mar						shallow alluvium/basin fill	3/31, 32	
	B-00415-O9*					57	Mar-32								
	B-00415-O10*		32	Mar-32		59	Mar-33								
	B-00415-O11*					72	Mar-34								
	13.9.29.341*	Jun-99	dry	Jun-99		190	Jun-99						San Rafael Group	Jun-99	abandoned
	19.9.29.341*	Jun-99				455	Jun-99								
SMC-34	13.9.28.111**		58.2 (08/05/19	Jun-99		125	Jun-99						alluvium	Jun-99	
SMC-35	te associated with SMC-11														
SMC-36	te associated with SMC-26														
SMC-39			86.6	[11]/XX		88	11/XX								Low yield; Isotope sample only.
	13.9.22.212*	Jun-99	7.5 (12/1957	Jun-99		95	Jun-99						alluvium	Jun-99	
	13.9.22.212*	Jun-99	7.1 (03/1975	Jun-99		130	Jun-99						alluvium	Jun-99	
**	dentification from Ref. [12]														

Table 7. Well construction information for the San Mateo Creek set of wells sampled in this investigation (p. 5 of 5).

Sample ID	Alternative well IDs	Reference/ page	Water Level (ft-BGS)	Reference/ page	Well Depth (ft)		Reference/ page	Screened interval		Reference/ page		Lithology/ stratigraphic unit opposite screened interval		Reference/ page	Notes
[1],	onda Company Bluewater uranium millsite, CERCLIS ID NMD007106891, Cibola County, New Mexico."														
[2],	for well permit numbers." Email sent to David L. Mayerson.														
[3],	essed through iWATERS (http://nmwrrs.ose.state.nm.us/WRDispatcher).														
[4],	Homestake Mining Company (HMC) project book.														
[5],	dated. "Residential well water sampling sign-up sheet."														
[6],	rea, McKinley and Valencia counties, New Mexico." New Mexico Institute of Mining and Technology Masters thesis.														
[7],	partment. Residential well questionnaires.														
[8],	water area, Valencia County, New Mexico." New Mexico State Engineer Technical Report 20.														
[9],	t. Field notebook for Grants Uranium belt projects.														
[10],	ry 10, 2009. "Compiled San Mateo well data." Emailed data transmittal to NMED.														
[11],	artment, 2009. Well sampling field sheets.														
[12],	howing geospatial position of historical wells compiled from various sources relative to wells sampled by NMED).														

Table 8. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2008 Bluewater set of ground water samples (p. 1 of 3).

Sample Number	Latitude (NAD83)	Longitude (NAD83)	Sample Date	Tempera-ture (T) °C	Dissolved Oxygen (DO) mg/L	Specific Conduc-tance (SC) µS/cm	Oxidation Reduction Potential (ORP)	Field pH	Lab pH	Total Dissolved Solids (TDS) mg/L	Total anions meq/L	Total cations meq/L	Charge balance error	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
EPA MCL																	
NM WQCC								6 - 9		1000			<10%				
BW-02	35.225595	-107.888629	8/25/2008	16.23	2.00	1289	69.40	6.89	7.20	1010	15.33	16.58	3.91	159	47.1	106	6.19
BW-03	35.227344	-107.888396	8/25/2008	16.5	2.21	1379	99.80	6.79	7.20	1110	16.26	18.24	5.71	171	49.4	126	6.11
BW-04	35.229749	-107.888762	8/27/2008	16.2	3.68	1273	-22.00	6.90	7.30	940	15.31	16.84	4.76	160	50.2	105	6.16
BW-05	35.258875	-107.972292	8/25/2008	18.51	1.98	1613	118.60	6.69	7.00	1280	18.62	20.72	5.34	170	52.7	178	6.32
BW-06	35.231733	-107.923966	8/25/2008	13.25	4.15	1115	118.50	7.14	7.30	664	9.61	10.72	5.49	109	38.5	46.9	2.9
