

Melrose

FOR OFFICIAL USE ONLY



**DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO**

11/20/06

Lieutenant Colonel Stephen D. Wood
Commander
506 N DL Ingram Blvd
Cannon AFB NM 88103-5323



Mr. David Cobrain
Chief Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Building 1
Santa Fe NM 87505-6303

Dear Mr. Cobrain

Enclosed for your review and records are two copies of the Analytical Results of Samples Collected 19, 20, 21, 22, and 23 June 2006 from ground water monitoring wells at Melrose Air Force Range, New Mexico, dated October 2006.

The purpose of this sampling is to provide annual groundwater quality data and groundwater altitude data to aid in the protection of the local aquifer.

If you have any questions regarding this information, please contact Ms. Kristi Doll, Environmental Flight, at (505) 784-1098 or email Kristi.doll@cannon.af.mil.

Sincerely

Stephen D. Wood
STEPHEN D. WOOD, Lt Col, USAF

Attachments:

Analytical Results of Samples Collected 19, 20, 21, 22, and 23 June 2006, Groundwater Monitoring At Melrose Air Force Range. (2 cys)

FOR OFFICIAL USE ONLY

United States Air Force

Ground-Water Monitoring at Melrose Air Force Range

Analytical Results of
Samples Collected June 19, 20, 21, 22, and 23, 2006

Prepared for
Cannon Air Force Base

October 2006

CONTENTS

	Page
Executive summary.....	1
Figure 1. Map of monitoring well network and ground-water altitude at Melrose Air Force Range, June 2006.....	2
Figure 2. Map of dissolved-solids concentrations in ground water at Melrose Air Force Range, June 2006.....	3
Table 1. Summary of field properties of ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.....	4
Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.....	6

APPENDIX I

Table I-1. Summary of organophosphorus pesticides and explosives that were not detected in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.....	I-2
---	-----

APPENDIX II

Laboratory Data validation checklist.....	II-2
Table II-1. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range.....	II-4
Table II-2. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range—notes.....	II-8
Appendix A—laboratory data validation checklist Instructions.....	II-9

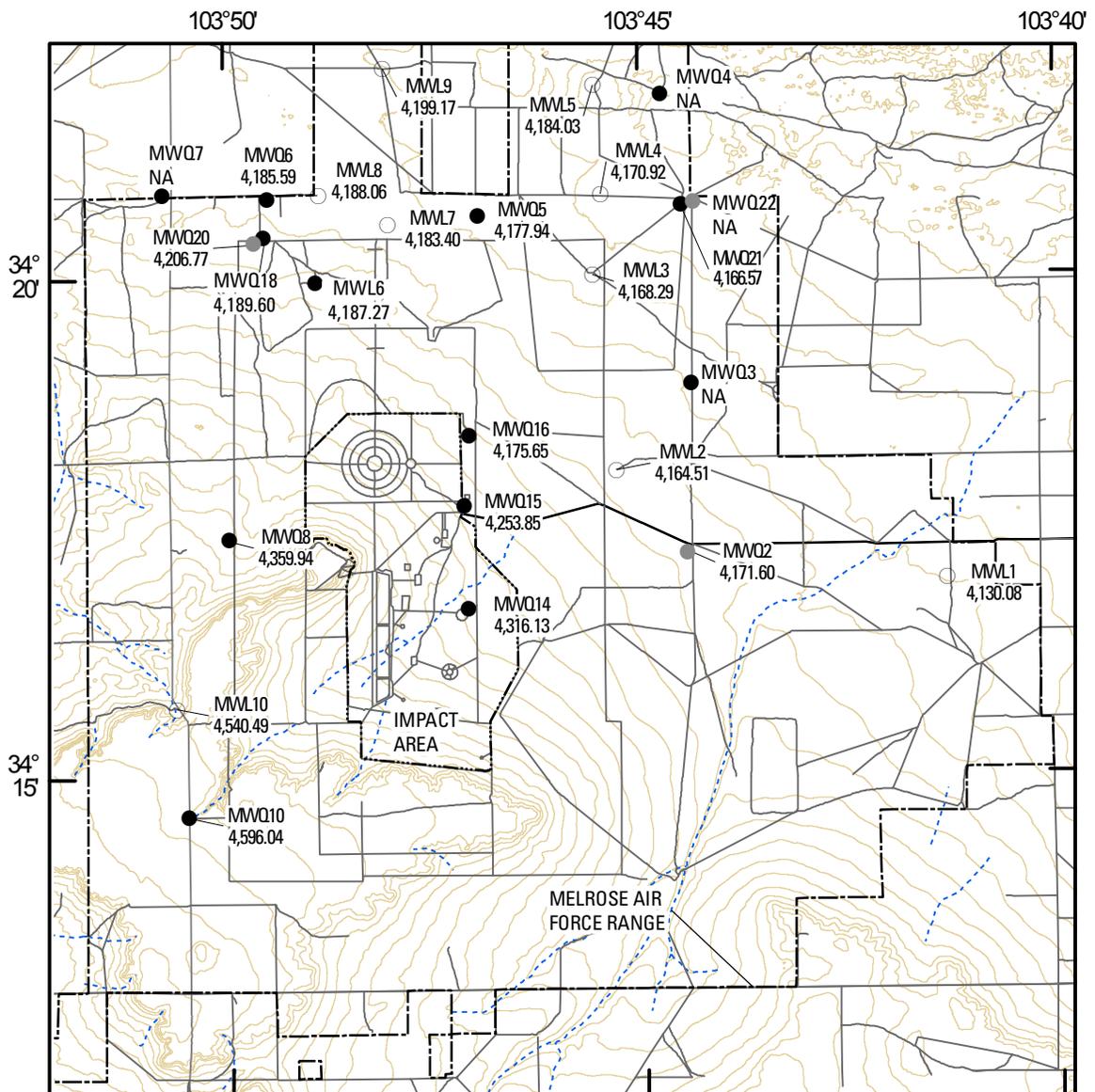
EXECUTIVE SUMMARY

The U.S. Geological Survey (USGS) New Mexico Water Science Center, in cooperation with the U.S. Air Force, is performing annual ground-water monitoring at Melrose Air Force Range (Range), New Mexico, for assessment and protection of the local aquifer. Current ground-water monitoring is an extension of the ground-water characterization completed at the Range by the USGS and the U.S. Air Force in 2002 and 2003. For the 2006 monitoring, ground-water quality samples were collected from 16 wells and ground-water altitude was measured in 21 wells (fig. 1). Water-quality monitoring wells included MWQ2, MWQ20, and MWQ22 completed in the Chinle Formation (Triassic age), and MWQ3–8, MWQ10, MWQ14–16, MWQ18, MWQ21, and MWL6 completed in the Ogallala Formation (Tertiary age). Ground-water-altitude monitoring was conducted at 12 of the 16 water-quality wells and also at wells MWL1–5 and MWL 7–10 (completed in the Ogallala Formation).

