

Table 2.4-3. Field and Laboratory Blank Tables
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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank) LDC Report# 455614	Calcium Iron Magnesium Sodium	7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All samples in SDG G9L080300: TNT-1C6A/0 TNT-1C6A/0.5 TNT-1C6A/1 TNT-1C6A/2 TNT-1C7A/0 TNT-1C7A/1 TNT-1C7A/1.5 TNT-1C4A/0 TNT-1C4A/1
PB (prep blank)	Aluminum Calcium Iron Magnesium Sodium	2.6 mg/Kg 7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All soil samples in SDG G9L080235: RSP 8 RSP 1
PB (prep blank)	Copper Sodium	0.0031 mg/L 0.039 mg/L	All water samples in SDG G9L080235: RSP1/K3
ICB/CCB LDC Report# 4556C4	Manganese	0.00325 mg/L	All samples in SDG G9L080235: RSP1/K3 RSP 8 RSP 1
PB (prep blank) LDC Report# 4556D4	Aluminum Calcium Iron Manganese Sodium	2.6 mg/Kg 7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All samples in SDG G9L080242: RSP 9 RSP 6 RSP 7
PB (prep blank) LDC Report# 4556E4	Aluminum Calcium Iron Magnesium Sodium	2.6 mg/Kg 7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All samples in SDG G9L080248: HF-2/5 HF-2/5.5 HF-2A/0.5 HF-2/10.5
PB (prep blank) LDC Report# 4556F4	Aluminum Calcium Iron Magnesium Sodium	2.6 mg/Kg 7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All samples in SDG G9L080262: TNT-1C5A/0 TNT-1C3A/0 TNT-1C3A/1 TNT-1C3A/2 TNT-1C6/4.5 TNT-1C4/3.5
PB (prep blank) LDC Report# 4556G4	Aluminum Calcium Iron Magnesium Sodium	2.6 mg/Kg 7.1 mg/Kg 1.0 mg/Kg 2.5 mg/Kg 5.9 mg/Kg	All samples in SDG G9L080277: RSP-2 RSP-2A

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank) LDC Report# 4556H4	Barium Sodium	0.21 mg/Kg 16.1 mg/Kg	All samples in SDG G9L080293: RSP-4 RSP-3
PB (prep blank) LDC Report# 4556I4	Barium Sodium	0.21 mg/Kg 16.1 mg/Kg	All samples in SDG G9L080300: TNT-1C6A/0 TNT-1C6A/0.5 TNT-1C6A/1 TNT-1C6A/2 TNT-1C7A/0 TNT-1C7A/1 TNT-1C7A/1.5 TNT-1C4A/0 TNT-1C4A/1
PB (prep blank)	Calcium Iron Sodium	5.6 mg/Kg 0.18 mg/Kg 6.5 mg/Kg	All soil samples in SDG G9L090246: HF 1/5 HF 1A/0.5 HF 1A/1 HF 3/5.5 HF 3/10.5 HF 3/15.5 HF 3/20.5 HF 3A/0.5 RSP 5
PB (prep blank)	Copper Sodium	0.0031 mg/L 0.039 mg/L	All water samples in SDG G9L090246: HF 3/K RSP5/K3
ICB/CCB LDC Report# 4556J4	Manganese	0.00325 mg/L	All samples in SDG G9L090246: HF 1/5 HF 1A/0.5 HF 1A/1 HF 3/5.5 HF 3/10.5 HF 3/15.5 HF 3/20.5 HF 3/K HF 3A/0.5 RSP5/K3 RSP 5

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Calcium Copper Iron Lead Magnesium Sodium	9.4 mg/Kg 8.0 mg/Kg 0.44 mg/Kg 4.7 mg/Kg 0.37 mg/Kg 3.2 mg/Kg 9.0 mg/Kg	All soil samples in SDG G9L140211: TW-1A/0.5 AR-3/4.5 AR-3/10.5 AR-3A/0.5 AR-2A/0.5 TW-7/0.5 TW-7/4.5 TW-7/7.5 TW-7/8 AR-4A/0.5 AR-4/4.5 AR-4/11 AR-4/15.5 AR-4/20.5 AR-4/25.5 AR-4/30.5 AR-3/13.5 AR-3/18 AR-1/4.5 AR-1A/0.5 AR-1A/1.0 AR-2/5.5 AR-2/10.5 AR-2/5
ICB/CCB	Nickel Molybdenum	0.0124 mg/L 0.0115 mg/L	All soil samples in SDG G9L140211: AR-3/4.5 AR-3/10.5 AR-3A/0.5 AR-2A/0.5 TW-7/0.5 TW-7/4.5 TW-7/7.5 TW-7/8 AR-4A/0.5 AR-4/4.5 AR-4/11 AR-4/15.5 AR-4/20.5 AR-4/25.5 AR-4/30.5 AR-3/13.5 AR-3/18 AR-1/4.5 AR-1A/0.5 AR-1A/1.0 AR-2/5.5 AR-2/10.5 AR-2/5
ICB/CCB	Thallium	0.0062 mg/L	AR-2/5.5

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Copper Sodium	0.0031 mg/L 0.039 mg/L	All water samples in SDG G9L140211: TW-1/K TW-7/K
ICB/CCB LDC Report# 4556K4	Manganese	0.00325 mg/L	All water samples in SDG G9L140211: TW-1/K TW-7/K
PB (prep blank)	Calcium Iron Sodium	4.1 mg/Kg 1.3 mg/Kg 5.2 mg/Kg	All soil samples in SDG G9L110172: TW-1/5.5 TW-1/10.5 TW-1/15.5 TW-1/19.5 TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5
ICB/CCB	Lead Manganese Nickel Thallium	0.0096 mg/L 0.0035 mg/L 0.0010 mg/L 0.0059 mg/L	All soil samples in SDG G9L110172: TW-1/5.5 TW-1/10.5 TW-1/15.5 TW-1/19.5 TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5
PB (prep blank)	Copper Sodium	0.0031 mg/L 0.039 mg/L	All water samples in SDG G9L110172: TW-8/K9 TW-5/K
ICB/CCB LDC Report# 4556L4	Manganese	0.00325 mg/L	All water samples in SDG G9L110172: TW-8/K9 TW-5/K

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Iron Magnesium Sodium	6.3 mg/Kg 0.16 mg/Kg 2.8 mg/Kg 10.3 mg/Kg	All soil samples in SDG G9L150204: TW-4A/0.5 TW-4/5 TW-4/10.5 TW-4/15.5 TW-4/21 TW-4/21.5 DA1-3W1 DA1-3W2 TW-4 TW-3 TW-3-1
ICB/CCB	Nickel Molybdenum	0.0124 mg/L 0.0115 mg/L	All soil samples in SDG G9L150204: TW-4A/0.5 TW-4/5 TW-4/10.5 TW-4/15.5 TW-4/21 TW-4/21.5 DA1-3W1 DA1-3W2 TW-4 TW-3 TW-3-1
PB (prep blank)	Iron	0.011 mg/L	TW-4/K
ICB/CCB	Manganese	0.00325 mg/L	TW-4/K
PB (prep blank)	Copper Sodium	0.0031 mg/L 0.039 mg/L	TW-4K TW-4 TW-3 TW-3-1
ICB/CCB LDC Report# 4556M4	Barium Beryllium Cadmium Iron Manganese Nickel Molybdenum	0.0137 mg/L 0.0113 mg/L 0.00454 mg/L 0.122 mg/L 0.00622 mg/L 0.01371 mg/L 0.0169 mg/L	TW-4K TW-4 TW-3 TW-3-1

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Magnesium Sodium Vanadium	4.1 mg/Kg 2.6 mg/Kg 5.6 mg/Kg 0.31 mg/Kg	All samples in SDG G9L170254: FA-5/0 FA-5/0.5 FA-5/1 FA-5/2 FA-5/5 FA-6A/1 FA-6A/1.5 FA-6/2 FA-6/3 FA-4/0 FA-4/0.5 FA-4/1 TW-11-16.5 FA-4/2.5 FA-4/3
ICB/CCB LDC Report# 4556N4	Nickel Molybdenum	0.0124 mg/L 0.0115 mg/L	All samples in SDG G9L170254: FA-4/0 FA-4/0.5 FA-4/1 FA-4/2.5 FA-4/3 FA-5/0 FA-5/0.5 FA-5/1 FA-5/2 FA-5/5 FA-6A/1 FA-6A/1.5 FA-6/2 FA-6/3 TW-11-16.5
PB (prep blank)	Calcium Iron Magnesium Sodium	6.3 mg/Kg 0.16 mg/Kg 2.8 mg/Kg 10.3 mg/Kg	All soil samples in SDG G9L210200: DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Nickel Thallium Molybdenum	0.0124 mg/L 0.00868 mg/L 0.0115 mg/L	All soil samples in SDG G9L210200: DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2
PB (prep blank) LDC Report# 4556O4	Aluminum Calcium Copper Iron Magnesium Manganese Sodium Zinc	0.048 mg/L 0.28 mg/L 0.0025 mg/L -0.068 mg/L 0.041 mg/L 0.0037 mg/L 0.13 mg/L 0.0055 mg/L	All water samples in SDG G9L210200: DA 3-5/K DA 3-3/K
PB (prep blank)	Calcium Iron Magnesium Sodium Vanadium	4.1 mg/Kg 1.7 mg/Kg 2.6 mg/Kg 5.6 mg/Kg 0.31 mg/Kg	All soil samples in SDG G9L230278: 100 118 129 132 146 170 173 179 184 19 210 238 241 27 38 44 50 68 89 99 WET-1 WET-2 WET-2A