BW-07	35.265414	-107.994713	8/26/2008	15.29	1.84	3231	147.40	6.34	6.80	3110	45.21	47.59	2.56	422	96.1	420	13.7
BW-08	35.265967	-107.975864	8/26/2008	14.9	4.86	847	115.60	6.98	7.30	714	9.95	11.49	7.21	138	35.2	37.3	3.38
BW-09	35.248517	-107.976643	8/26/2008	13.94	15.87	1068	135.20	6.66	7.20	916	13.2	14.98	6.2	164	43.3	71.1	5.46
BW-10	35.256567	-107.966417	8/26/2008	14.43	9.67	982	160.10	6.55	7.20	774	11.05	12.73	7.06	165	35.3	34.9	2.69
BW-11	35.255950	-107.967767	8/26/2008	14.58	8.62	910	170.10	6.55	7.20	740	10.18	11.33	5.34	147	33.6	26.5	2.97
BW-12	35.242589	-107.963738	8/27/2008	13.52	3.90	1474	153.00	6.84	7.20	832	13.41	15.37	6.8	143	47.0	95.7	7.83
BW-13	35.239510	-107.961517	8/27/2008	13.67	3.89	1446	191.60	6.82	7.20	844	12.99	14.92	6.9	149	44.8	83.7	6.1
BW-14	35.252936	-107.981026	8/27/2008	15.01	5.32	1688	132.30	6.58	7.10	964	15.51	17.21	5.21	196	59.4	56.1	3.99
BW-15	35.218020	-107.912511	8/25/2008	13.96	13.15	1033	113.90	7.25	7.40	848	11.93	12.76	3.35	134	39.1	63.5	3.59
BW-16	35.213846	-107.912278	8/27/2008	n/a	n/a	n/a	n/a	n/a	7.40	812	13.06	14.47	5.15	148	42.3	80.6	3.92
BW-17	35.233128	-107.944206	8/28/2008	15.55	7.89	788	104.20	7.14	7.50	510	7.43	8.59	7.23	79.3	37.7	33.8	2.18
BW-18	35.242809	-107.924478	8/28/2008	16.95	7.76	1804	80.50	6.99	7.40	1210	18.42	20.47	5.28	228	48.2	116	3.11
BW-19	35.236342	-107.932447	8/28/2008	13.62	4.98	1113	197.30	6.85	7.30	738	10.86	13.01	9	131	43.7	63.8	3.8
BW-20	35.233410	-107.912254	8/28/2008	13.88	5.12	1373	37.00	7.15	7.30	876	14.06	16.11	6.78	185	52.3	56.6	4.39
BW-21	35.203787	-107.908264	8/25/2008	14.21	10.81	995	129.70	7.25	7.30	732	11.4	12.48	4.53	125	36.5	72.5	3.45
BW-22	35.203835	-107.915436	8/25/2008	15.31	10.48	644	134.60	7.52	7.50	422	6.68	7.53	5.99	73.3	29.2	32.5	2.22
BW-23	35.234271	-107.888866	8/25/2008	16.35	8.24	1624	135.60	7.06	7.20	1230	18.3	19.78	3.88	187	54.5	133	7.02
BW-24	35.261930	-107.974420	8/25/2008	15.42	1.53	2101	125.50	6.72	7.00	1300	18.92	21.18	5.63	167	53.5	191	5.34
BW-25	35.271106	-107.957824	8/27/2008	17.16	0.81	1344	-232.8	10.21	10.00	704	7.87	14.76	30.48	0.6	1.9	332	5.47
BW-26	35.268777	-107.938559	8/27/2008	17.94	1.03	6753	-75.4	5.40	5.00	4720	74.63	47.86	21.86	758	61.6	113	1.84
BW-27	35.271529	-107.938604	8/27/2008	17.7	2.76	3727	-119.6	6.48	6.10	2460	39.96	38.69	1.61	83.5	132.0	535	15.3
BW-28	35.266163	-107.907318	8/27/2008	15.38	0.89	1175	88.60	8.66	9.20	584	9.56	10.1	2.72	14.5	10.8	192	5.22
BW-29	35.242032	-107.855229	8/27/2008	20.47	3.97	2828	124.40	6.69	6.80	1840	29.75	31.53	2.91	225	77.8	312	13
BW-30	35.239529	-107.864253	8/27/2008	18.13	9.00	2530	132.20	6.75	6.90	2200	28.06	30.54	4.23	231	78.1	282	12.6
BW-32	35.255295	-107.861760	9/16/2008	14.95	0.81	1858	74.00	8.27	8.48	1150	17.75	19.56	4.84	15.2	4.3	423	1.56
BW-33	35.225191	-107.876176	9/16/2008	18.66	0.93	2079	121.60	6.86	7.72	1660	24.67	27.13	4.75	187	62.2	286	9.36
BW-34	35.247480	-107.923981	8/27/2008	13.92	8.95	1254	172.80	7.22	7.20	972	14.17	16.38	7.23	159	47.5	101	5.62
BW-35	35.279927	-107.831931	8/25/2008	22.99	3.80	3857	64.90	8.48	7.20	1010	15.33	16.58	3.91	159	47.1	106	6.19
Average values	**n/a**	**n/a**	**n/a**	**15.89**	**5.34**	**1787**	**n/a**	**7.08**	**7.31**	**1208**	**18.16**	**19.04**	**5.06**	**169**	**48.3**	**149**	**5.73**