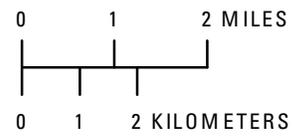
This report presents water-quality data for samples collected June 19–23, 2006, at the Range (table 2). Filtered ground-water samples were analyzed for trace and major elements (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc by method SW6020; aluminum, beryllium, boron, calcium, iron, lithium, magnesium, potassium, silica, sodium, and strontium by method SW6010B; mercury by method SW7470A; bromide, chloride, fluoride, and sulfate by method MCAWW300.0A), dissolved solids (method MCAWW160.1), organic carbon (method SW9060), alkalinity (method SW310.1), phosphorus (method MCAWW365.3), ammonia (method MCAWW350.1), nitrate plus nitrite (method MCAWW353.2), organophosphorus pesticides (method SW8141A), and explosives (method SW8330). Severn Trent Laboratories in Arvada, Colorado, conducted all laboratory analysis.

Water-quality results from the June 2006 sampling round were consistent with earlier data. Ground water in the Impact Area (fig. 1) continues to have a different water quality than ground water from the same formation in other parts of the Range. The differences include larger concentrations of dissolved solids (fig. 2) and major elements in ground water from wells MWQ14–16. Ground water from MWL6, located north of the Impact Area (fig. 1) also has larger concentrations of dissolved solids and major elements, and may represent the northern extent of different water quality in the Impact Area compared to the surrounding region.

Ground water from the Chinle Formation (MWQ2, MWQ20, and MWQ22) continues to have water-quality similarities with ground water from the Ogallala Formation in the Impact Area. The similarity of ground water from the Impact Area and the Chinle Formation may suggest interaction between the aquifers. The ground-water potentiometric surface of the aquifer in the Chinle Formation is at a higher altitude than the potentiometric surface of the aquifer in the Ogallala Formation for wells completed in the Chinle Formation (fig. 1).



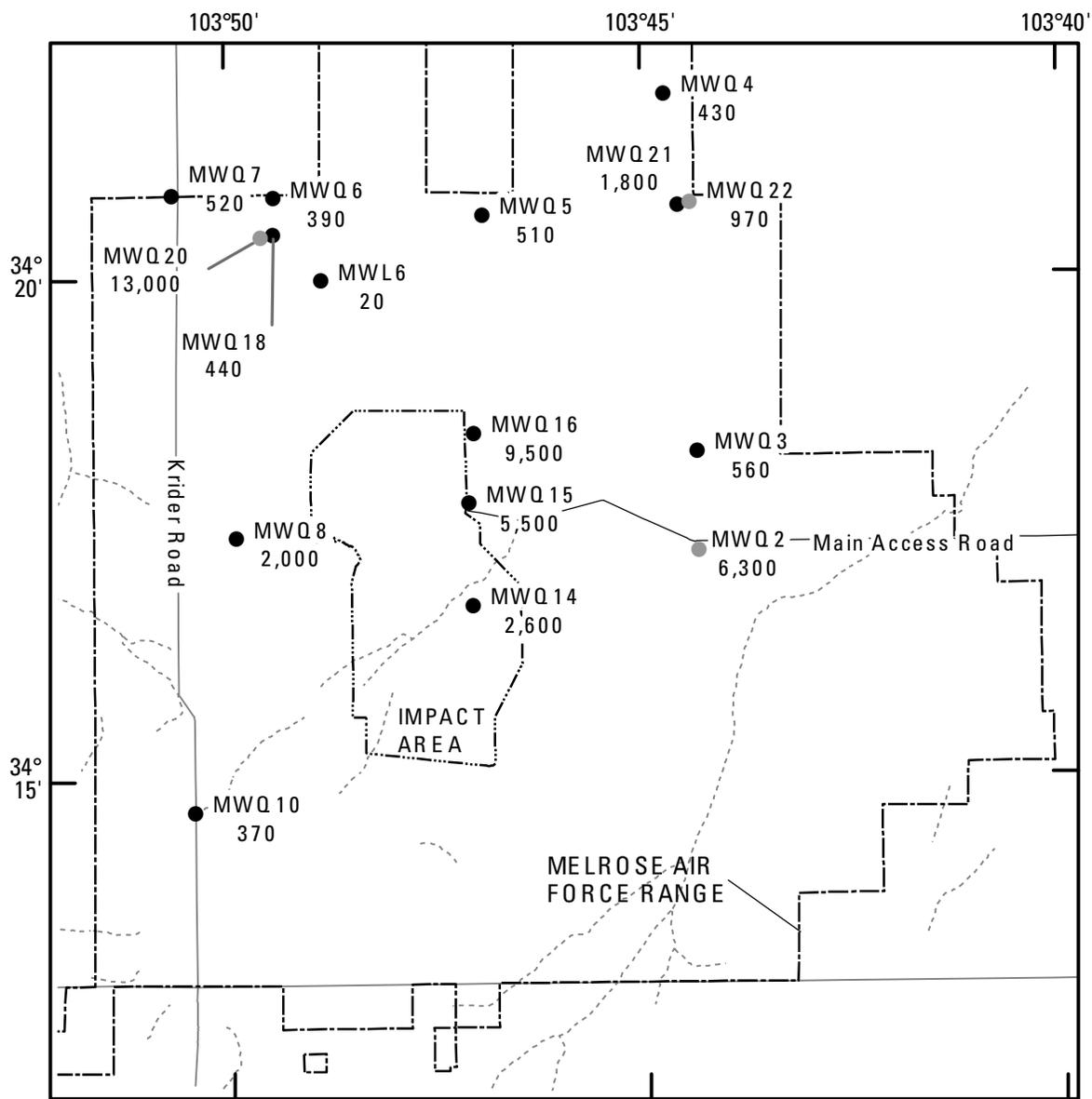
Base from U.S. Geological Survey digital data, 1994, 1:100,000
 Universal Transverse Mercator Zone 13N, NAD 83



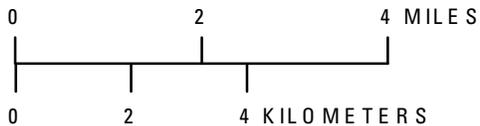
EXPLANATION

- Dirt road
- Paved road
- 4,700— Topographic contour—Contour interval is 20 feet. Vertical coordinate information is references to NAVD 88.
- MWQ10 4,596.04 Water-quality and water-altitude well—Top characters are the well site identifier and bottom number is the altitude of water level in feet above NAVD 88. Well is located in the Ogallala Formation.
- MWQ20 4,206.77 Water-quality and water-altitude well—Top characters are the well site identifier and bottom number is the altitude of water level in feet above NAVD 88. Well is located in the Chinle Formation.
- MWL10 4,540.49 Water-altitude well—Top characters are the well site identifier and bottom number is the altitude of water level in feet above NAVD 88. Well is located in the Ogallala Formation.
- NA Water-level measurement was unable to be collected because pump was on upon arrival at the well or the measurement was unable to be collected because of other well issues.