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum	0.0115 mg/L	All soil samples in SDG G9L230278: 100 118 129 132 146 170 173 179 184 19 210 238 241 27 38 44 50 68 89 99 WET-1 WET-2 WET-2A
PB (prep blank)	Calcium Iron Magnesium Sodium Zinc	0.078 mg/L 0.011 mg/L 0.035 mg/L 0.12 mg/L 0.0028 mg/L	SRC-1 SRC-2 TNT-5A8/K TW-12 SW-1 SW-2
ICB/CCB	Manganese Nickel	0.0035 mg/L 0.0103 mg/L	SRC-1 SRC-2 TNT-5A8/K TW-12 SW-1 SW-2
PB (prep blank)	Calcium Iron Magnesium Sodium Zinc	0.078 mg/L 0.011 mg/L 0.035 mg/L 0.12 mg/L 0.0028 mg/L	TW-12(Dissolved) TW-12/A(Dissolved) SW-1D SW-2D

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Table 2.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
ICB/CCB LDC Report# 4556P4	Barium Beryllium Cadmium Iron Manganese Nickel Molybdenum	0.0137 mg/L 0.00113 mg/L 0.00454 mg/L 0.122 mg/L 0.00622 mg/L 0.01371 mg/L 0.0169 mg/L	TW-12(Dissolved) TW-12/A(Dissolved) SW-1D SW-2D

Note:
Bold highlight indicates that associated non-blank field sample results were blank qualified for this element.

Table 2.4-3E Field Blanks for Metals

Equipment Blank ID	Sampling Date	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Concentration	Associated Samples
TW-6/K LDC Report# 4556A4	12/8/99	Barium Calcium Copper Iron Magnesium Nickel Sodium Zinc	0.0018 mg/L 0.052 mg/L 0.0042 mg/L 0.012 mg/L 0.027 mg/L 0.0018 mg/L 0.076 mg/L 0.0035 mg/L	TW-6/4.5 TW-6/9 TW-6/0.5
HF 3/K	12/7/99	Barium Calcium Copper Iron Manganese Sodium	0.0048 mg/L 0.095 mg/L 0.0036 mg/L 0.12 mg/L 0.0019 mg/L 0.069 mg/L	HF 1/5 HF 1A/0.5 HF 1A/1 HF 3/5.5 HF 3/10.5 HF 3/15.5 HF 3/20.5 HF 3A/0.5
RSP5/K3 LDC Report# 4556J4	12/7/99	Calcium Copper Iron Sodium	0.029 mg/L 0.0031 mg/L 0.022 mg/L 0.055 mg/L	RSP 5

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Table 2.4-3E Field Blanks for Metals

Equipment Blank ID	Sampling Date	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Concentration	Associated Samples
TW-1/K	12/10/99	Calcium Copper Iron Sodium	0.039 mg/L 0.036 mg/L 0.012 mg/L 0.062 mg/L	TW-1A/0.5
TW-7/K LDC Report# 4556K4	12/11/99	Calcium Copper Iron Magnesium Sodium	0.083 mg/L 0.029 mg/L 0.0084 mg/L 0.055 mg/L 0.27 mg/L	TW-7/0.5 TW-7/4.5 TW-7/7.5 TW-7/8
TW-8/K9	12/9/99	Lead Aluminum Barium Calcium Chromium Copper Iron Magnesium Manganese Nickel Sodium Zinc	0.0029 mg/L 0.94 mg/L 0.12 mg/L 0.45 mg/L 0.0097 mg/L 0.0056 mg/L 2.7 mg/L 0.35 mg/L 0.037 mg/L 0.0049 mg/L 0.27 mg/L 0.010 mg/L	TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5
TW-5/K LDC Report# 4556L4	12/9/99	Barium Calcium Copper Iron Magnesium Nickel Sodium Zinc	0.0012 mg/L 0.11 mg/L 0.0034 mg/L 0.028 mg/L 0.039 mg/L 0.0014 mg/L 0.099 mg/L 0.0032 mg/L	TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5
TW-4/K	12/13/99	Barium Calcium Copper Iron Magnesium Manganese Sodium Aluminum	0.0045 mg/L 1.8 mg/L 0.0034 mg/L 0.19 mg/L 0.088 mg/L 0.059 mg/L 0.14 mg/L 0.11 mg/L	TW-4A/0.5 TW-4/5 TW-4/10.5 TW-4/15.5 TW-4/21 TW-4/21.5
TW-4K LDC Report# 4556M4	12/14/99	Selenium Thallium Magnesium Barium Sodium Zinc Calcium	0.0033 mg/L 0.0049 mg/L 0.047 mg/L 0.0015 mg/L 0.12 mg/L 0.0025 mg/L 0.062 mg/L	TW-4 TW-3 TW-3-1

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Table 2.4-3E Field Blanks for Metals

Equipment Blank ID	Sampling Date	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Concentration	Associated Samples
DA 3-5/K	12/16/99	Mercury Lead Aluminum Barium Calcium Chromium Copper Iron Magnesium Manganese Nickel Sodium Zinc	0.000073 mg/L 0.0094 mg/L 0.32 mg/L 0.019 mg/L 0.32 mg/L 0.0068 mg/L 0.0060 mg/L 1.2 mg/L 0.17 mg/L 0.030 mg/L 0.0024 mg/L 0.29 mg/L 0.0044 mg/L	All soil samples in SDG G9L210200 DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2
DA 3-3/K LDC Report# 4556O4	12/16/99	Lead Aluminum Barium Calcium Chromium Copper Iron Magnesium Manganese Nickel Sodium Vanadium Zinc	0.092 mg/L 1.2 mg/L 0.17 mg/L 0.61 mg/L 0.0082 mg/L 0.032 mg/L 2.4 mg/L 0.46 mg/L 0.054 mg/L 0.0035 mg/L 0.34 mg/L 0.0045 mg/L 0.018 mg/L	All soil samples in SDG G9L210200 DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2
TNT-5A8/K LDC Report# 4556P4	12/21/99	Aluminum Copper Iron Sodium Zinc	0.048 mg/L 0.0056 mg/L 0.024 mg/L 0.037 mg/L 0.0025 mg/L	No associated samples in this SDG
SRC-1	12/21/99	Calcium Iron Sodium Zinc	0.028 mg/L 0.017 mg/L 0.049 mg/L 0.0022 mg/L	No associated samples in this SDG
SRC-2 LDC Report# 4556P4	12/21/99	Aluminum Calcium Copper Magnesium Manganese Sodium Zinc	0.11 mg/L 0.82 mg/L 0.0039 mg/L 0.82 mg/L 0.0012 mg/L 3.9 mg/L 0.0027 mg/L	No associated samples in this SDG

Note: Bold highlight indicates that associated non-blank field sample results were blank qualified for this element.