Table 8. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2008 Bluewater set of ground water samples (p. 2 of 3).

Sample Number	Cl (mg/L)	SO_4 (mg/L)	HCO_3 (mg/L)	Ag (µg/L)	Al (µg/L)	As (µg/L)	Ba (µg/L)	Be (µg/L)	Cd (µg/L)	Co (µg/L)	Cr (µg/L)	Cu (µg/L)	F (mg/L)	Fe (µg/L)	Hg (µg/L)	Mn (µg/L)	Mo (µg/L)	Ni (µg/L)	NO_3+NO_2 (mg/L)	Pb (µg/L)	Sb (µg/L)
EPA MCL						10	2000	4	5		100	1300	4		2				10	15	6
NM WQCC	250	600		50	5000(i)	100	1000		10	50(i)	50	1000	1.6	1000	2	200	1000(i)	200(i)	10	50	
BW-02	65	434	267	<10	<100	<2	12.3	<5	<5	<20	<20	<20	0.43	<25	<0.2	<5	<2	<20	3.83	<2	<2
BW-03	73	463	273	<10	<100	<2	13.3	<5	<5	<20	<20	<20	0.41	<25	<0.2	<5	<2	<20	4.28	<2	<2
BW-04	67	434	262	<10	<100	<2	21.3	<5	<5	<20	<20	<20	0.46	177	0.21	27.6	<2	<20	4.13	<2	<2
BW-05	101	475	356	<10	<100	2.2	11.7	<5	<5	<20	<20	<20	0.38	<25	<0.2	5.3	<2	<20	1.75	<2	<2
BW-06	20	249	230	<10	<100	<2	20.1	<5	<5	<20	<20	<20	0.31	<25	<0.2	<5	<2	<20	4.39	<2	<2
BW-07	262	1440	476	<10	<100	5.1	<10	<5	<5	<20	<20	<20	0.58	53.9	<0.2	<5	<2	<20	0.33	<2	<2
BW-08	25	245	249	<10	<100	5	<10	<5	<5	<20	<20	<20	0.29	<25	<0.2	<5	<2	<20	2.69	<2	<2
BW-09	40	345	293	<10	<100	11.5	21.1	<5	<5	<20	<20	<20	0.45	<25	<0.2	<5	2.1	<20	4.18	<2	<2
BW-10	17	241	335	<10	<100	<2	30.3	<5	<5	<20	<20	<20	<0.25	<25	0.235	<5	<2	<20	2.79	<2	<2
BW-11	14	222	312	<10	<100	2.7	40.6	<5	<5	<20	<20	<20	<0.25	<25	<0.2	<5	<2	<20	2.24	<2	<2
BW-12	45	352	288	<10	<100	4.6	11.6	<5	<5	<20	<20	<20	0.54	<25	0.244	<5	<2	<20	3.83	<2	<2
BW-13	39	342	286	<10	<100	5.9	15.4	<5	<5	<20	<20	<20	0.56	<25	0.329	<5	<2	<20	3.46	<2	<2
BW-14	48	451	284	<10	<100	8.7	12.5	<5	<5	<20	<20	<20	0.58	<25	<0.2	5.7	<2	<20	4.79	<2	<2
BW-15	33	341	233	<10	<100	<2	41.6	<5	<5	<20	<20	<20	0.3	<25	<0.2	<5	<2	<20	4.13	<2	<2
BW-16	42	385	230	<10	<100	2.9	39.9	<5	<5	<20	<20	<20	0.33	<25	<0.2	<5	<2	<20	4.2	<2	<2
BW-17	11	181	200	<10	<100	<2	17.8	<5	<5	<20	<20	<20	0.26	<25	0.221	<5	3.3	<20	3.51	<2	<2
BW-18	147	529	188	<10	<100	<2	27.4	<5	<5	<20	<20	<20	<0.25	<25	<0.2	<5	<2	<20	10	<2	<2
BW-19	27	290	242	<10	<100	<2	24.5	<5	<5	<20	<20	<20	0.33	<25	0.201	<5	3.3	<20	4.65	<2	<2
BW-20	60	415	222	<10	<100	<2	23.3	<5	<5	<20	<20	<20	0.28	<25	0.236	<5	<2	<20	4.77	<2	<2
BW-21	31	329	220	<10	<100	2.2	29.2	<5	<5	<20	<20	<10	0.34	<25	<0.2	<5	<2	<20	3.36	<2	<2
BW-22	10	162	182	<10	<100	<2	21.5	<5	<5	<20	<20	24.3	0.37	<25	<0.2	<5	3.4	<20	1.4	<2	<2
BW-23	101	517	280	<10	<100	<2	11.8	<5	<5	<20	<20	<20	0.45	<25	<0.2	<5	<2	<20	4.76	<2	<2
BW-24	107	478	362	<10	<100	2	10.5	<5	<5	<20	<20	<20	0.28	45.4	<0.2	<5	<2	<20	0.34	<2	<2
BW-25	217	2.5	102	<10	<100	<2	<10	<5	<5	<20	<20	<20	0.38	<25	0.221	<5	16.5	<20	0.02	<2	<2
BW-26	2380	357	<5	<10	<100	3.7	73.5	<5	<5	<20	<20	<20	0.25	564000	0.268	66100	<2	<20	0.07	<2	<2
BW-27	996	567	<5	<10	<100	<2	<10	<5	<5	<20	<20	<20	0.25	1020	0.332	784	<2	<20	0.13	<2	<2
BW-28	216	103	80	<10	<100	<2	10	<5	<5	<20	<20	<20	0.26	68.5	0.307	77.3	<2	<20	0.07	<2	<2
BW-29	219	749	485	<10	<100	<2	<10	<5	<5	<20	<20	<20	0.25	87.2	0.309	14.9	<2	54.3	1.02	3.6	<2
BW-30	209	727	426	<10	<100	<2	10.8	<5	<5	<20	<20	<20	0.25	<25	0.266	<5	3.5	<20	2.33	<2	<2
BW-32	36.5	555	315	<1	<10	4	<100	<1	<1	<1	2	<10	n/a	<50	<0.2	6	9	<10	0.11	<1	<1
BW-33	139	678	400	<1	<10	2	<100	<1	<1	<1	2	<10	n/a	<50	<0.2	1	1	<10	4.8	<1	<1
BW-34	57	383	274	<10	<100	2.5	18.2	<5	<5	<20	<20	<20	0.47	33.4	<0.2	<5	<2	<20	4.61	<2	<2
BW-35	65	434	267	<10	<100	1	12.3	<5	<5	<20	<20	<20	0.43	<25	<0.2	<5	<2	<20	3.83	<2	<2
Average values	**179**	**420**	**278**	**<10**	**<100**	**<5**	**22.4**	**<5**	**<5**	**<20**	**<20**	**<20**	**0.37**	**<20**	**0.26**	**<5**	**<2**	**<20**	**3.05**	**<2**	**<2**

Table 8. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2008 Bluewater set of ground water samples (p. 3 of 3).