Figure 1. Monitoring well network and ground-water altitude at Melrose Air Force Range, June 2006.



Base from U.S. Geological Survey digital data, 1994, 1:100,000
 Universal Transverse Mercator Zone 13N, NAD 83



EXPLANATION

- MWQ 10 370 Well—Top characters are the well site identifier and bottom number is the dissolved solids concentration in milligrams per liter.
- Well completed in the Ogallala Formation.
- Well completed in the Chinle Formation.

Figure 2. Dissolved-solids concentrations in ground water at Melrose Air Force Range, June 2006.

Table 1. Summary of field properties of ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.

[°C, degrees Celsius; $\mu\text{S/cm}$, microsiemens per centimeter; mg/L , milligrams per liter; NTU , nephelometric turbidity units; **NA**, parameter not recorded]

Sample ID:	MWQ2		MWQ3		MWQ4		MWQ5	
Sample date & time:	6/21/2006	1725	6/23/2006	1210	6/22/2006	1225	6/21/2006	1235
Analytes	Result		Result		Result		Result	
FIELD PROPERTIES								
Temperature (°C)	25.4		18.6		18.0		18.1	
pH	7.45		7.59		7.33		7.41	
Specific conductance ($\mu\text{S/cm}$)	10,070		832		590		669	
Dissolved oxygen (mg/L)	0.25		6.34		7.40		6.78	
Turbidity (NTU)	164		NA		NA		NA	

Sample ID:	MWQ6		MWQ7		MWQ8		MWQ10	
Sample date & time:	6/20/2006	0915	6/19/2006	1555	6/19/2006	1300	6/19/2006	1100
Analytes	Result		Result		Result		Result	
FIELD PROPERTIES								
Temperature (°C)	18.6		18.6		NA		19.2	
pH	7.40		7.39		7.37		7.23	
Specific conductance ($\mu\text{S/cm}$)	596		785		3,360		592	
Dissolved oxygen (mg/L)	5.58		7.84		0.30		7.87	
Turbidity (NTU)	NA		0.27		NA		0.13	

Table 1. Summary of field properties of ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—concluded.

[°C, degrees Celsius; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; mg/L , milligrams per liter; **NTU**, nephelometric turbidity units; **NA**, not available]

Sample ID:	MWQ14	MWQ15	MWQ16	MWQ18
Sample date & time:	6/23/2006 0845	6/22/2006 1550	6/23/2006 1330	6/20/2006 1035
Analytes	Result	Result	Result	Result
FIELD PROPERTIES				
Temperature (°C)	20.6	23.4	23.5	21.1
pH	7.90	7.37	7.71	7.69
Specific conductance ($\mu\text{S}/\text{cm}$)	3,910	7,780	13,700	675
Dissolved oxygen (mg/L)	3.46	0.94	1.08	5.77
Turbidity (NTU)	1.95	1.39	3.22	0.18

Sample ID:	MWQ20	MWQ21	MWQ22	MWL6
Sample date & time:	6/22/2006 0820	6/21/2006 1240	6/21/2006 1010	6/22/2006 1230
Analytes	Result	Result	Result	Result
FIELD PROPERTIES				
Temperature (°C)	22.6	20.0	20.3	21.0
pH	7.47	7.26	7.94	7.42
Specific conductance ($\mu\text{S}/\text{cm}$)	18,700	NA	1,680	994
Dissolved oxygen (mg/L)	0.63	3.31	0.20	5.59
Turbidity (NTU)	3.01	10.30	0.49	9.50

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.

[**RL**, reporting limit; **mg/L**, milligrams per liter; **J**, the associated method blank contained the target analyte at a reportable limit; **Q**, Reporting limit is elevated due to high analyte levels; **B**, estimated concentration—detected below the reporting limit; **ND**, not detected]

Sample ID: Sample date & time:	MWQ2 6/21/2006 1725		MWQ3 6/23/2006 1210		MWQ4 6/22/2006 1225		MWQ5 6/21/2006 1235	
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
MAJOR ELEMENTS (mg/L)								
Calcium, SW6010B	170 J	0.2	33 J	0.2	46 J	0.2	43 J	0.2
Magnesium, SW6010B	110	0.2	36	0.2	21	0.2	23	0.2
Potassium, SW6010B	9.9	3	6.4	3	3.1	3	3.0	3
Sodium, SW6010B	2,000	5	91	5	57	5	67	5
Chloride, MCAWW300.0A	2,900 Q	300	69 Q	15	20	3.0	22	3.0
Silica, SW6010B	7.5	1.1	34	1.1	40	1.1	50	1.1
Strontium, SW6010B	9.7	0.01	2.2	0.01	0.91	0.01	1.1	0.01
Sulfate, MCAWW300.0A	1,100 J,Q	250	160 Q	25	62 J,Q	10	94 J,Q	25
Alkalinity, CaCO ₃ , MCAWW310.1	63	5.0	150	5.0	190	5.0	170	5.0
GENERAL CHEMISTRY (mg/L)								
Ammonia as N, MCAWW350.1	0.30	0.10	0.042 B	0.10	ND	0.10	0.061 B	0.10
Bromide, MCAWW300.0A	6.3	0.20	0.40	0.20	0.20	0.20	0.20	0.20
Fluoride, MCAWW300.0A	ND	0.50	2.0	0.50	1.8	0.50	2.4	0.50
Nitrate & Nitrite, MCAWW353.2	0.028 B	0.10	0.99	0.10	5.5	0.10	6.7	0.10
Organic Carbon, SW9060	0.97 B,J	1.0	0.56 B,J	1.0	0.49 B,J	1.0	0.64 B,J	1.0
Dissolved Solids, MCAWW160.1	6,300 Q	20	560	10	430	10	510	10
Perchlorate, DEN LC-0024 (µg/L)	0.017	0.010	9.1	1.0	3.6	0.20	4.1	0.50

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[**RL**, reporting limit; **µg/L**, micrograms per liter; **B**, estimated concentration—detected below the reporting limit; **ND**, not detected; **J**, the associated method blank contained the target analyte at a reportable limit]