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Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
TW-6/9 LDC Report# 4556A4	Lead	4.2 mg/Kg	4.2UJ mg/Kg
TW-1A/0.5	Molybdenum	0.90 mg/Kg	0.90UJ mg/Kg
AR-3/4.5	Molybdenum	0.88 mg/Kg	0.88UJ mg/Kg
AR-3/10.5	Molybdenum	0.99 mg/Kg	0.99UJ mg/Kg
AR-3A/0.5	Molybdenum	0.92 mg/Kg	0.92UJ mg/Kg
TW-7/0.5	Molybdenum	1.1 mg/Kg	1.1UJ mg/Kg
TW-7/4.5	Molybdenum	2.0 mg/Kg	2.0UJ mg/Kg
TW-77.5	Molybdenum	0.58 mg/Kg	0.58UJ mg/Kg
TW-7/8	Molybdenum	1.3 mg/Kg	1.3UJ mg/Kg
AR-4A/0.5	Molybdenum	1.2 mg/Kg	1.2UJ mg/Kg
AR-4/11	Molybdenum	0.66 mg/Kg	0.66UJ mg/Kg
AR-4/15.5	Molybdenum	0.59 mg/Kg	0.59UJ mg/Kg
AR-4/25.5	Molybdenum	0.63 mg/Kg	0.63UJ mg/Kg
AR-4/30.5	Molybdenum	0.61 mg/Kg	0.61UJ mg/Kg
AR-3/13.5	Molybdenum	0.97 mg/Kg	0.97UJ mg/Kg
AR-3/18	Molybdenum	1.7 mg/Kg	1.7UJ mg/Kg
AR-1/4.5	Molybdenum	0.91 mg/Kg	0.91UJ mg/Kg
AR-1A/0.5	Molybdenum	1.3 mg/Kg	1.3UJ mg/Kg
AR-1A/1.0	Molybdenum	1.3 mg/Kg	1.3UJ mg/Kg
AR-2/5.5	Molybdenum	2.0 mg/Kg	2.0UJ mg/Kg
AR-2/10.5	Molybdenum	1.1 mg/Kg	1.1UJ mg/Kg
AR-2/5	Molybdenum	0.85 mg/Kg	0.85UJ mg/Kg
LDC Report# 4556K4			

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Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
TW-4A/0.5	Molybdenum	0.63 mg/Kg	0.63UJ mg/Kg
TW-4/21	Molybdenum	0.68 mg/Kg	0.68UJ mg/Kg
TW-4/21.5	Molybdenum	0.79 mg/Kg	0.79UJ mg/Kg
DA1-3W1	Molybdenum	1.0 mg/Kg	1.0UJ mg/Kg
DA1-3W2	Molybdenum	0.72 mg/Kg	0.72UJ mg/Kg
TW-4	Copper Iron Nickel Molybdenum	0.0055 mg/L 0.040 mg/L 0.0020 mg/L 0.0050 mg/L	0.0055UJ mg/L 0.040UJ mg/L 0.0020UJ mg/L 0.0050UJ mg/L
TW-4	Thallium (Due to EB only) Zinc (Due to EB only)	0.0064 mg/L 0.0035 mg/L	0.0064UJ mg/L 0.0035UJ mg/L
TW-3	Copper Nickel	0.0051 mg/L 0.0026 mg/L	0.0051UJ mg/L 0.0026UJ mg/L
TW-3	Zinc (Due to EB only)	0.0029 mg/L	0.0029UJ mg/L
TW-3-1 LDC Report# 4556M4	Barium Copper Iron Nickel	0.065 mg/L 0.0028 mg/L 0.021 mg/L 0.0013 mg/L	0.065UJ mg/L 0.0028UJ mg/L 0.021UJ mg/L 0.0013UJ mg/L
FA-5/1	Molybdenum	1.2 mg/Kg	1.2UJ mg/Kg
FA-6/2	Molybdenum	0.92 mg/Kg	0.92UJ mg/Kg
FA-6/3	Molybdenum	1.4 mg/Kg	1.4UJ mg/Kg
FA-4/0.5	Molybdenum	0.71 mg/Kg	0.71UJ mg/Kg
FA-4/1	Molybdenum	1.0 mg/Kg	1.0UJ mg/Kg
FA-4/2.5	Molybdenum	1.9 mg/Kg	1.9UJ mg/Kg
FA-4/3 LDC Report# 4556N4	Molybdenum	1.4 mg/Kg	1.4UJ mg/Kg

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Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
DA 3-4/10.5	Molybdenum	0.98 mg/Kg	0.98UJ mg/Kg
DA 3-5/7.5	Molybdenum	0.80 mg/Kg	0.80UJ mg/Kg
DA 3-3/10.5	Thallium	0.86 mg/Kg	0.86UJ mg/Kg
DA 3-3/15.5	Molybdenum	0.67 mg/Kg	0.67UJ mg/Kg
LDC Report# 4556O4			
DA 3-4/5.5	Lead (Due to EB only)	2.0 mg/Kg	2.0UJ mg/Kg
DA 3-4/10.5	Lead (Due to EB only)	7.9 mg/Kg	7.9UJ mg/Kg
DA 3-5/7.5	Lead (Due to EB only)	12.7 mg/Kg	12.7UJ mg/Kg
DA 3-3/6	Mercury (Due to EB only) Lead (Due to EB only)	0.017 mg/Kg 6.1 mg/Kg	0.017UJ mg/Kg 6.1UJ mg/Kg
DA 3-3/10.5	Mercury (Due to EB only) Lead (Due to EB only)	0.02 mg/Kg 2.5 mg/Kg	0.02UJ mg/Kg 2.5UJ mg/Kg
DA 3-3/15.5	Mercury (Due to EB only) Lead (Due to EB only)	0.040 mg/Kg 10 mg/Kg	0.040UJ mg/Kg 10UJ mg/Kg
DA 3-6/5.5	Lead (Due to EB only)	20.9 mg/Kg	20.9UJ mg/Kg
DA 3-6/10.5	Lead (Due to EB only)	16.9 mg/Kg	16.9UJ mg/Kg
DA 3-6/16.5	Mercury (Due to EB only) Lead (Due to EB only)	0.054 mg/Kg 7.8 mg/Kg	0.054UJ mg/Kg 7.8UJ mg/Kg
LB-3A/4.5	Mercury (Due to EB only) Lead (Due to EB only)	0.056 mg/Kg 9.3 mg/Kg	0.056UJ mg/Kg 9.3UJ mg/Kg
TNT-1C10A/0	Mercury (Due to EB only) Lead (Due to EB only) Sodium (Due to EB only)	0.059 mg/Kg 10.2 mg/Kg 105 mg/Kg	0.059UJ mg/Kg 10.2UJ mg/Kg 105UJ mg/Kg
TNT-1C10A/2	Mercury (Due to EB only) Lead (Due to EB only) Sodium (Due to EB only)	0.077 mg/Kg 8.1 mg/Kg 133 mg/Kg	0.077UJ mg/Kg 8.1UJ mg/Kg 133UJ mg/Kg
LDC Report# 4556O4			

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 21 of 27)

Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
179	Molybdenum	0.75 mg/Kg	0.75UJ mg/Kg
129	Molybdenum	0.82 mg/Kg	0.82UJ mg/Kg
146	Molybdenum	1.0 mg/Kg	1.0UJ mg/Kg
170	Molybdenum	1.3 mg/Kg	1.3UJ mg/Kg
184	Molybdenum	0.73 mg/Kg	0.73UJ mg/Kg
50	Molybdenum	0.73 mg/Kg	0.73UJ mg/Kg
68	Molybdenum	0.69 mg/Kg	0.69UJ mg/Kg
241	Molybdenum	0.78 mg/Kg	0.78UJ mg/Kg
210	Molybdenum	0.86 mg/Kg	0.86UJ mg/Kg
238	Molybdenum	0.78 mg/Kg	0.78UJ mg/Kg
19	Molybdenum	0.83 mg/Kg	0.83UJ mg/Kg
27	Molybdenum	0.94 mg/Kg	0.94UJ mg/Kg
38	Molybdenum	0.70 mg/Kg	0.70UJ mg/Kg
99	Molybdenum	0.92 mg/Kg	0.92UJ mg/Kg
100	Molybdenum	0.85 mg/Kg	0.85UJ mg/Kg
SW-1	Nickel Zinc	0.0058 mg/L 0.012 mg/L	0.0058UJ mg/L 0.012UJ mg/L
SW-2	Nickel Zinc	0.0035 mg/L 0.0068 mg/L	0.0035UJ mg/L 0.0068UJ mg/L
TW-12(Dissolved)	Iron Nickel Molybdenum	0.044 mg/L 0.0020 mg/L 0.0050 mg/L	0.044UJ mg/L 0.0020UJ mg/L 0.0050UJ mg/L
TW-12/A(Dissolved)	Iron Nickel Zinc	0.034 mg/L 0.0014 mg/L 0.0023 mg/L	0.034UJ mg/L 0.0014UJ mg/L 0.0023UJ mg/L
SW-1D	Iron Nickel Zinc	0.0047 mg/L 0.0013 mg/L 0.0074 mg/L	0.0047UJ mg/L 0.0013UJ mg/L 0.0074UJ mg/L

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 22 of 27)

Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
SW-2D LDC Report# 4556P4	Iron Nickel	0.015 mg/L 0.0017 mg/L	0.015UJ mg/L 0.0017UJ mg/L
TW-6/K* LDC Report# 4556A4	Copper Sodium <i>* Sample TW-6/K was identified as an equipment blank and should not be blank-qualified.</i>	0.0042 mg/L 0.076 mg/L	0.0042UJ mg/L 0.076UJ mg/L
RSP1/K3* LDC Report# 4556C4	Manganese Sodium <i>* Sample RSP1/K3 was identified as an equipment blank and should not be blank-qualified.</i>	0.0019 mg/L 0.087 mg/L	0.0019UJ mg/L 0.087UJ mg/L
HF 3/K* RSP5/K3* LDC Report# 4556J4	Copper Manganese Sodium Copper Sodium <i>* Samples HF-3K and RSP5/K3 were identified as equipment blanks and should not be blank-qualified.</i>	0.0036 mg/L 0.0019 mg/L 0.069 mg/L 0.0031 mg/L 0.055 mg/L	0.0036UJ mg/L 0.0019UJ mg/L 0.069UJ mg/L 0.0031UJ mg/L 0.055UJ mg/L
TW-1/K* TW-7/K* LDC Report# 4556K4	Copper Sodium Copper <i>* Samples TW-1K and TW-7K were identified as equipment blanks and should not be blank-qualified.</i>	0.0036 mg/L 0.062 mg/L 0.0029 mg/L	0.0036UJ mg/L 0.062UJ mg/L 0.0029UJ mg/L
TW-8/K9* TW-5/K* LDC Report# 4556L4	Copper Copper Sodium <i>* Samples TW-5K and TW-8K were identified as equipment blanks and should not be blank-qualified.</i>	0.0056 mg/L 0.0034 mg/L 0.099 mg/L	0.0056UJ mg/L 0.0034UJ mg/L 0.099UJ mg/L
TW-4K* LDC Report# 4556M4	Barium Sodium <i>* Sample TW-4K was identified as an equipment blank and should not be blank-qualified.</i>	0.0015 mg/L 0.12 mg/L	0.0015UJ mg/L 0.12UJ mg/L

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 23 of 27)

Table 2.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
DA 3-5/K*	Calcium Copper Magnesium Sodium Zinc	0.32 mg/L 0.0060 mg/L 0.17 mg/L 0.29 mg/L 0.0044 mg/L	0.32UJ mg/L 0.0060UJ mg/L 0.17UJ mg/L 0.29UJ mg/L 0.0044UJ mg/L
DA 3-3/K*	Calcium Sodium	0.61 mg/L 0.34 mg/L	0.61UJ mg/L 0.34UJ mg/L
LDC Report# 4556O4	Zinc <i>* Samples DA-5K and DA-3K were identified as equipment blanks and should not be blank-qualified.</i>	0.018 mg/L	0.018UJ mg/L
SRC-1*	Calcium Iron Sodium Zinc	0.028 mg/L 0.017 mg/L 0.049 mg/L 0.0022 mg/L	0.028UJ mg/L 0.017UJ mg/L 0.049UJ mg/L 0.0022UJ mg/L
SRC-2*	Manganese Zinc	0.0012 mg/L 0.0027 mg/L	0.0012UJ mg/L 0.0027UJ mg/L
TNT-5A8/K*	Iron Sodium	0.024 mg/L 0.037 mg/L	0.024UJ mg/L 0.037UJ mg/L
LDC Report# 4556P4	Zinc <i>* Samples SRC-1 and SRC-2 were identified as source water blanks, and sample TNT-5A8/K was identified as an equipment blank, and should not be blank-qualified.</i>	0.0025 mg/L	0.0025UJ mg/L

Notes:

Bold highlight indicates that non-blank field sample results were qualified for this analyte.

* Equipment blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and USEPA Region IX validation protocols, field, equipment and trip blanks cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 24 of 27)

Table 2.4-3G Laboratory Blanks for SW8260B - VOCs

Method Blank ID	Analysis Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
M.Blank 121299 LDC Report# 4565A1	12/12/99	Methylene chloride	4.0 ug/L	HF2/K Trip Blank 1206 HF-3/K Trip Blank 1207 TW-6/K** Trip Blank 1207D TW-8/K** Trip Blank 1208A Trip Blank 1209A TW-9/K TW-1/K TW-7/K Trip Blank 1211A
Mblank122799 LDC Report# 4565B1	12/27/99	Methylene chloride	2.1 ug/L	All samples in SDG VW-2 TW-12 Trip Blank 122299A SRC-1 SRC-2
Mblank121099 LDC Report# 4565C1	12/10/99	Methylene chloride	0.020 mg/Kg	TW-6/0.5
M.Blank121099 LDC Report# 4565D1	12/10/99	Methylene chloride	0.020 mg/Kg	TW-6/4 TW-6/8.5 TW-5/0.5 TW-5/5 TW-5/10 TW-5/14.5 TW-8/15.5 (NOT USED) TW-1/4 TW-1/10 TW-1/15 TW-1/20 TW-1/22 TW-9/11 TW-1/0.5 AR-3/0.5 (NOT USED)
M.Blank121399#1 LDC Report# 4565D1	12/13/99	Methylene chloride	0.020 mg/Kg	AR-3/4.0 (NOT USED) AR-3/10 TW-8/15.5RE AR-3/0.5RE

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 25 of 27)

Table 2.4-3G Laboratory Blanks for SW8260B - VOCs

Method Blank ID	Analysis Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
M.Blank 121399#1 LDC Report# 4565E1	12/13/99	Methylene chloride	0.020 mg/Kg	AR-3/13 AR-3/17.5 AR-1/8 AR-1/0.5 AR-1/1.0 AR-2/0.5 AR-2/4 AR-2/4.5 AR-2/10 AR-1/4

Note: **Bold highlight** indicates that associated non-blank field sample results were blank qualified for this analyte.

Table 2.4-3H Field Blanks for SW8260B - VOCs

Trip Blank ID	Sampling Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
Trip Blank 1211A	12/11/99	Methylene chloride	2.3	TW-7/K
Trip Blank 1211B LDC Report# 4565A1	12/14/99	Methylene chloride	2.3	TW-3 TW-3-1 TW-4K TW-4
Trip Blank 1211A LDC Report# 4565E1	12/11/99	Methylene chloride	2.3 ug/L	AR-4/0.5 AR-4/4
Trip Blank 1211A LDC Report# 4565F1	12/11/99	Methylene chloride	2.3 ug/L	AR-4/10 AR-4/15 AR-4/20 AR-4/25 AR-4/30 TW-7/0.5 TW-7/4 TW-7/7

Note: **Bold highlight** indicates that associated non-blank field sample results were blank qualified for this element. No field sample results were qualified due to trip or equipment blank contamination.

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 26 of 27)

Table 2.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
TW-1/4	Methylene chloride	0.045 mg/Kg	0.045UJ mg/Kg
TW-1/10	Methylene chloride	0.057 mg/Kg	0.057UJ mg/Kg
TW-1/15	Methylene chloride	0.047 mg/Kg	0.047UJ mg/Kg
TW-1/20	Methylene chloride	0.054 mg/Kg	0.054UJ mg/Kg
TW-1/22	Methylene chloride	0.054 mg/Kg	0.054UJ mg/Kg
TW-5/0.5	Methylene chloride	0.031 mg/Kg	0.031UJ mg/Kg
TW-5/5	Methylene chloride	0.031 mg/Kg	0.031UJ mg/Kg
TW-5/10	Methylene chloride	0.035 mg/Kg	0.035UJ mg/Kg
TW-5/14.5	Methylene chloride	0.037 mg/Kg	0.037UJ mg/Kg
AR-3/17.5	Methylene chloride	0.025 mg/Kg	0.025UJ mg/Kg
LDC Report# 4565E1			
TW-8/15.5 (NOT USED)	Methylene chloride	0.038 mg/Kg	0.038UJ mg/Kg
LDC Report# 4565D1			
Trip Blank 1211A*	Methylene chloride	2.3 ug/L	2.3UJ ug/L
LDC Report# 4565A1	<i>* Samples identified as trip blanks should not be blank-qualified.</i>		

Note: Bold highlight indicates that non-blank field sample results were qualified for this analyte.

* Trip blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and USEPA Region IX validation protocols, field, equipment and trip blanks cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

Table 2.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 27 of 27)

Table 2.4-3J Laboratory Blank Issues for SW8330 - Explosives

Sample	Explosives: EPA Method SW8330 Compound	Finding	Criteria	Flag	A or P
TNT-1L/K TW-6/K TW-5/K TNT-4C6/K LDC Report# 4567A40	All TCL compounds	No method blank associated with these samples.	Method blanks required for all samples.	<i>NA</i> (R all detects) <i>All results were ND in the associated samples</i>	P

Note: No results were detected in the associated samples, which were all equipment blanks. No data were qualified, and there is no effect on the quality of the data.