Sample Number	Se (µg/L)	Tl (µg/L)	V (µg/L)	Zn (µg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	^{226}Ra (pCi/L)	^{228}Ra (pCi/L)	U (µg/L)	^{238}U (pCi/L)	^{235}U (pCi/L)	^{234}U (pCi/L)	∂ ^{2}H per mil (‰)	∂ ^{18}O per mil (‰)	∂ ^{13}C per mil (‰)	∂ ^{34}S per mil (‰)
EPA MCL	50	2			15	50	5	5	30							
NM WQCC	50			10000			30	30	30							
BW-02	10.9	<2	<20	32.8	1.9	12	-0.03	0.31	6.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-03	10.8	<2	<20	<20	7.3	9.1	0.24	0.2	11.7	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-04	9.2	<2	<20	<20	4.9	7.2	0.91	ND	7	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-05	4	<2	<20	261	10.4	14	-0.05	0.41	10.5	3	0.07	6.4	-75.0	-9.71	-6.32	10.09
BW-06	3.7	<2	<20	10	4	2.3	0.19	0.27	5.1	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-07	2.2	<2	<20	392	6.3	14.4	0.08	0.25	9.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-08	2.5	<2	<20	<20	1.8	5.6	ND	ND	4.9	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-09	4.8	<2	<20	<20	4.2	5.7	ND	ND	7.8	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-10	2	<2	<20	<20	5.1	2.5	0.05	0.39	5.5	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-11	<2	<2	<20	47.9	2.5	4.2	0.01	ND	5	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-12	4.7	<2	<20	10	4.1	6.5	0.23	0.15	6.8	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-13	3.8	<2	<20	53.8	5.2	5.7	0.09	0.24	6.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-14	10	<2	<20	38	7.4	5.8	0.38	0.29	10.5	3.4	0.08	13.8	-93.3	-12.40	-6.68	10.64
BW-15	10.1	<2	<20	<20	6.7	5.3	0.16	ND	12	2.8	0.1	4.5	-76.5	-10.05	-8.57	7.53
BW-16	18.8	<2	<20	<20	5.1	5.9	0.14	ND	17.7	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-17	3.9	<2	<20	43.7	3.6	2.2	0.05	ND	4.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-18	31	<2	<20	30.7	1.5	4	0.05	0.25	3.6	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-19	11.1	<2	<20	<20	5.3	10.3	0.08	ND	14.2	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-20	18.7	<2	<20	29.9	6.5	5	0.11	0.15	7.2	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-21	16.3	<2	<20	<20	7.2	4.9	0.19	0.01	11.8	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-22	7.3	<2	<20	20	4	2	0.15	ND	5.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-23	8.5	<2	<20	<20	12.6	13	0.2	0.22	13.8	4.3	0.4	7.1	-78.5	-10.15	-7.07	6.74
BW-24	4.1	<2	<20	201	11.3	16.1	0.32	0.41	10.9	3.2	0.1	14.4	-78.4	-10.20	-5.43	9.46
BW-25	<2	<2	<20	21.3	-0.7	5	ND	0.29	<2	-0.03	0.0008	0.01	-84.9	-10.68	n/a	n/a
BW-26	<2	<2	<20	26.9	-1.1	1	1.65	ND	<2	0.2	-0.1	0.4	-72.0	-9.01	n/a	8.55
BW-27	<2	<2	<20	<20	8.8	18.7	0.09	ND	<2	7.61	0.08	0.06	-73.6	-8.99	n/a	14.26
BW-28	<2	<2	<20	<20	0.9	3.4	0.01	ND	<2	0.04	-0.01	0.4	-73.3	-9.35	n/a	n/a
BW-29	7.3	<2	<20	126	7.5	15.8	0.25	0.22	8.9	0.3	r/a	n/a	n/a	n/a	n/a	n/a
BW-30	7.7	<2	<20	47.5	13.6	12.3	0.04	0.28	16.7	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-32	5	<1	<20	<10	29	10.8	0.11	ND	29	11	0.5	22.9	-77.0	-10.24	-8.49	-13.61
BW-33	16	<1	<20	<10	12.1	13.8	0.2	ND	20	n/a	r/a	n/a	n/a	n/a	n/a	n/a
BW-34	5.3	<2	<20	73.8	22.8	15.6	0.05	ND	53.3	12.3	0.5	13.5	-71.8	-9.63	-7.70	7.62
BW-35	10.9	<2	<20	32.8	3	0.4	0.19	0.16	6.4	n/a	r/a	n/a	n/a	n/a	n/a	n/a
Average values	**9**	**<2**	**<20**	**78.9**	**6.8**	**7.9**	**0.2**	**0.25**	**11.5**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**

Table 9. Environmental issues, data gaps, and suggested solutions for the Bluewater area, New Mexico (p. 1 of 2).

Environmental Issue	Data Gap	Suggested Solution
1.Validity of placement of shallow wells to detect excursion or movement of contamination from mill site may be inadequate.	Direction of flow in the shallow aquifer with respect to faults is poor & out dated.	Update ground water flow direction in the shallow aquifer w/ potentiometric contour map based on more current information: geologic mapping, new monitoring wells, & pump test data if possible.
2. L (SG) well pH value (10) is elevated & not representative of background pH (7). Suspect other chemical concentrations at this well location are not representative of natural ground water conditions.	Source of elevated pH is unknown but suspected to be from carbonate-alkaline leach circuit waste water during early operation of mill site	Conduct geochemical study of ground water quality at the L (SG) well location and/or site & install new background monitoring well and re-evaluate monitoring program against new data for compliance.
3. Boring logs of deep monitoring wells (MWs) constructed to monitor San Andres Aquifer at U mill site suggest the wells may not be properly constructed-located to adequately monitor the complex hydrogeologic system at the mill site. Wells contain large sections of open borehole that may produce water from multiple zones causing sample water to be a mix or diluted fraction. Large fault systems between well locations may impede or enhance ground water flow.	Deep MWs at mill site may not be properly constructed-located to adequately understand & monitor impacts to San Andres Aquifer.	Review all historical information & boring logs describing the reasons for siting-constructing deep MWs. Determine if existing wells provide adequate monitoring of the complex hydrogeologic & hydrochemical ground water system beneath mill site. If wells are found to be inadequate then propose new well siting-construction-pump testing to better characterize & understand ground water system for long term monitoring.
4. San Andres Aquifer beneath the U mill site is contaminated with mill raffinate waste water from evaporation pond seepage & deep disposal well injection into Yeso-Abo Formation.	Source of contamination is unclear if it is from downward evaporation pond seepage, or upward from Yeso-Abo Formation injection seepage, or combination of both.	Determine if source(s) of contamination in San Andres Aquifer by expanded geochemical water sampling of existing MWs & new wells. Conduct pump-flow testing of Yeso-Abo Formation and/or San Andres Aquifer to determine if there is leakage or hydraulic communication between units.
5. Ground water pumpage in offsite deep wells completed in the San Andres Aquifer near south boundary of U mill site may cause contaminated water to be drawn off site past site boundary.	Amount of annual-seasonal ground water pumpage in nearby offsite wells unknown. Application of potentially contaminated ground water unknown.	Update deep ground water flow direction map to understand if contaminated water beneath mill site is migrating toward or being drawn toward offsite wells. Identify application of offsite ground water from wells near mill site boundary.

DRAFT

Table 9. Environmental issues, data gaps, and suggested solutions for the Bluewater area, New Mexico (p. 2 of 2).