Sample ID:	MWQ2		MWQ3		MWQ4		MWQ5	
Sample date & time:	6/21/2006	1725	6/23/2006	1210	6/22/2006	1225	6/21/2006	1235
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
TRACE ELEMENTS (µg/L)								
Aluminum, SW6010B	28 B	100	ND	100	19 B	100	23 B	100
Antimony, SW6020	ND	4.0	ND	2.0	ND	2.0	0.094 B	2.0
Arsenic, SW6020	4.2 B	10	11	5.0	6.9	5.0	7.3	5.0
Barium, SW6020	27 J	2.0	26 J	1.0	39 J	1.0	28 J	1.0
Boron, SW6010B	1,300	100	220	100	160	100	190	100
Chromium, SW6020	3.1 B,J	4.0	1.8 B,J	2.0	1.1 B,J	2.0	1.5 B,J	2.0
Cobalt, SW6020	1.1 B	2.0	0.10 B	1.0	0.12 B	1.0	0.12 B	1.0
Copper, SW6020	3.4 B	4.0	1.7 B	2.0	3.3	2.0	1.2 B	2.0
Iron, SW6010B	55 B,J	100	ND	100	32 B,J	100	ND	100
Lead, SW6020	ND	2.0	0.38 B	1.0	ND	1.0	0.22 B	1.0
Lithium, SW6010B	420	10	100	10	42	10	66	10
Manganese, SW6020	310	2.0	0.38 B	1.0	0.49 B	1.0	0.38 B	1.0
Molybdenum, SW6020	18	4.0	5.7	2.0	2.8	2.0	3.8	2.0
Nickel, SW6020	8.9 J	4.0	0.78 B,J	2.0	0.94 B,J	2.0	0.83 B,J	2.0
Selenium, SW6020	5.5 B	10	6.3	5.0	2.7 B	5.0	3.6 B	5.0
Uranium, SW6020	0.87 B	2.0	6.6	1.0	6.1	1.0	4.7	1.0
Vanadium, SW6020	2.4 B	10	78	5.0	52	5.0	60	5.0
Zinc, SW6020	4.7 B,J	20	5.2 B,J	10	12 J	10	11 J	10

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[**RL**, reporting limit; **mg/L**, milligrams per liter; **B**, estimated concentration—detected below the reporting limit; **J**, the associated method blank contained the target analyte at a reportable limit; **Q**, Reporting limit is elevated due to high analyte levels; **ND**, not detected; **G**, The reporting limit is elevated due to matrix interference.]

Sample ID: Sample date & time:	MWQ6		MWQ7		MWQ7-2		MWQ8	
	6/20/2006	0915	6/19/2006	1555	6/19/2006	1600	6/19/2006	1300
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
MAJOR ELEMENTS (mg/L)								
Calcium, SW6010B	39	0.2	56	0.2	56	0.2	46	0.2
Magnesium, SW6010B	18	0.2	23	0.2	23	0.2	17	0.2
Potassium, SW6010B	2.6 B	3	2.6 B	3	2.7 B	3	4.5	3
Sodium, SW6010B	60 J	5	74 J	5	75 J	5	710 J	5
Chloride, MCAWW300.0A	16	3.0	49	3.0	49 Q	6.0	490 Q	60
Silica, SW6010B	57	1.1	55	1.1	59	1.1	11	1.1
Strontium, SW6010B	0.84	0.01	1.00	0.01	1.10	0.01	1.40	0.01
Sulfate, MCAWW300.0A	81 J,Q	25	170 B,J,Q	250	150 J,Q	25	610 J,Q	100
Alkalinity, CaCO ₃ , MCAWW 310.1	160	5.0	150	5.0	150	5.0	360	5.0
GENERAL CHEMISTRY (mg/L)								
Ammonia as N, MCAWW350.1	ND	0.10	ND	0.10	0.056 B	0.10	0.78	0.10
Bromide, MCAWW300.0A	0.16 B	0.20	0.30	0.20	0.30	0.20	3.1	0.20
Fluoride, MCAWW300.0A	2.7	0.50	2.2 B,G	2.5	1.8	0.50	2.4	0.50
Nitrate & Nitrite, MCAWW353.2	4.9	0.10	1.8	0.10	1.8	0.10	0.061 B	0.10
Organic Carbon, SW9060	0.56 B,J	1.0	0.71 B,J	1.0	0.68 B,J	1.0	1.8 J	1.0
Phosphorus, MCAWW365.3	ND	0.050	ND	0.050	ND	0.050	0.085	0.050
Dissolved Solids, MCAWW160.1	390	10	520	10	520	10	2,000	10
Perchlorate, DEN LC-0024 (µg/L)	5.1	1.0	7.2	1.0	6.3	1.0	0.031	0.010

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[**RL**, reporting limit; **µg/L**, micrograms per liter; **ND**, not detected; **B**, estimated concentration—detected below the reporting limit; **J**, the associated method blank contained the target analyte at a reportable limit]

Sample ID: Sample date & time:	MWQ6		MWQ7		MWQ7-2		MWQ8	
	6/20/2006	0915	6/19/06	1555	6/19/2006	1600	6/19/2006	1300
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
TRACE ELEMENTS (µg/L)								
Aluminum, SW6010B	ND	100	ND	100	ND	100	25 B	100
Antimony, SW6020	ND	2.0	0.074 B	2.0	ND	2.0	ND	2.0
Arsenic, SW6020	6.7	5.0	5.8	5.0	5.7	5.0	4.3 B	5.0
Barium, SW6020	30 J	1.0	28 J	1.0	26 J	1.0	16 J	1.0
Boron, SW6010B	150	100	160	100	160	100	140	100
Chromium, SW6020	1.4 B,J	2.0	1.6 B,J	2.0	1.4 B,J	2.0	0.84 B,J	2.0
Cobalt, SW6020	0.12 B	1.0	0.15 B	1.0	0.15 B	1.0	1.9	1.0
Copper, SW6020	0.92 B	2.0	1.0 B	2.0	1.0 B	2.0	1.8 B	2.0
Iron, SW6010B	ND	100	ND	100	ND	100	45 B	100
Lead, SW6020	ND	1.0	ND	1.0	0.19 B	1.0	ND	1.0
Lithium, SW6010B	70	10	76	10	80	10	130	10
Manganese, SW6020	0.53 B	1.0	0.40 B	1.0	0.40 B	1.0	380	1.0
Molybdenum, SW6020	2.4	2.0	4.8	2.0	4.5	2.0	8.9	2.0
Nickel, SW6020	1.2 B,J	2.0	0.51 B,J	2.0	0.67 B,J	2.0	3.1 J	2.0
Selenium, SW6020	2.5 B	5.0	5.3	5.0	5.0	5.0	6.0	5.0
Uranium, SW6020	3.7	1.0	3.5	1.0	3.5	1.0	2.5	1.0
Vanadium, SW6020	53	5.0	51	5.0	49	5.0	1.8 B	5.0
Zinc, SW6020	15 J	10	6.5 B,J	10	6.5 B,J	10	4.5 B,J	10