Table 2.4-3K Field Blanks for SW8330 - Explosives

Source Blank ID	Sampling Date	Explosives: EPA Method SW8330 Compound	Concentration	Associated Samples
SRC-2 LDC Report# 4565Z40	12/21/99	2,6-Dinitrotoluene	0.9 ug/L	TNT-5A8/0 TNT-5A8/1 TNT-5A8/2 TNT-5A8A/2 TNT-5A8/4 TNT-5A10/0 (<i>NOT USED</i>) TNT-5A10/1 TNT-5A10/2 (<i>NOT USED</i>) TNT-5A10A/2 TNT-5A10/4 (<i>NOT USED</i>) TNT-5A10/6 TNT-5A10/7.5 (<i>NOT USED</i>)

Note: No field sample results were qualified due to equipment blank contamination.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-4. Surrogate Recovery Tables

Summary of QC Outliers (Page 1 of 5)

Table 2.4-4A Surrogate Recoveries for SW8015B - TEPH

Sample	Surrogate	%R (Limits)	TEPH: EPA Method SW8015B Compound	Flag	A or P
HF-2/K LDC Report# 4565N8	o-Terphenyl	17 (50-110)	TPH as extractables	UJ (all non-detects)	P
RSP4-B (NOT USED) LDC Report# 4565I8	o-Terphenyl	21 (60-120)	TPH as extractables	UJ (all non-detects)	P

Note:

No field sample results were qualified due to surrogate recoveries. Samples with the suffix "/K" were identified as equipment blanks.

Table 2.4-4B Surrogate Recoveries for SW8260B - VOCs

Sample	Surrogate	%R (Limits)	VOCs: EPA Method SW8260B Compound	Flag	A or P
AR-4/25	Dibromofluoromethane 1,2-Dichloroethane-d4 Bromofluorobenzene	151 (70-130) 167 (70-130) 56 (70-130)	All TCL compounds	UJ (all non-detects)	A
AR-4/30 LDC Report# 4565F1	Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	150 (70-130) 170 (70-130) 68 (70-130) 54 (70-130)	All TCL compounds	UJ (all non-detects)	A
TW-7/0.5RE (NOT USED)	1,2-Dichloroethane-d4	142 (70-130)	All TCL compounds	NA (J+ all detects) <i>No samples qualified, all ND</i>	A
TW-4/4.5RE	1,2-Dichloroethane-d4	152 (70-130)	All TCL compounds	NA (J+ all detects) <i>No samples qualified, all ND</i>	A
AR-4/20	1,2-Dichloroethane-d4	131 (70-130)	All TCL compounds	NA (J+ all detects) <i>No samples qualified, all ND</i>	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-4. Surrogate Recovery Tables
 Summary of QC Outliers (Page 2 of 5)

Table 2.4-4C Surrogate Recoveries for SW8310 - PAHs

Sample	Detector	Surrogate	%R (Limits)	PAHs: EPA Method SW8310 Compound	Flag	A or P
HF-4/4	UV	o-Terphenyl	26 (30-135)	All TCL compounds	UJ (all non-detects)	P
HF-4/10	UV	o-Terphenyl	19 (30-135)	All TCL compounds	UJ (all non-detects)	P
TW-1/20	UV	o-Terphenyl	24 (30-135)	All TCL compounds	UJ (all non-detects)	A
AR-1/4 LDC Report# 4565G9	UV	o-Terphenyl	20 (30-135)	All TCL compounds	UJ (all non-detects)	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-4. Surrogate Recovery Tables
 Summary of QC Outliers (Page 3 of 5)

Table 2.4-4D Surrogate Recoveries for SW8330 - Explosives

Sample	Surrogate	%R (Limits)	Explosives: EPA Method SW8330 Compound	Flag	A or P
SW-1	1,2-Dinitrobenzene	32 (50-135)	All TCL compounds	UJ (all non-detects)	P
SW-2	1,2-Dinitrobenzene	28 (50-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
TW-3-1 (TW-3A)	1,2-Dinitrobenzene	0 (50-135)	All TCL compounds	R (all non-detects)	P
TW-12	1,2-Dinitrobenzene	37 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-1F3/K	1,2-Dinitrobenzene	34 (50-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
HF-2/K	1,2-Dinitrobenzene	40 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-1D/K	1,2-Dinitrobenzene	42 (50-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
HF-3/K	1,2-Dinitrobenzene	29 (50-135)	All TCL compounds	UJ (all non-detects)	P
RSP5/K1	1,2-Dinitrobenzene	30 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-1L/K	1,2-Dinitrobenzene	34 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-6/K	1,2-Dinitrobenzene	36 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-5/K	1,2-Dinitrobenzene	43 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-4C6/K	1,2-Dinitrobenzene	43 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-4K1	1,2-Dinitrobenzene	36 (50-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
TNT-5F/K	1,2-Dinitrobenzene	14 (50-135)	All TCL compounds	UJ (all non-detects)	P

Table 2.4-4. Surrogate Recovery Tables
 Summary of QC Outliers (Page 4 of 5)

Table 2.4-4D Surrogate Recoveries for SW8330 - Explosives

Sample	Surrogate	%R (Limits)	Explosives: EPA Method SW8330 Compound	Flag	A or P
TW-9/K1**	1,2-Dinitrobenzene	33 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-1/K**	1,2-Dinitrobenzene	39 (50-135)	All TCL compounds	UJ (all non-detects)	P
DA3-3/K	1,2-Dinitrobenzene	21 (50-135)	All TCL compounds	UJ (all non-detects)	P
DA3-5/K	1,2-Dinitrobenzene	16 (50-135)	All TCL compounds	UJ (all non-detects)	P
SRC-1	1,2-Dinitrobenzene	19 (50-135)	All TCL compounds	UJ (all non-detects)	P
SRC-2	1,2-Dinitrobenzene	24 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-5L/K	1,2-Dinitrobenzene	22 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-8/K1	1,2-Dinitrobenzene	27 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-1N/K	1,2-Dinitrobenzene	45 (50-135)	All TCL compounds	UJ (all non-detects)	P
TNT-5A&K LDC Report# 4567A40	1,2-Dinitrobenzene	40 (50-135)	All TCL compounds	UJ (all non-detects)	P
WET-1 WET-1(Duplicate) WET-2 WET-2RE (NOT USED) LDC Report# 4567B40	1,2-Dinitrobenzene	58 (65-135) 54 (65-135) 59 (65-135) 63 (65-135)	All TCL compounds	UJ (all non-detects)	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound. Samples with the suffix "K" were identified as equipment blanks, and samples with the prefix "SRC" were identified as source water blanks. All other associated samples are field samples.

Table 2.4-4. Surrogate Recovery Tables
Summary of QC Outliers (Page 5 of 5)

Table 2.4-4E Surrogate Recoveries for SW8330M - PETN/Nitroglycerin

Sample	Surrogate	%R (Limits)	Nitroglycerin/PETN: EPA Method SW8330M Compound	Flag	A or P
SW-1	1,2-Dinitrobenzene	20 (50-135)	All TCL compounds	UJ (all non-detects)	P
SW-2	1,2-Dinitrobenzene	17 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-3	1,2-Dinitrobenzene	0 (50-135)	All TCL compounds	R (all non-detects)	P
TW-3-1 (TW-3A)	1,2-Dinitrobenzene	10 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-4	1,2-Dinitrobenzene	0 (50-135)	All TCL compounds	R (all non-detects)	P
TW-12	1,2-Dinitrobenzene	19 (50-135)	All TCL compounds	UJ (all non-detects)	P
HF-2/K	1,2-Dinitrobenzene	24 (50-135)	All TCL compounds	UJ (all non-detects)	P
HF-3/K	1,2-Dinitrobenzene	19 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-6/K**	1,2-Dinitrobenzene	25 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-5/K**	1,2-Dinitrobenzene	28 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-8/K1	1,2-Dinitrobenzene	18 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-9/K1	1,2-Dinitrobenzene	26 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-1/K	1,2-Dinitrobenzene	27 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-7/K	1,2-Dinitrobenzene	36 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-4/K	1,2-Dinitrobenzene	43 (50-135)	All TCL compounds	UJ (all non-detects)	P
TW-4K1	1,2-Dinitrobenzene	6 (50-135)	All TCL compounds	R (all non-detects)	P
DA3-3/K	1,2-Dinitrobenzene	13 (50-135)	All TCL compounds	UJ (all non-detects)	P
SRC-1	1,2-Dinitrobenzene	15 (50-135)	All TCL compounds	UJ (all non-detects)	P
SRC-2 LDC Report# 4567D24	1,2-Dinitrobenzene	19 (50-135)	All TCL compounds	UJ (all non-detects)	P

Note: Bold highlight indicates that associated sample results were qualified for this compound. Samples with the suffix "/K" were identified as equipment blanks, and samples with the prefix "SRC" were identified as source water blanks. All other associated samples are field samples.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-5. Internal Standard Tables

Summary of QC Outliers (Page 1 of 3)