Environmental Issue	Data Gap	Suggested Solution
6. Uranium concentration in nearby off site wells close to site boundary are elevated 2-3 times background range of U.	Source of elevated uranium concentration in offsite wells close to site boundary is unknown.	Conduct geochemical sampling of onsite & offsite wells using environmental isotopes of U & other geochemical parameters to determine locations where U is natural, anthropogenic, or mixture of two sources.
7. Bluewater Basin is critical, long-term potable water supply basin for agricultural, domestic, industrial, & municipal water supplies. It must be protected from degradation & threat of contamination from mill site.	The level of potential risk of degradation to the quality & quantity of the Bluewater Basin ground water supply from potentially contaminated water at the mill site is unknown.	Determine if Bluewater Basin water quality-quantity supply is at risk from contaminated mill site ground water & the effect of long term, offsite high volume pumping along fault systems that extend onto & beneath mill site.

DRAFT

Table 10. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2009 San Mateo Creek set of ground water samples (p. 1 of 3).

Sample Number	Latitude (NAD83)	Longitude (NAD83)	Sample Date	Tempera-ture (T) °C	Dissolved Oxygen (DO) mg/L	Specific Conduc-tance (SC) µS/cm	Oxidation Reduction Potential (ORP)	Field pH	Lab pH	Total Dissolved Solids (TDS) mg/L	Total anions meq/L	Total cations meq/L	Charge balance error	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
EPA MCL																	
NM WQCC								6 - 9		1000			<10%				
SMC-03	35.204251	-107.897797	3/31/2009	13.28	4.55	1481	130.2	7.29	7.4	884	13.13	14.35	4.44	172	40.1	54.3	4.1
SMC-04	35.206449	-107.871402	3/31/2009	12.79	1.29	1291	25.2	8.57	8.4	698	9.83	9.94	0.56	11.2	3.24	208	2.4
SMC-05	35.204204	-107.872925	3/31/2009	15.09	3.24	1126	93.3	8.81	8.6	592	8.08	8.86	4.61	2.83	0.58	199	0.5
SMC-07	35.442460	-107.823329	4/1/2009	n/a	n/a	n/a	n/a	n/a	8.2	534	7.59	9.18	9.47	21.7	7.94	168	5.3
SMC-08	35.266714	-107.835451	3/30/2009	12.74	5.01	727	116.5	8.36	7.1	1400	21.34	22.11	1.77	106	23.4	341	2.3
SMC-09	35.238520	-107.784902	3/30/2009	12.77	70.70	898	92.8	7.47	7.4	3400	47.59	50.33	2.80	541	148	251	9.4
SMC-10	35.277739	-107.830824	3/30/2009	12.98	0.16	2341	-195.3	7.94	7.4	3380	48.41	52.09	3.65	567	149	261	7.0
SMC-11	35.276939	-107.844180	3/31/2009	13.05	0.20	3590	207.4	6.92	7.5	2440	37.55	43.14	6.94	479	88.5	269	10.1
SMC-12	35.289443	-107.839515	3/31/2009	12.43	4.10	3206	201.0	7.70	8	1870	27.08	31.12	6.94	59	10.3	628	0.5
SMC-13	35.275482	-107.850652	4/2/2009	13.52	1.52	2922	13.7	6.83	7.4	2710	38.46	41.13	3.36	389	73.7	355	8.4
SMC-14	35.275194	-107.859294	4/2/2009	11.8	0.17	1643	-222.5	8.76	8.7	1180	16.9	19.22	6.43	4.94	0.84	434	1.1
SMC-16	35.348006	-107.737150	4/1/2009	10.5	0.25	1184	-225.0	8.10	8.1	864	13.4	15.40	6.94	47	17.2	266	2.7
SMC-17	35.357557	-107.807733	4/1/2009	14.14	3.18	1980	195.0	7.57	7.8	1100	16.34	18.02	4.91	87.7	5.53	301	3.8
SMC-18	35.348290	-107.803197	4/1/2009	13.18	0.18	1289	-55.9	7.28	7.7	732	10.74	11.83	4.83	89.9	14.8	136	8.1
SMC-20	35.349029	-107.779781	3/31/2009	13.74	2.5	589	-13.7	7.05	7.6	504	6.71	9.01	14.65	92.3	15.8	67.9	5.9
SMC-21	35.363551	-107.769202	3/31/2009	12.96	2.30	2870	57.1	6.84	7.4	3320	15.24	53.11	55.41	536	183	257	4.8
SMC-22	35.325185	-107.826384	3/31/2009	16.56	5.50	7078	40.2	9.29	9.2	506	6.32	8.38	14.05	1.09	0.08	191	0.5
SMC-23	35.345152	-107.786056	3/30/2009	12.64	0.39	3	82.0	6.97	8.4	440	5.19	6.70	12.71	7.07	1.44	143	0.5
SMC-24	35.344586	-107.785136	3/30/2009	12.26	0.78	3221	40.0	7.11	7.3	3310	47.69	47.97	0.29	509	138	254	6.4
SMC-25	35.347131	-107.783340	3/30/2009	10.68	0.83	3110	78.7	7.05	7.8	504	6.86	8.38	9.94	64.9	8.26	102	1.0
SMC-26	35.346584	-107.774666	3/31/2009	13.69	7.29	721	68.1	7.64	7.9	572	7.92	9.96	11.40	48.7	8.35	156	2.3
SMC-28	35.348787	-107.767434	4/2/2009	16.98	1.61	714	101.7	7.50	7.8	378	5.35	6.28	7.98	52.4	6.47	70.1	3.3
SMC-30	35.336706	-107.654231	4/2/2009	10.88	4.40	130	453.0	6.84	7.3	254	3.36	4.32	12.46	51.5	7.26	24.3	3.6
SMC-31	35.335064	-107.638226	4/2/2009	10.1	0.12	969	-11.6	7.37	7.9	500	7.44	9.06	9.85	36.2	7.82	151	1.6
SMC-32	35.354520	-107.794613	4/1/2009	13.38	0.10	2591	-61.9	7.00	7.4	1630	26.86	27.05	0.36	316	72.3	118	7.9
SMC-33	35.321455	-107.817586	4/1/2009	15.42	2.25	2478	59.5	7.12	7.5	1490	22.72	24.76	4.30	225	24.8	262	3.6
SMC-34	35.332654	-107.802743	4/1/2009	n/a	n/a	n/a	n/a	n/a	7.5	1780	26.78	29.55	4.92	247	39.3	317	7.8
Average values	**n/a**	**n/a**	**n/a**	**13**	**5**	**1926**	**50**	**7.58**	**7.8**	**1369**	**18.7**	**21.9**	**8.37**	**176.5**	**40.6**	**221.7**	**4.2**

Table 10. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2009 San Mateo Creek set of ground water samples (p. 2 of 3).