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[**RL**, reporting limit; **mg/L**, milligrams per liter; **J**, the associated method blank contained the target analyte at a reportable limit; **Q**, Reporting limit is elevated due to high analyte levels; **B**, estimated concentration—detected below the reporting limit; **ND**, not detected; **G**, The reporting limit is elevated due to matrix interference]

Sample ID:	MWQ10		MWQ14		MWQ15		MWQ16	
Sample date & time:	6/19/2006	1100	6/23/2006	0845	6/22/2006	1550	6/23/2006	1330
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
MAJOR ELEMENTS (mg/L)								
Calcium, SW6010B	50	0.2	82 J	0.2	140 J	0.2	350 J	0.2
Magnesium, SW6010B	35	0.2	76	0.2	110	0.2	310	0.2
Potassium, SW6010B	5.6	3	13	3	12	3	21	3
Sodium, SW6010B	18 J	5	650	5	1,600	5	2,600	5
Chloride, MCAWW300.0A	12	3.0	640 Q	60	1,500 Q	150	3,900 Q	300
Silica, SW6010B	39	1.1	12	1.1	15	1.1	7.9	1.1
Strontium, SW6010B	2.9	0.01	4.0	0.01	5.7	0.01	16	0.01
Sulfate, MCAWW300.0A	37 J	5.0	970 Q	100	2,000 Q	250	2,200 Q	250
Alkalinity, MCAWW310.1	210	5.0	130	5.0	150	5.0	56	5.0
GENERAL CHEMISTRY (mg/L)								
Ammonia as N, MCAWW350.1	0.031 B	0.10	ND	0.10	0.070 B	0.10	0.042 B	0.10
Bromide, MCAWW310.1	0.16 B	0.20	5.0 G	0.40	8.9 G	1.0	8.9 G	1.0
Fluoride, MCAWW300.0A	0.98	0.50	2.8 G	1.0	1.9 B,G	2.5	0.69 B,G	2.5
Nitrate & Nitrite, MCAWW353.2	9.3 Q	0.40	3.1	0.10	6.4	0.10	0.71	0.10
Organic Carbon, SW9060	0.60 B,J	1.0	0.73 B,J	1.0	6.1 J	1.0	0.42 B,J	1.0
Phosphorus, MCAWW365.3	ND	0.050	0.10	0.050	ND	0.050	ND	0.050
Dissolved Solids, MCAWW160.1	370	10	2,600	10	5,500 Q	20	9,500 Q	100
Perchlorate, DEN LC-0024 (µg/L)	0.32	0.010	5.8	1.0	27	2.0	2.9	0.20

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[**RL**, reporting limit; **µg/L**, micrograms per liter; **ND**, not detected; **B**, estimated concentration—detected below the reporting limit; **J**, the associated method blank contained the target analyte at a reportable limit]

Sample ID:	MWQ10		MWQ14		MWQ15		MWQ16	
Sample date & time:	6/19/2006	1100	6/23/2006	0845	6/22/2006	1550	6/23/2006	1330
Analytes and Method	Result	RL	Result	RL	Result	RL	Result	RL
TRACE ELEMENTS (µg/L)								
Aluminum, SW6010B	ND	100	39 B	100	ND	100	39 B	100
Antimony, SW6020	ND	2.0	0.16 B	2.0	0.30 B	4.0	1.1 B	10
Arsenic, SW6020	4.8 B	5.0	6.8	5.0	12	10	5.4 B	25
Barium, SW6020	120 J	1.0	12 J	1.0	11 J	2.0	14 J	5.0
Boron, SW6010B	88 B	100	1,700	100	1,700	100	1,700	100
Cadmium, SW6020	ND	1.0	0.056 B	1.0	ND	2.0	ND	5.0
Chromium, SW6020	0.86 B,J	2.0	2.1 J	2.0	2.9 B,J	4.0	5.4 B,J	10
Cobalt, SW6020	0.18 B	1.0	0.54 B	1.0	0.75 B	2.0	1.2 B	5.0
Copper, SW6020	1.7 B	2.0	2.6	2.0	5.9	4.0	6.0 B	10
Lead, SW6020	0.55 B	1.0	ND	1.0	ND	2.0	ND	5.0
Lithium, SW6010B	44	10	240	10	470	10	520	10
Manganese, SW6020	ND	1.0	2.4	1.0	32	2.0	46	5.0
Molybdenum, SW6020	4.6	2.0	28	2.0	14	4.0	11	10
Nickel, SW6020	1.9 B,J	2.0	5.2 J	2.0	4.4 J	4.0	11 J	10
Selenium, SW6020	2.0 B	5.0	32	5.0	160	10	28	25
Uranium, SW6020	12	1.0	21	1.0	28	2.0	3.7 B	5.0
Vanadium, SW6020	37	5.0	5.1	5.0	10	10	8.9 B	25
Zinc, SW6020	10 J	10	9.8 B,J	10	7.0 B,J	20	ND	50

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—continued.

[RL, reporting limit; mg/L, milligrams per liter; J, the associated method blank contained the target analyte at a reportable limit; Q, Reporting limit is elevated due to high analyte levels; B, estimated concentration—detected below the reporting limit; ND, not detected]