Table 2.4-5A Internal Standards for SW8260B - VOCs

Sample	Internal Standards	Area (Limits)	VOCs: EPA Method SW8260B Compound	Flag	A or P
AR-4/25RE AR-4/30RE AR-4/20RE (NOT USED) LDC Report# 4565F1	Chlorobenzene-d5 1,4-Dichlorobenzene-d4	159866 (185314-741256) 46526 (112322-449288) 14435 (185314-741256) 43306 (112322-449288) 183292 (185314-741256) 59417 (112322-449288)	4-Methyl-2-pentanone 2-Hexanone Tetrachloroethene 1,3-Dichloropropane Dibromochloromethane 1,2-Dibromoethane Chlorobenzene 1,1,1,2-Tetrachloroethane Ethylbenzene m,p-Xylenes o-Xylene Styrene Bromoform Isopropylbenzene Bromobenzene 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 4-Chlorotoluene 1,3,5-Trimethylbenzene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene 1,2-Dichlorobenzene n-Butylbenzene 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects)	A
AR-4/25 (NOT USED) AR-4/30 (NOT USED) LDC Report# 4565F1	Fluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	219437 (289367-1157468) 55132 (180342-721368) 7476 (112763-451052) 224841 (289367-1157468) 54443 (180342-721368) 6791 (112763-451052)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

Table 2.4-5. Internal Standard Tables

Summary of QC Outliers (Page 2 of 3)

Table 2.4-5A Internal Standards for SW8260B - VOCs

Sample	Internal Standards	Area (Limits)	VOCs: EPA Method SW8260B Compound	Flag	A or P
HF-2C/4.5	1,4-Dichlorobenzene-d4	63147 (78747-314988)	Isopropylbenzene Bromobenzene 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 4-Chlorotoluene 1,3,5-Trimethylbenzene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene 1,2-Dichlorobenzene n-Butylbenzene 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects)	A
HF-4/4		71499 (78747-314988)			
LDC Report# 4565C1					
AR-1/0.5		106809 (117665-470660)			
AR-1/1.0		111584 (117665-470660)			
AR-1/0.5RE		85790 (112322-449288)			
AR-1/1.0RE		106412 (112322-449288)			
LDC Report# 4565E1					
TW-8/15.5 (NOT USED)		104890 (121251-485004)			
AR-3/4.0 (NOT USED)		96955 (117665-470660)			
LDC Report# 4565D1					
AR-4/20		55696 (112763-451052)			
TW-7/0.5		77983 (112763-451052)			
TW-4/4.5 (NOT USED)		109940 (112763-451052)			
TW-7/0.5RE (NOT USED)	92662 (112322-449288)				
LDC Report# 4565F1					

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-5. Internal Standard Tables

Summary of QC Outliers (Page 3 of 3)

Table 2.4-5B Internal Standards for SW8290 - Dioxins/Furans

Sample	Internal Standards	%R (Limits)	DIOXINS/FURAN: EPA Method SW8290 Compound	Flag	A or P
TW-5/10.5 LDC Report# 4556L21	¹³ C-1,2,3,7,8-PeCDF ¹³ C-1,2,3,7,8-PeCDD ¹³ C-1,2,3,6,7,8-HxCDD ¹³ C-OCDD	37.0 (40-135) 32.2 (40-135) 39.1 (40-135) 39.6 (40-135)	1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,7,8-PeCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8-HxCDD OCDD OCDF	J- (all detects) UJ (all non-detects)	P
FA-6A/1 LDC Report# 4556N21	¹³ C-2,3,7,8-TCDD	37 (40-135)	2,3,7,8-TCDD	J- (all detects) UJ (all non-detects)	P
FA-6A/1.5 LDC Report# 4556N21	¹³ C-1,2,3,4,6,7,8-HpCDD ¹³ C-OCDD ¹³ C-1,2,3,4,6,7,8-HpCDF	37 (40-135) 26 (40-135) 32 (40-135)	1,2,3,4,6,7,8-HpCDD OCDD OCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J- (all detects) UJ (all non-detects)	P

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 1 of 17)

Table 2.4-6A MS/MSD Issues for General Chemistry Methods E160.1/SW9060

Sample	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/415.1/SW9060 Analyte	Finding	Criteria	Flag	A or P
PE-TCUP-TOC LDC Report# 4556B6	Total organic carbon	No MS associated with these samples.	MS required.	None	P
PE-TCUP-G LDC Report# 4556B6	Total dissolved solids	No DUP associated with these samples.	DUP required.	None	P

Note: Samples PE-TCUP-TOC and PE-TCUP-G were performance evaluation (PE) samples. There was not adequate sample volume for MS and DUP analyses of these samples. As the purpose of PE samples is to evaluate laboratory accuracy and the results for the PE samples were acceptable, there is no adverse effect on the quality of the data.

Table 2.4-6B MS/MSD for General Chemistry Method 415.1

Spike ID (Associated Samples)	GENERAL CHEMISTRY: EPA Method 415.1 Analyte	%R (Limits)	Flag	A or P
TW-1/BMS (TW-1B TW-1/B) LDC Report# 4556K6	Total organic carbon	61 (75-125)	J- (all detects)	A

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-6C MS/MSD for CADHS 300.0M - Perchlorate

Spike ID (Associated Samples)	PERCHLORATE: CADOHS 300.0M Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TW-3-1MS/MSD (All samples in SDG L63569) No samples qualified (No detects) LDC Report# 4582B6	Perchlorate	126 (75-125)	-	-	NA (J+ all detects) No samples qualified, all ND	A

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 2 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
TW-6/0.5MS (All soil samples in SDG G9L100226) HF-4/4.5 HF-4/10.5 HF-4/15.5 HF-4/20.5 HF-4/23.5 SP-2C SP-1C TNT-1C3/3.5 HF-4A/0.5 TW-6/4.5 TW-6/9 TW-6/0.5 LDC Report# 4556A4	Antimony Calcium	36 (75-125) 0 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects)	A
HF-4/4.5MS (All soil samples in SDG G9L100226) HF-4/4.5 HF-4/10.5 HF-4/15.5 HF-4/20.5 HF-4/23.5 SP-2C SP-1C TNT-1C3/3.5 HF-4A/0.5 TW-6/4.5 TW-6/9 TW-6/0.5 (not As - Acceptable recovery in TW-6/0.5MS) LDC Report# 4556A4	Antimony Arsenic Chromium	56 (75-125) 72 (75-125) 129 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) J+ (all detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables

Summary of QC Outliers (Page 3 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
RSP6MS (All soil samples in SDG G9L080235) RSP 8 RSP 1 LDC Report# 4556C4 and RSP 6MS (All samples in SDG G0L080242) RSP 9 RSP 6 RSP 7 LDC Report# 4556D4 and (All samples in SDG G9L080277 RSP-2 RSP-2A LDC Report# 4556G4	Antimony Copper	45 (75-125) 74 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
HF-2/5MS (All samples in SDG G0L080248) HF-2/5 HF-2/5.5 HF-2A/0.5 HF-2/10.5 LDC Report# 4556E4	Antimony Calcium	45 (75-125) 127 (75-125)	J- (all detects) UJ (all non-detects)	A
TNT-1C7A/1MS (All samples in SDG G9L080262) TNT-1C5A/0 TNT-1C3A/0 TNT-1C3A/1 TNT-1C3A/2 TNT-1C6/4.5 TNT-1C4/3.5 LDC Report# 4556F4 (All samples in SDG G0L080300) TNT-1C6A/0 TNT-1C6A/0.5 TNT-1C6A/1 TNT-1C6A/2 TNT-1C7A/0 TNT-1C7A/1 TNT-1C7A/1.5 TNT-1C4A/0 TNT-1C4A/1 LDC Report# 4556I4	Antimony Arsenic Copper	40 (75-125) 42 (75-125) 55 (75-125)	J- (all detects) UJ (all non-detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 4 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
RSP-4MS (All samples in SDG G0L080293) RSP-4 RSP-3 LDC Report# 4556H4	Antimony	42 (75-125)	J- (all detects) UJ (all non-detects)	A
HF 3/20.5MS (All soil samples in SDG G9L090246) HF 1/5 HF 1A/0.5 HF 1A/1 HF 3/5.5 HF 3/10.5 HF 3/15.5 HF 3/20.5 HF 3A/0.5 RSP 5 LDC Report# 4556J4	Antimony	37 (75-125)	J- (all detects) UJ (all non-detects)	A
AR-3/4.5MS (The following samples in SDG G9L140211:) (TW-1A/0.5 AR-3/4.5 AR-3/10.5 AR-3A/0.5 AR-2A/0.5 TW-7/0.5 TW-7/4.5 TW-7/7.5 TW-7/8 AR-4A/0.5 AR-4/4.5 AR-4/11 AR-4/15.5 AR-4/20.5 AR-4/25.5 AR-4/30.5) LDC Report# 4556K4	Antimony Chromium Vanadium Antimony Chromium	46 (75-125) 140 (75-125) 135 (75-125) 40 (75-125) 136 (75-125)	J- (all detects) UJ (all non-detects) J+ (all detects) J+ (all detects) J- (all detects) UJ (all non-detects) J+ (all detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 5 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
AR-2/5.5MS AR-3/4.5MS (The following samples in SDG G9L140211:) AR-3/13.5 AR-3/18 AR-1/4.5 AR-1A/0.5 AR-1A/1.0 AR-2/5.5 AR-2/10.5 AR-2/5 LDC Report# 4556K4	Antimony Nickel Selenium	30 (75-125) 74 (75-125) 69 (75-125)	J- (all detects) UJ (all non-detects)	A
TW-1/5.5MS (All soil samples in SDG G9L110172) TW-1/5.5 TW-1/10.5 TW-1/15.5 TW-1/19.5 TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5 LDC Report# 4556L4	Antimony	50 (75-125)	J- (all detects) UJ (all non-detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 6 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
TW-4A/0.5MS (All soil samples in SDG G9L150204) TW-4A/0.5 TW-4/5 TW-4/10.5 TW-4/15.5 TW-4/21 TW-4/21.5 DA1-3W1 DA1-3W2 LDC Report# 4556M4 and (All soil samples in SDG GSL210200) DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2 LDC Report# 4558O4	Antimony Chromium Vanadium	44 (75-125) 144 (75-125) 131 (75-125)	J- (all detects) UJ (all non-detects) J+ (all detects) J+ (all detects)	A
179MS (The following soil samples in SDG G9L230278:) 179 118 129 132 146 170 173 184 89 50 68 241 210 238 19 27 44 38 99 100 LDC Report# 4556P4	Antimony Chromium	26 (75-125) 132 (75-125)	J- (all detects) J+ (all detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 7 of 17)