Sample Number	Cl (mg/L)	SO_4 (mg/L)	HCO_3 (mg/L)	Ag (µg/L)	Al (µg/L)	As (µg/L)	Ba (µg/L)	Be (µg/L)	Cd (µg/L)	Co (µg/L)	Cr (µg/L)	Cu (µg/L)	F (mg/L)	Fe (µg/L)	Hg (µg/L)	Mn (µg/L)	Mo (µg/L)	Ni (µg/L)	NO_3+NO_2 (mg/L)	Pb (µg/L)
EPA MCL						10	2000	4	5		100	1300	4		2				10	15
NM WQCC	250	600		50	5000(i)	100	1000		10	50(i)	50	1000	1.6	1000	2	200	1000(i)	200(i)	10	50
SMC-03	32	369	272	<10	<100	2.9	11.9	<5	<5	<20	<10	<20	0.39	<25	<0.2	<5	<50	<20	4.12	<2
SMC-04	33	200	284	<10	<100	5.1	5	<5	<5	<20	<10	<20	1.18	<25	<0.2	<5	<50	<20	0.82	<2
SMC-05	27	105	308	<10	<100	3.2	5	<5	<5	<20	<10	<20	1.28	<25	<0.2	<5	<50	<20	0.86	<2
SMC-07	2.5	168	243	<10	<100	4	18.7	<5	<5	<20	<10	<20	0.76	<25	<0.2	<5	<50	<20	0.02	<2
SMC-08	78	911	10	<10	<100	<2	39.4	<5	<5	<20	<10	<20	<0.25	2740	<0.2	101	<50	<20	0.05	<2
SMC-09	48	2070	168	<10	<100	3.4	5	<5	<5	<20	<10	<20	0.36	<25	<0.2	<5	<50	<20	22.80	<2
SMC-10	47	2110	170	<10	<100	3.2	31.9	<5	<5	<20	<10	<20	0.56	<25	<0.2	<5	<50	<20	21.20	<2
SMC-11	55	1580	188	<10	<100	21.5	11.9	<5	<5	<20	<10	<20	0.31	<25	<0.2	<5	<50	<20	0.02	<2
SMC-12	125	955	210	<10	<100	22.8	11.3	<5	<5	<20	<10	<20	0.91	<25	<0.2	<5	<50	<20	11.50	<2
SMC-13	59	1610	180	<10	<100	37.7	67	<5	<5	<20	<10	<20	0.5	<25	<0.2	11.5	<50	<20	18.60	<2
SMC-14	58	535	246	<10	<100	4.7	12.5	<5	<5	<20	<10	<20	1.08	28.4	<0.2	23.8	<50	<20	2.36	<2
SMC-16	25	323	359	<10	<100	1	29.2	<5	<5	<20	<10	<20	1.68	168	<0.2	57	<50	<20	0.02	<2
SMC-17	11	656	139	<10	<100	10	5	<5	<5	<20	<10	<20	1.25	112	<0.2	53.6	<50	<20	1.45	<2
SMC-18	10	370	167	<10	<100	<2	27.5	<5	<5	<20	<10	<20	0.29	86.9	<0.2	75.7	<50	<20	0.02	<2
SMC-20	15	96	260	<10	<100	4.7	5	<5	<5	<20	<10	<20	<0.25	<25	<0.2	56.8	<50	<20	1.08	<2
SMC-21	42	546	153	<10	<100	<2	21.3	<5	<5	<20	<10	<20	0.46	<25	<0.2	128	<50	<20	9.38	<2
SMC-22	27	100	206	<10	<100	21.5	36	<5	<5	<20	<10	<20	1.27	<25	<0.2	<5	<50	<20	1.86	<2
SMC-23	33	49	192	<10	<100	3.1	54.3	<5	<5	<20	<10	<20	0.43	45.2	<0.2	<5	<50	<20	4.43	<2
SMC-24	50	2070	172	<10	<100	5.3	11.1	<5	<5	<20	<10	<20	0.63	<25	<0.2	<5	<50	<20	20.20	<2
SMC-25	26	144	181	<10	<100	11.8	13.2	<5	<5	<20	<10	<20	1.43	<25	<0.2	<5	<50	<20	5.67	<2
SMC-26	13	135	280	<10	<100	2.5	13.6	<5	<5	<20	<10	<20	1.04	<25	<0.2	<5	72.8	<20	6.28	<2
SMC-28	2.5	144	136	<10	<100	5	5	<5	<5	<20	<10	<20	0.69	<25	<0.2	<5	<50	<20	1.11	<2
SMC-30	2.5	12	184	<10	<100	<2	5	<5	<5	<20	<10	<20	0.41	<25	<0.2	<5	<50	<20	0.11	<2
SMC-31	7	120	286	<10	<100	<2	15.4	<5	<5	<20	<10	<20	0.98	27.4	<0.2	88.4	<50	<20	0.02	<2
SMC-32	33	1100	184	<10	<100	<2	5	<5	<5	<20	<10	<20	<0.25	1650	<0.2	1150	<50	<20	0.02	<2
SMC-33	46	899	153	<10	<100	21	28.1	<5	<5	<20	<10	<20	0.73	<25	<0.2	6.8	<50	<20	9.62	<2
SMC-34	53	1080	163	<10	<100	29	288	<5	<5	<20	<10	<20	0.52	<25	<0.2	<5	<50	<20	6.15	<2
Average values	**35.6**	**684**	**203**	**<10**	**<100**	**8.5**	**29.0**	**<5**	**<5**	**<20**	**<10**	**<20**	**0.71**	**188.7**	**<0.2**	**66.4**	**<50**	**<20**	**5.55**	**<2**

Table 10. Summary of data values describing: the sample number; field parameters; individual and average chemical values; and isotopic results for the 2009 San Mateo Creek set of ground water samples (p. 3 of 3).