Sample ID:	MWQ18		MWQ20		MWQ21		MWQ22		MWL6	
Sample date & time:	6/20/2006	1035	6/22/2006	0820	6/21/2006	1240	6/21/2006	1010	6/22/2006	1230
Analytes and Method	Result	RL								
MAJOR ELEMENTS (mg/L)										
Calcium, SW6010B	42	0.2	550 J	0.2	180 J	0.2	29 J	0.2	71 J	0.2
Magnesium, SW6010B	19	0.2	330	0.2	85	0.2	12	0.2	35	0.2
Potassium, SW6010B	3.2	3	17	3	12	3	3.0	3	4.5	3
Sodium, SW6010B	73 J	5	3,300	5	210	5	300	5	72	5
Chloride, MCAWW300.0A	38	3.0	6,800 Q	600	160 Q	15	280 Q	30	130 Q	3.0
Silica, SW6010B	58	1.1	9.3	1.1	49	1.1	9.7	1.1	48	1.1
Strontium, SW6010B	0.99	0.01	28	0.1	3.6	0.01	0.73	0.01	1.70	0.01
Sulfate, MCAWW300.0A	100 J,Q	25	1,600 J,Q	250	800 J,Q	100	220 J,Q	10	210 B,J,Q	250
Alkalinity, MCAWW310.3	170	5.0	52	5.0	220	5.0	140	5.0	120	5.0
GENERAL CHEMISTRY (mg/L)										
Ammonia as N, MCAWW350.1	0.031 B	0.10	0.46	0.10	ND	0.10	0.030 B	0.10	0.071 B	0.10
Bromide, MCAWW300.0A	0.23	0.20	ND	0.20	1.2	0.20	0.78	0.20	0.64	0.20
Fluoride, MCAWW300.0A	1.8	0.50	ND	0.50	2.5	0.50	1.1	0.50	1.4	0.50
Nitrate & Nitrite, MCAWW353.2	0.58	0.10	0.051 B	0.10	1.4	0.10	0.56	0.10	0.62	0.10
Organic Carbon, SW9060	0.52 B,J	1.0	0.66 B,J	1.0	1.9 J	1.0	2.1 J	1.0	0.67 B,J	1.0
Phosphorus, MCAWW365.3	ND	0.050								
Dissolved Solids, MCAWW160.1	440	10	13,000 Q	100	1,800	10	970	10	20	10
Perchlorate, DEN LC-0024 (µg/L)	7.1	1.0	0.0085 B	0.010	6.7	0.50	2.1	0.20	11	1.0

Table 2. Summary of analyte concentrations in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—concluded.

[RL, reporting limit; µg/L, micrograms per liter; ND, not detected; B, estimated concentration—detected below the reporting limit; J, the associated method blank contained the target analyte at a reportable limit]

Sample ID:	MWQ18		MWQ20		MWQ21		MWQ22		MWL6	
Sample date & time:	6/20/2006	1035	6/22/2006	0820	6/21/2006	1240	6/21/2006	1010	6/22/2006	1230
Analytes and Method	Result	RL								
TRACE ELEMENTS (µg/L)										
Aluminum, SW6010B	ND	100	33 B	100	250	100	23 B	100	ND	100
Antimony, SW6020	ND	2.0	ND	10	0.093 B	2.0	0.24 B	2.0	ND	2.0
Arsenic, SW6020	8.2	5.0	3.1 B	25	6.6	5.0	1.8 B	5.0	7.4	5.0
Barium, SW6020	31 J	1.0	24 J	5.0	39 J	1.0	30 J	1.0	24 J	1.0
Boron, SW6010B	180	100	1,200	100	340	100	720	100	180	100
Cadmium, SW6020	ND	1.0	ND	5.0	0.040 B	1.0	ND	1.0	ND	1.0
Chromium, SW6020	2.2 J	2.0	6.0 B,J	10	1.4 B,J	2.0	0.90 B,J	2.0	1.0 B,J	2.0
Cobalt, SW6020	0.21 B	1.0	2.7 B	5.0	0.50 B	1.0	0.21 B	1.0	0.33 B	1.0
Copper, SW6020	0.67 B	2.0	5.4 B	10	2.4	2.0	0.83 B	2.0	1.0 B	2.0
Iron, SW6010B	ND	100	39 B,J	100	1,000 J	100	86 B,J	100	0.52 J	100
Lithium, SW6010B	78	10	720	10	190	10	79	10	92	10
Manganese, SW6020	0.33 B	1.0	870	5.0	3.3	1.0	220	1.0	68	1.0
Molybdenum, SW6020	5.1	2.0	16	10	8.0	2.0	8.4	2.0	2.1	2.0
Nickel, SW6020	2.1 J	2.0	18 J	10	3.1 J	2.0	0.89 B,J	2.0	2.6 J	2.0
Selenium, SW6020	3.7 B	5.0	5.5 B	25	12	5.0	7.2	5.0	9.4	5.0
Uranium, SW6020	4.3	1.0	0.89 B	5.0	110	1.0	21	1.0	3.1	1.0
Vanadium, SW6020	62	5.0	4.8 B	25	41	5.0	26	5.0	50	5.0
Zinc, SW6020	5.8 B,J	10	20 B,J	50	11 J	10	4.3 B,J	10	7.1 B,J	10
ANTHROPOGENIC COMPOUND (µg/L)										
RDX, SW8330	ND	0.25	ND	0.25	ND	0.25	0.22 B	0.25	ND	0.25

APPENDIX I

Table I-1. Summary of organophosphorus pesticides and explosives that were not detected in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico.

[RL, reporting limit; µg/L, micrograms per liter]

Analyte		Units	RL	Wells
Organophosphorus pesticides:				
Azinphos-methyl	SW846 8141A	µg/L	2.5	All wells
Bolstar	SW846 8141A	µg/L	1.0	All wells
Chlorpyrifos	SW846 8141A	µg/L	0.50	All wells
Coumaphos	SW846 8141A	µg/L	1.0	All wells
Demeton	SW846 8141A	µg/L	1.0	All wells
Diazinon	SW846 8141A	µg/L	0.50	All wells
Dichlorvos	SW846 8141A	µg/L	0.50	All wells
Dimethoate	SW846 8141A	µg/L	0.50	All wells
Disulfoton	SW846 8141A	µg/L	0.50	All wells
EPN	SW846 8141A	µg/L	1.2	All wells
Ethoprop	SW846 8141A	µg/L	0.50	All wells
Famphur	SW846 8141A	µg/L	1.0	All wells
Fensulfothion	SW846 8141A	µg/L	2.5	All wells
Fenthion	SW846 8141A	µg/L	2.5	All wells
Malathion	SW846 8141A	µg/L	1.2	All wells
Merphos	SW846 8141A	µg/L	5.0	All wells
Methyl parathion	SW846 8141A	µg/L	4.0	All wells
Mevinphos	SW846 8141A	µg/L	6.2	All wells
Naled	SW846 8141A	µg/L	0.8	All wells
Ethyl parathion	SW846 8141A	µg/L	1.0	All wells
Phorate	SW846 8141A	µg/L	1.2	All wells
Ronnel	SW846 8141A	µg/L	10	All wells
Sulfotepp	SW846 8141A	µg/L	0.50	All wells
Thionazin	SW846 8141A	µg/L	0.50	All wells
Tokuthion	SW846 8141A	µg/L	1.6	All wells
Trichloronate	SW846 8141A	µg/L	0.50	All wells
O,O,O-Triethylphosphorothioate	SW846 8141A	µg/L	0.50	All wells

Table I-1. Summary of organophosphorus pesticides and explosives that were not detected in ground water collected June 19–23, 2006, from monitoring wells at Melrose Air Force Range, New Mexico—concluded.