Table 2.4-6D MS/MSD for Metals - EPA Methods SW6010B/SW7470A/SW7471A

Spike ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	%R (Limits)	Flag	A or P
FA-5/OMS (All samples in SDG G9L170254) FA-5/0 FA-5/0.5 FA-5/1 (<i>Sb R</i>) FA-5/2 FA-5/5 (<i>Sb R</i>) FA-6A/1 FA-6A/1.5 (<i>Sb R</i>) FA-6/2 FA-6/3 (<i>Sb R</i>) FA-4/0 FA-4/0.5 FA-4/1 TW-11-16.5 (<i>Sb R</i>) FA-4/2.5 (<i>Sb R</i>) FA-4/3 (<i>Sb R</i>) LDC Report# 4556N4 and FA-5/OMS (The following sediment samples in SDG G9L230278:) WET-1 (<i>Sb R</i>) WET-2 (<i>Sb R</i>) WET-2A (<i>Sb R</i>) LDC Report# 4556P4	Antimony Selenium	8.8 (75-125) 60 (75-125)	J- (all detects) R (all non-detects) J- (all detects) UJ (all non-detects)	A

Note: Bold highlight indicates that associated sample results were qualified for this element.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 8 of 17)

Table 2.4-6E MS/MSD Issues for SW8015B - TEPH

Sample	TEPH: EPA Method SW8015B Compound	Finding	Criteria	Flag	A or P
All samples in SDGs DW-12, DW-18, DW- 27 (1) RSP1/K HF-2/K HF-3/K RSP5/K TW-6/K** TW-5/K** TW-9/K TW-1/K TW-7/K TW-4/K TW-3 TW-3-1 (TW-3A in final reports) TW-4 TW-4K SRC-1 SRC-2 LDC Report# 4565N8	TPH as extractables	No MS/MSD associated with these samples.	MS/MSD required.	None	P

Notes:

MS/MSD analyses are not required for field or equipment blanks (source water samples are field blanks) as they do not represent the environmental matrix. All of the samples listed above were equipment blanks or source water samples, with the exception of field samples TW-3, TW-3A, and TW-4. Temporary wells TW-3 and TW-4 were converted into permanent monitoring wells MW-3 and MW-4 during the Data Gaps Investigation and further analyses for SW8015-TEPH were performed on samples from these wells.

Table 2.4-6F MS/MSD for SW8015B - TEPH

Spike ID (Associated Samples)	TEPH: EPA Method SW8015B Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
RSP3-AMS/MSD (RSP3-A) LDC Report# 456518	TPH as extractables	58 (65-135) <i>Incorrect Limits Should be (30- 135) Due to SGC</i>	-	-	NA (UJ all non-detects) <i>Incorrect Assessment: No Qualification. Limits of 30-135 %R due to SGC</i>	A
HF-3/15MS/MSD (HF-3/15) LDC Report# 456518	TPH as extractables	48 (65-135) <i>Incorrect Limits Should be (30- 135) Due to SGC</i>	59 (65-135)	-	NA (UJ all non-detects) <i>Incorrect Assessment: No Qualification. Limits of 30-135 %R due to SGC</i>	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 9 of 17)

Table 2.4-6F MS/MSD for SW8015B - TEPH

Spike ID (Associated Samples)	TEPH: EPA Method SW8015B Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
HF-3/10MS/MSD (HF-3/10) LDC Report# 4565J8	TPH as extractables	29 (65-135)	21 (65-135)	-	UJ (all non-detects)	A

Note: Bold highlight indicates that associated sample results were qualified for this compound. QC limits should be 30-135 due to silica gel cleanup (SGC) of all soil extracts.

Table 2.4-6G MS/MSD Issues for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Finding	Criteria	Flag	A or P
All samples in SDG VS-2 TW-6/4 TW-6/8.5 TW-5/0.5 TW-5/5 TW-5/10 TW-5/14.5 TW-1/4 TW-1/10 TW-1/15 TW-1/20 TW-1/22 TW-9/11 TW-1/0.5 The following associated results are not being used for reporting purposes: TW-8/15.5 AR-3/0.5 AR-3/4.0 AR-3/10 TW-8/15.5RE AR-3/0.5RE AR-3/4.0RE LDC Report# 4565D1	All TCL compounds <i>The samples listed to left were analyzed in batch 991210 with QC sample HF-4/0.5MS and HF-4/0.5MSD which were reported in SDG VS-1.</i> <i>The samples listed to left were analyzed in batch 991213 with QC sample TW-4/10MS and TW-4/10MSD which were reported in SDG VS-4.</i>	No MS/MSD associated with these samples. <i>Incorrect Assessment: MS/MSD analyses were performed as required and reported in a different SDG.</i>	MS/MSD required.	None	P

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
Summary of QC Outliers (Page 10 of 17)

Table 2.4-6G MS/MSD Issues for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Finding	Criteria	Flag	A or P
All samples in SDG VS-3 AR-3/13 AR-3/17.5 AR-1/8 AR-1/0.5 AR-1/1.0 AR-2/0.5 AR-2/4 AR-2/4.5 AR-2/10 AR-1/4 AR-4/0.5 AR-4/4 The following associated results are not being used for reporting purposes: AR-1/0.5RE AR-1/1.0RE LDC Report# 4565E1	All TCL compounds <i>The samples listed to left were analyzed in batch 991213 with QC sample TW-4/10MS and TW-4/10MSD which were reported in SDG VS-4.</i>	No MS/MSD associated with these samples. <i>Incorrect Assessment: MS/MSD analyses were performed as required and reported in a different SDG.</i>	MS/MSD required.	None	P

Note:
MS/MSD analyses were performed as required. The referenced comments in the DVRs are incorrect and do not affect the technical or contractual quality of the data.

Table 2.4-6H MS/MSD for SW8260B - VOCs

Spike ID (Associated Samples)	VOCs: EPA Method SW8260B Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TW-3MS/MSD (TW-3) LDC Report# 4565A1	Acetone 2-Chloroethylvinyl ether	49 (65-135) 33 (65-135)	53 (65-135) 25 (65-135)	- 26 (≤25)	J- (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A A
SRC-1MS/MSD (SRC-1) LDC Report# 4565B1	Dichlorodifluoromethane Acetone Vinyl acetate 2-Butanone 2-Chloroethylvinyl ether	43 (65-135) 48 (65-135) 13 (65-135) 62 (65-135) 30 (65-135)	40 (65-135) 43 (65-135) 12 (65-135) 58 (65-135) 30 (65-135)	- - - - -	J- (all detects) UJ (all non-detects)	A

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 11 of 17)