Sample Number	Sb (µg/L)	Se (µg/L)	Tl (µg/L)	V (µg/L)	Zn (µg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	^{226}Ra (pCi/L)	^{228}Ra (pCi/L)	U (µg/L)	^{238}U (pCi/L)	^{235}U (pCi/L)	^{234}U (pCi/L)	∂ ^{2}H per mil (‰)	∂ ^{18}O per mil (‰)	∂ ^{13}C per mil (‰)	∂ ^{34}S per mil (‰)
EPA MCL	6	50	2			15	50	5	5	30							
NM WQCC		50			10000			30	30	30							
SMC-03	<2	22.1	<2	<20	28.9	5.6	5	0.01	<0.08	11	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-04	<2	5.8	<2	<20	<20	17.4	5.2	0.08	0.15	20.6 [19]	[5.61]	n/a	[11.1]	n/a	n/a	n/a	n/a
SMC-05	<2	4.6	<2	22.3	<20	20.8	10.3	0.05	<0.17	26.2 [26]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-07	<2	<2	<2	<20	70.9	8.2	6.8	1.61	0.87	2.5 [2]	0.6 [0.7]	0.1	4.6 [4.03]	-98.3	-13.12	-11.06	-9.25
SMC-08	<2	3.8	<2	<20	<20	6.7	1.5	0.02	0.89	<2 [9]	2.8	0.2	3.9	-57.8	-8.17	-7.80	-6.12
SMC-09	<2	36.5	<2	<20	209	7.9	6.7	0.31	0.28	40.7 [21]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-10	<2	32.1	<2	<20	81.9	1.3	3.9	0.01	0.36	30.9	0.04	0.01	0.1	-63.9	-8.51	-7.96	-3.96
SMC-11	<2	367	<2	<20	<20	91.3	82.7	0.16	0.76	228 [200]	63	2.8	78.1	-76.7	-10.04	-7.86	-24.97
SMC-12	<2	382	<2	38.3	481	66.8	29.5	0.01	0.52	163 [150]	52 [44.8]	2.3	61.9 [54.6	-70.8	-9.36	-6.00	-11.11
SMC-13	<2	618	<2	<20	<20	121	83	0.07	0.28	240 [220]	64.3	3.2	75.8	-72.7	-9.89	-5.57	-21.20
SMC-14	<2	52.9	<2	<20	<20	14	9.7	<0.01	0.45	23.2 [21]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-16	<2	<2	<2	<20	<20	0.9	4.6	0.28	0.44	2.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-17	<2	49	<2	<20	959	58.8	33.3	0.14	0.46	99.5 [85]	[27.1]	n/a	[44.9]	n/a	n/a	n/a	n/a
SMC-18	<2	3.6	<2	<20	<20	10.9	14.6	1.35	0.83	<2 [2]	0.5 [0.52]	0.03	4 [3.73]	-73.3	-9.99	-14.38	1.53
SMC-20	<2	73.6	<2	<20	54.8	46.6	20.6	0.96	1.87	63.9 [58]	17.4	0.9	30.4	-73.6	-9.96	-9.06	-1.84
SMC-21	<2	8	<2	<20	<20	6.5	7.5	0.27	2.4	11.9 [10]	3.3	0.2	6.8	-71.8	-9.84	-6.48	-11.37
SMC-22	<2	26.3	<2	135	<20	33.5	11.7	<0.01	0.11	42.9 [42]	[12.8]	n/a	[22.9]	n/a	n/a	n/a	n/a
SMC-23	<2	27.1	<2	<20	<20	6.2	10.9	0.42	0.97	10.1 [12]	3.8	0.3	6.1	-68.9	-9.51	-7.51	-12.07
SMC-24	<2	66.2	<2	<20	<20	20.7	20.1	<0.01	0.33	13.8 [36]	11.8	0.4	15.7	-70.2	-9.00	-7.44	-11.40
SMC-25	<2	13.2	<2	26.5	<20	16	10.4	<0.01	0.51	20.6 [26]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-26	<2	26.2	<2	<20	20.8	128.3	45.3	0.13	0.24	188 [170]	62.5 [52.9]	3.5	94.6 [82.4	-68.3	-9.52	-9.34	-0.33
SMC-28	<2	42.6	<2	<20	527	19.4	18.6	0.15	0.34	46.4 [43]	13.5	0.6	19.8	-70.7	-9.78	-8.56	9.09
SMC-30	<2	<2	<2	<20	<20	2	3.1	n/a	0.8	2.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SMC-31	<2	<2	<2	<20	268	<0.1	2	0.38	n/a	<2	0.1	-0.02	0.5	-89.2	-12.03	-12.21	n/a
SMC-32	<2	<2	<2	<20	23.3	56	50.3	2.9	3.91	<2 [100]	31.8	1.6	31.3	-71.6	-9.75	-7.82	-15.48
SMC-33	<2	268	<2	<20	<20	72.1	62.5	0.13	0.5	166 [150]	46.7 [42.7]	2.5	59.9 [53.5	-79.0	-10.20	-7.03	-8.21
SMC-34	<2	434	<2	<20	<20	56.2	46.4	0.27	0.46	117 [100]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average values	**<2**	**95.1**	**<2**	**<20**	**<20**	**33.2**	**22.5**	**0.37**	**0.75**	**58.3**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
	SLD radiochem data in brackets [ ]: U, 238U, & 234U.																

Table 11. Environmental issues, data gaps, and suggested solutions for the San Mateo Creek area, New Mexico (p. 1 of 1).