[RL, reporting limit; µg/L, micrograms per liter]

Analyte	Method	Units	RL	Wells
Explosives:				
2-Amino-4,6-dinitrotoluene	SW846 8330	µg/L	0.25	All wells
4-Amino-2,6-dinitrotoluene	SW846 8330	µg/L	0.25	All wells
1,3-Dinitrobenzene	SW846 8330	µg/L	0.25	All wells
2,4-Dinitrotoluene	SW846 8330	µg/L	0.25	All wells
2,6-Dinitrotoluene	SW846 8330	µg/L	0.25	All wells
HMX	SW846 8330	µg/L	0.25	All wells
Nitrobenzene	SW846 8330	µg/L	0.25	All wells
2-Nitrotoluene	SW846 8330	µg/L	0.25	All wells
3-Nitrotoluene	SW846 8330	µg/L	0.25	All wells
4-Nitrotoluene	SW846 8330	µg/L	0.40	All wells
Tetryl	SW846 8330	µg/L	0.50	All wells
1,3,5-Trinitrobenzene	SW846 8330	µg/L	0.25	All wells
2,4,6-Trinitrobenzene	SW846 8330	µg/L	0.25	All wells

APPENDIX II

USGS Laboratory Quality Assurance/Quality Control Results

LABORATORY DATA VALIDATION CHECKLIST

SECTION 1.0: GENERAL INFORMATION

Data reviewer(s) name, affiliation, title, and date of review:
Jeff Langman, USGS-NMWSC, Hydrologist 10/09/06

Data Inventory

1.1 Sample project number: Severn Trent No's. D6F210360, D6F230375, D6F240128

1.2 Operable unit and site: Melrose Air Force Range
Sample collection date: June 19, 20, 21, 22 and 23, 2006

1.3 Sample locations (location IDs): MWQ2, MWQ3, MWQ4, MWQ5, MWQ6, MWQ7,

1.4 MWQ7-2 (duplicate), MWQ8, MWQ10, MWQ14, MWQ15, MWQ16, MWQ18,

1.5 MWQ20, MWQ21, MWQ22, MWL6, and MWQ-EQB (equipment blank).

1.4 Sample matrix (ground water, soil, other): filtered ground water

1.5 Type and number of field samples (environmental and quality control) in sample project:

Type	number	Type	number
environmental	16	MS/MSD	1 pair
field duplicate	1	trip blank	1
equipment blank	1	ambient blank	0

Data validation level: LEVEL 1, see appendix A for description of different levels

SECTION 2.0: DATA REPORTS AND COMPLETENESS

Data reviewer(s) name, affiliation, title, and date of review:
Jeff Langman, USGS-NMWSC, Hydrologist 10/09/06

Laboratory Data Reports

2.1 Analytical Results Report—report date: August 3, 2006

2.2 Raw Data Report—number of volumes: Raw data not reviewed

2.3 Was completeness of lab reports acceptable? Yes √ No _____

(overview, analytical results, quality-control report)

Data Completeness

2.4 Were all samples requested on chain of custody form analyzed by lab? Yes ✓ No

	Alkalinity	Dissolved Solids	Anions	Ammonia
requested:	18	18	18	18
analyzed:	18	18	18	18

	Nitrate-Nitrite	Phosphorus	Organic Carbon	Metals
requested:	18	18	18	18
analyzed:	18	18	18	18

	Perchlorate	Explosives	Pesticides	Mercury
requested:	18	18	18	18
analyzed:	18	18	18	18

2.5 List cancelled analyses on cancelled-data worksheet: none

2.6 Were sample cooler seals intact upon receipt by lab? Yes

2.7 What were the sample cooler temperatures upon receipt by lab? 0.1–4.6 °C at Severn Trent

SECTION 3.0: DATA VALIDATION REVIEW

In the following table (Table II-1), the resulting data from the June 19–23, 2006, sampling round is reviewed for the following data validation parameters: holding times, surrogate spike recovery, field duplicates, equipment blanks, lab control samples, lab method blanks, matrix spike and duplicates, and results over the reporting limits with qualifiers. Data validation parameters are reviewed for compliance with individual requirements for each parameter specific to the individual analyses of alkalinity (MCAWW310.1), dissolved solids (MCAWW160.1), anions (including chloride, fluoride, bromide and sulfate) (MCAWW300.0A), ammonia (MCAWW350.1), nitrate-nitrite (MCAWW353.2), phosphorus (MCAWW365.3), organic carbon (SW9060), metals (SW6010B and SW6020), perchlorate (DEN LC-0024), explosives (SW8330), organophosphorus pesticides (SW8141A), and mercury (SW7470A).

Table II-1. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range—validation parameters, analytes, and methods (USEPA, 1994a; USEPA, 1994b; USGS, 1992).

Data Validation Parameters	Alkalinity by Method MCAWW 310.1	Dissolved Solids by Method MCAWW160.1	Anions (including Chloride, Fluoride, and Bromide, and Sulfate) by Method MCAWW300.0A
<i> Holding times </i>	14 days sample to analysis	7 days sample to analysis	28-days sample to analysis
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Surrogate Spike Recovery </i>	Not Applicable	Not Applicable	Not Applicable
Met			
<i> Field Duplicates </i>	RPD <20%	RPD <30%	RPD <30%
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Equipment Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Control Samples </i>	%R and RPD within 3 SD of historical laboratory performance	%R and RPD within 3 SD of historical laboratory performance	%R and RPD within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Method Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Matrix Spike and Duplicates </i>	% R and RPD within 3 SD of historical laboratory performance	% R and RPD within 3 SD of historical laboratory performance	% R and RPD within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes
<i> Results over RL with Qualifiers </i>	List: None	List: The reporting limit was elevated due to large analyte levels in MWQ-2, 15, 16, 20.	List: Reporting limit elevated due to large chloride and sulfate levels in select samples. The method blank contained sulfate at a reportable level for select samples. Reporting limit elevated due to matrix interference for bromide in MWQ-14, 15, and 16; and fluoride in MWQ-14.

Table II-1. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range—validation parameters, analytes, and methods (USEPA, 1994a; USEPA, 1994b; USGS, 1992)—continued.

Data Validation Parameters	Ammonia by Method MCAWW350.1	Nitrate-Nitrite by Method MCAWW353.2	Phosphorus by Method MCAWW365.3
<i> Holding times </i>	28-days sample to analysis	28-days sample to analysis	28-days sample to analysis
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Surrogate Spike Recovery </i>	Not Applicable	Not Applicable	Not Applicable
Met			
<i> Field Duplicates </i>	RPD <30%	RPD <30%	RPD <30%
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Equipment Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Control Samples </i>	%R and RPD within 3 SD of historical laboratory performance	%R and RPD within 3 SD of historical laboratory performance	%R and RPD within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Method Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Matrix Spike and Duplicates </i>	% R within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Results over RL with Qualifiers </i>	List: None	List: The reporting limit for MWQ10 was elevated due to high analyte levels	List: None

Table II-1. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range—validation parameters, analytes, and methods (USEPA, 1994a; USEPA, 1994b; USGS, 1992)—continued.

Data Validation Parameters	Organic Carbon by Method SW9060	Metals by Methods SW6010B and SW6020	Perchlorate by Method DEN-LC-0024
<i> Holding times </i>	28 days sample to analysis	180 days sample to analysis	28 days sample to analysis
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Surrogate Spike Recovery </i>	Not Applicable	Not Applicable	Not Applicable
Met			
<i> Field Duplicates </i>	RPD <30%	RPD <30%	RPD <30%
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Equipment Blanks </i>	≤ RL	≤ 2 X RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes
<i> Lab Control Samples </i>	% R within 3 SD of historical laboratory performance	%R and RPD within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Method Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Matrix Spike and Duplicates </i>	% R within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Results over RL with Qualifiers </i>	List: The associated method blank contains the target analyte at a reportable level for MWQ-8, 15, 21, and 22.	List: Samples reported method blank contamination Ba, Ca, Cr, Fe, Na, Ni., Zn. for select wells.	List: None

Table II-1. Data validation worksheet table for June 19 to 23, 2006 sampling round at Melrose Air Force Range—validation parameters, analytes, and methods (USEPA, 1994a; USEPA, 1994b; USGS, 1992)—concluded.

Data Validation Parameters	Explosives by Method SW8330	Organophosphorus pesticides by Method SW8141A	Mercury by Method SW7470A
<i> Holding times </i>	7 days sample to extraction, 40 days sample to analysis	7 days sample to extraction, 40 days sample to analysis	28 days sample to analysis
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Surrogate Spike Recovery </i>	% R within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance	Not Applicable
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	
<i> Field Duplicates </i>	RPD <30%	RPD <30%	RPD <30%
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Equipment Blanks </i>	≤ 3 X RL	≤ RL	≤ 2 X RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Control Samples </i>	% R and RPD within 3 SD of historical laboratory performance	% R and RPD within 3 SD of historical laboratory performance	% R within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Lab Method Blanks </i>	≤ RL	≤ RL	≤ RL
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes
<i> Matrix Spike and Duplicates </i>	% R and RPD within 3 SD of historical laboratory performance	% R and RPD within 3 SD of historical laboratory performance	% R and RPD within 3 SD of historical laboratory performance
Met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No, see notes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, see notes
<i> Results over RL with Qualifiers </i>	List: None	List: None.	List: None.

Table II-2. Data validation worksheet table for June 19–23, 2006 sampling round at Melrose Air Force Range—notes.

Analyte and method:	Notes of data validation parameters:
Alkalinity, MCAWW310.1	-None
Dissolved solids, MCAWW160.1	-Holding time for MWQ-EB was not met.
Chloride, fluoride, bromide, and sulfate, 300.0A	-The matrix spike and matrix spike duplicate percent recovery for chloride was outside control limits for one of the batch analyses.
Ammonia, MCAWW350.1	-None
Nitrate and nitrite, MCAWW353.2	-None
Phosphorus, MCAWW365.3	-None
Dissolved organic carbon, SW9060	-None
Metals, SW6010B/SW6020	-The percent recovery for lithium in the matrix spike was outside control limits. The percent recovery for the matrix spike duplicate was within limits.
Perchlorate, DEN-LC-0024	-Equipment blank (MWQ-EB) returned a result higher than RL.
Explosives, SW8330	-None
Organophosphorus pesticides, SW8141A	-Samples MWQ-4, 5, and 21 exceeded their holding time for a second analysis, which was required because the first analysis indicated the surrogate was outside recovery limits. Results from both analyses indicated no pesticide detections.
Mercury, SW7470A	-The matrix spike and matrix spike duplicate percent recoveries were outside laboratory control limits.

Appendix A—Laboratory Data Validation Checklist

Instruction Notes for the Data Validation Checklist

This data validation checklist will be used when validating the chemical analytical results. Data validation is a systematic and independent verification of data quality and consists of checking, verifying, evaluating, and qualifying, the chemical analytical results.

Two different levels of data validation are used with level I being not as detailed or as rigorous as level II. Level I data validation includes: (1) checking holding times limits, (2) evaluating the results of field and laboratory quality control (QC) samples such as field replicates, matrix spikes, surrogate samples, and duplicate control samples, and (3) checking that contamination during sample processing has not occurred in QC blanks such as equipment, method, ambient, and trip blanks. Most of the information and data used to conduct a level I data validation is contained in the summary-data reports prepared by the reporting laboratory. Level II data validation includes all the level I guidelines plus using the raw-data reports prepared by the reporting laboratory to: (1) check that laboratory instruments have been properly tuned and calibrated, and (2) verify that selected sample results do not have any omissions, problems, discrepancies, transcription errors, and reduction (dilution, conversion) errors.

Field samples (environmental and QC) are processed and analyzed by the reporting laboratory in specific groups of samples called sample projects (also called sample cases). A sample project usually consists of 20 or fewer samples that are collected from one or more sampling locations (monitoring well) in a given sampling period. Numerous laboratory QC samples also are analyzed with the field samples for each sample project.

This data validation checklist is designed to be used when validating the analytical results for a given sample project and it has a multi-level organization. The first part of the checklist contains general information (section 1.0) about the scope (who, when, how, and what) of the data validation and data reports and completeness (section 2.0) for each sample project. Sections 1.0 and 2.0 will be completed and included with all data validation checklists. The data validation checklist also contains numerous supplemental sections that are listed at the bottom of the first page of this document. These supplemental checklist sections are used for specific analytical methods and will be marked with a checkmark (√) when they are completed for a given sample project. Specific project-required frequency and QC acceptance criteria and pertinent reference page numbers are listed with most of the checklist items. The Major data-validation references are the USEPA guidance documents (USEPA 1994).

References

USEPA, 1994a, USEPA Contract laboratory program national functional guidelines for organic data review, February 1994, Publication 9240.1-05, Document number PB94-963501, 124 p.

USEPA, 1994b, USEPA Contract laboratory program national functional guidelines for inorganic data review, February 1994, Publication 9240.1-05-01, Document number PB94-963502, 42 p.

USGS, 1992, Laboratory data validation checklist: Wyoming District, U.S. Geological Survey checklist prepared for the U.S. Air Force, multiple pages.