Environmental Issue	Data Gap	Suggested Solution
1 Conceptual model of the hydrogeology of the SMC area, particularly the alluvial channel, is incomplete and poorly understood.	Surface-subsurface geology-hydrology not well known.	Geologic mapping + geologic cross sections to understand San Mateo Fault Zone, depth-width of alluvial channel, bedrock units cut by alluvial channel in hydraulic communication with Qal aquifer.
2. Conceptual model of the hydrology part of the SMC area is unknown. Is there seasonal flux in Qal aquifer SWLs? Is there still surface flow in SMC channel? Is there still recharge to Qal aquifer?	Static water levels (SWLs) not available: have levels returned to pre-mining conditions?	Manual + transducer/logger SWL data needed at various depths at various positions along + away from Qal channel. New borings & wells that also support No. 1 above.
3. Geochemical characterization of ground water systems off to good start, but hampered by existing wells: no choice but to sample existing wells. Wells not located or constructed for investigation objectives.	No control over well locations & screen zones to identify & sample discrete zones/aquifers w/ confidence-reliability.	Focus exploratory drilling, sampling, characterization, monitoring on Qal aquifer. Above-below state road 605-509 junction and above & below Qal well cluster north of HMC site. Conduct exploratory drilling in transect fashion in Qal channel above, across, & below areas of elevated water quality parameters (TDS, SO_4, NO_3, U, Se).
4. Geochemical understanding of sources of elevated major ions, trace metals unknown-poorly understood. Suspect-assume that legacy U mining-milling is source of elevated analytes.	Have not determined source of elevated TDS, Na, SO_4, NO_3, U, & Se.	Need more ground water sampling points w/ better control of location & discrete sample intervals. Confirm and expand geochemistry parameters: Nitrogen $\delta^{15}N$, sulfur $\delta^{34}S$, uranium isotopes ^{234}U:^{238}U; species or complexes of U, Se, Mo, Fe?
5. Confirm application of U isotopes to determine source of elevated U in Qal aquifer; source of Se, source of SO_4 using $\delta^{34}S$ isotope.	Need proof of concept that ratio ^{234}U:^{238}U can distinguish anthropogenic component.	Measure U isotopic ratio at 12-15 well locations to prove-disprove U milling raffinate waste water in Qal aquifer hypothesis. UNM, NM Tech, EPA, USGS, & possibly LANL to perform isotopic analysis & geochemical interpretation.
6. Mineralogy of Qal aquifer materials unknown. Do metals U + Se adsorb-desorb to gravels, sand, silt, clay layers? if clay layer surface coated w/ minerals – do metals mobilize downstream until they adsorp? If SWLs drop or rise, do metals go out of or back into solution?	Mineralogical data on Qal aquifer materials not available.	Collect various sieve size samples from various locations-depths for x-ray diffraction & geochemical assay to determine composition. Determine materials or zones that contained elevated metals and why.
7. Geochemical modeling of ground water should be long term objective to predict water quality changes, mixing of end members to predict resultant water.	USGS or university research modelers not available yet.	Circulate draft ground water report & future investigation work plans to agencies-entities with modeling capacity to seek-obtain their involvement.

Table 12. Comparison of average values of chemical parameters between ground water sample sets, Bluewater and San Mateo Creek areas, Grants Mineral Belt, New Mexico.

Chemical parameter	Tempera-ture (T) °C	Dissolved Oxygen (DO) mg/L	Specific Conduc-tance (SC) µS/cm	Oxidation Reduction Potential (ORP)	Field pH	Lab pH	Total Dissolved Solids (TDS) mg/L	Total anions meq/L	Total cations meq/L	Charge balance error	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Cl (mg/L)	SO_4 (mg/L)	HCO_3 (mg/L)	Ag (µg/L)
SMC averaged values w/o SMC-03, -04, & -05 & w BW-35	13.45	5.1	2092	45.9	7.49	7.7	1432	19.57	22.99	8.81	189.5	43.9	230	4.6	37	729	196	<10
BW averaged values w/o BW MWs & w/ SMC-03, -04, & -05	15.3	5.7	1475	117.4	7.07	7.4	1051	15.58	17.21	5.25	153.3	44.6	132	5.2	69	422	291	<10
Numerical difference between chemical averages for each group of samples	-1.85	-0.6	617	-71.5	0.42	0.3	381	3.99	5.78	3.56	36.2	-0.7	98	-0.6	-32	307	-95	0

Chemical parameter	Al (µg/L)	As (µg/L)	Ba (µg/L)	Be (µg/L)	Cd (µg/L)	Co (µg/L)	Cr (µg/L)	Cu (µg/L)	F (mg/L)	Fe (µg/L)	Hg (µg/L)	Mn (µg/L)	Mo (µg/L)	Ni (µg/L)	NO_3+NO_2 (mg/L)	Pb (µg/L)	Sb (µg/L)	Se (µg/L)
SMC averaged values w/o SMC-03, -04, & -05 & w BW-35	<100	8.8	30.9	<5	<5	<20	<10	<20	0.68	202.8	<0.2	71.5	no lab data	<20	5.91	<2	<2	101.8
BW averaged values w/o BW MWs & w/ SMC-03, -04, & -05	<100	2.8	20.1	<5	<5	<20	<20	<20	0.4	24.1	<0.2	<5	<2	<20	3.3	<2	<2	8.8
Numerical difference between chemical averages for each group of samples	0	6	10.8	0	0	0	0	0	0.28	178.7	0	69	0	0	2.61	0	0	93

Chemical parameter	Tl (µg/L)	V (µg/L)	Zn (µg/L)	Gross alpha (pCi/L)	Gross Beta (pCi/L)	^{226}Ra (pCi/L)	^{228}Ra (pCi/L)	U (µg/L)	^{238}U (pCi/L)	^{235}U (pCi/L)	^{234}U (pCi/L)	δ^{2}H per mil (‰)	δ^{18}O per mil (‰)	δ^{13}C per mil (‰)	δ^{34}S per mil (‰)
SMC averaged values w/o SMC-03, -04, & -05 & w BW-35	<2	<20	114.7	34.2	23.4	0.41	0.78	67.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BW averaged values w/o BW MWs & w/ SMC-03, -04, & -05	<2	<20	50.5	8.3	8.1	0.1	0.2	12.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Numerical difference between chemical averages for each group of samples	0	0	64.2	25.9	15.3	0.31	0.58	54.9	0	0	0	0	0	0	0