Table 2.4-6H MS/MSD for SW8260B - VOCs

Spike ID (Associated Samples)	VOCs: EPA Method SW8260B Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
HF-4/0.5MS/MSD (HF-4/0.5) LDC Report# 4565C1	Acetone Methylene chloride Vinyl acetate 1,2,4-Trichlorobenzene Naphthalene 1,2,3-Trichlorobenzene Hexachlorobutadiene	213 (65-135) 145 (65-135) - - - - -	140 (65-135) - 26 (65-135) 54 (65-135) 49 (65-135) 48 (65-135) 60 (65-135)	41 (≤ 40) 46 (≤ 40) 103 (≤ 40) 53 (≤ 40) 69 (≤ 40) 62 (≤ 40) -	J (all detects) UJ (all non-detects)	A
Not Qualified, All ND	2-Butanone 2-Hexanone 1,2,3-Trichloropropane	163 (65-135) 147 (65-135) 137 (65-135)	148 (65-135) - -	- - -	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A
TW-4/10MS/MSD (TW-4/10) LDC Report# 4565F1	Chloromethane Vinyl chloride 1,2,4-Trichlorobenzene Naphthalene 1,2,3-Trichlorobenzene 2-Chloroethylvinyl ether Vinyl acetate	163 (65-135) 145 (65-135) 43 (65-135) 41 (65-135) 38 (65-135) 39 (65-135) 4 (65-135)	- - - - - 50 (65-135) -	55 (≤ 40) 44 (≤ 40) 50 (≤ 40) 52 (≤ 40) 61 (≤ 40) - 173 (≤ 40)	J (all detects) UJ (all non-detects) UJ (all non-detects) R (all non-detects)	A
Not Qualified, All ND)	Acetone	-	151 (65-135)	-	NA (J+ all detects) No samples qualified, all ND	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-6I MS/MSD for SW8290 - Dioxins/Furans

Sample	DIOXINS/FURAN: EPA Method SW8290 Compound	Finding	Criteria	Flag	A or P
All samples in SDG G9L230278: SRC-1 SRC-2 LDC Report# 4556P21	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

Note: MS/MSD analyses are not required for field or equipment blanks (source water samples are field blanks) as they do not represent the environmental matrix. All of the samples listed above were source water blanks.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 12 of 17)

Table 2.4-6J MS/MSD for SW8310 - PAHs

Spike ID (Associated Samples)	PAHs: EPA Method SW8310 Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TW-8/15.5MS/MSD (TW-8/15.5)	Naphthalene	5 (30-135)	8 (30-135)	-	R (all non-detects)	A
	Acenaphthylene	6 (30-135)	9 (30-135)	-		
	Acenaphthene	5 (30-135)	8 (30-135)	-		
	Phenanthrene	6 (30-135)	10 (30-135)	-		
	Fluoranthene	9 (30-135)	14 (30-135)	-		
	Fluorene	12 (30-135)	15 (30-135)	-	UJ (all non-detects)	
	Anthracene	10 (30-135)	16 (30-135)	-		
	Pyrene	13 (30-135)	17 (30-135)	-		
	AR-3/0.5MS/MSD (AR-3/0.5)	Naphthalene	-	15 (30-135)	-	UJ (all non-detects)
Acenaphthylene		-	27 (30-135)	-		
Indeno(1,2,3-cd)pyrene		26 (30-135)	28 (30-135)	-		
AR-4/20MS/MSD (AR-4/20)	Naphthalene	-	28 (30-135)	-	UJ (all non-detects)	A
	Acenaphthylene	-	29 (30-135)	-		
	Fluorene	-	26 (30-135)	-		
	Benzo(g,h,i)perylene	-	21 (30-135)	-		
	Indeno(1,2,3-cd)pyrene	-	29 (30-135)	-		
TNT-IC3/2MS/MSD (TNT-IC3/2**)	Indeno(1,2,3-cd)pyrene	196 (30-135)	-	111 (≤ 30)	J (all detects) UJ (all non-detects)	A
	Naphthalene	136 (30-135)	136 (30-135)	-	NA (J+ all detects) No samples qualified, all ND	A
AR-4/20MSRE/MSDRE (AR-4/20RE <i>Not Used</i>)	Naphthalene	-	24 (30-135)	-	J- (all detects) UJ (all non-detects)	A
HF-3/15MS/MSD (HF-3/15)	Naphthalene	-	136 (30-135)	-	NA (J+ all detects) No samples qualified, all ND	A
LDC Report# 4565G9						

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 13 of 17)

Table 2.4-6K MS/MSD Issues for SW8330 - Explosives

Sample	Explosives: EPA Method SW8330 Compound	Finding	Criteria	Flag	A or P
All samples in SDGs 12/12, W-17, Exp-29, 23-Exp TNT-1F3/K RSP1/K2 HF-2/K TNT-1D/K HF-3/K RSP5/K1 TNT-1L/K TW-6/K TW-5/K TNT-4C6/K TW-7/K TW-4/K TW-3 TW-3-1 (TW-3A) TW-4 TW-4K1 TNT-5F/K TW-9/K1** TW-1/K** DA3-3/K DA3-5/K TW-12 SRC-1 SRC-2 TNT-5L/K TW-8/K1 SW-1 SW-2 TNT-1N/K TNT-5A8/K LDC Report# 4567A40	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

Note: MS/MSD analyses are not required for field, equipment, or source water blanks as they do not represent the environmental matrix. All of the samples listed above were equipment blanks or source water samples, with the exception of field samples SW-1, SW-2, TW-3, TW-3A, TW-4, and TW-12. These locations were all resampled and analyzed for SW8330M during the Data Gaps Investigation. Therefore, there is no effect on the project objectives.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 14 of 17)

Table 2.4-6K MS/MSD Issues for SW8330 - Explosives

Sample	Explosives: EPA Method SW8330 Compound	Finding	Criteria	Flag	A or P
All samples in SDG 000107/000113/000 118 WET-1 WET-1(Duplicate)	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P
WET-2 WET-2A WET-2RE (NOT USED) LDC Report# 4567B40	<i>The samples listed to left were extracted and analyzed in batch 000113 with QC sample TNT-5H/OMS and TNT-5H/OMSD which were reported in SDG S-22,23.</i>	<i>Incorrect Assessment: MS/MSD analyses were performed as required and reported in a different SDG.</i>			

Note: MS/MSD analyses were performed as required with samples WET-2 and WET-2A. The sediment matrix for sample WET-1 is the same as that for samples WET-2 and WET-2A, so one MS/MSD was performed for every three samples for this matrix. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits for the MS/MSD and LCS/LCSDs. The effect on the project objectives is not significant.

*All samples in SDG S-16,17 LB-2/14.5 DA1/3W1 DA1/3W2 TW-11-16 FA6/1 FA6/1.5 DA3-3/5.5 DA3-3/10 DA3-3/15 DA3-6/5 DA3-6/10 DA3-6/15.5 DA3-6/16 TNT-1C5/4 TNT-1C5/6 TNT-1C5/8 TW-4/0.5 TW-4/4.5 TW-4/10 TW-4/15 TW-4/20 TW-4/20.5 LDC Report# 4565V40	All TCL compounds	Twenty-two samples associated to a matrix spike sample.	No more than twenty samples to be associated to a matrix spike sample.	None	P
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Note: MS/MSD analyses were performed at an overall frequency that exceeded the general requirement of one MS/MSD per 20 samples. The effect of the association of 22 samples to one MS/MSD is not expected to be significant.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 15 of 17)

Table 2.4-6L MS/MSD for SW8330 - Explosives

Spike ID (Associated Samples)	Explosives: EPA Method SW8330 Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TNT-1C3A/1MS/MSD (TNT-1C3A/1) LDC Report# 4556F40	2,4,6-Trinitrotoluene 2-Amino-4,6-dinitrotoluene	244 (65-135) 0 (65-135)	337 (65-135) 0 (65-135)	- -	J+ (all detects) R (all non-detects)	A
* TNT-1C7/0MS/MSD (TNT-1C7/0) LDC Report# 4565O40	2,4,6-Trinitrotoluene	-	-	103.5 (≤35)	J (all detects)	A
TNT-4C8/1MS/MSD (TNT-4C8/1) LDC Report# 4565S40	2,4,6-Trinitrotoluene	-	-	151.0 (≤35)	J (all detects)	A
TNT-5H/0MS/MSD (TNT-5H/0) LDC Report# 4565Y40	Amino-dinitrotoluenes 2,4,6-Trinitrotoluene	- -	176 (65-135) 913 (65-135)	36.3 (≤35) 153 (≤35)	J (all detects) UJ (all non-detects)	A
TNT-1F5/2MS/MSD (TNT-1F5/2) Not Qualified, ND LDC Report# 4565P40	Amino-dinitrotoluenes 2,4,6-Trinitrotoluene	- 142 (65-135)	57 (65-135) 141 (65-135)	- -	J- (all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	A
TNT-1F4/0MS/MSD (TNT-1F4/0) LDC Report# 4565Q40	2,4,6-Trinitrotoluene	227 (65-135)	-	53.0 (≤35)	J (all detects)	A
TNT-1F6/2MS/MSD (TNT-1F6/2)	2,4,6-Trinitrotoluene	-	179 (65-135)	-	J+ (all detects)	A
TNT-1F5/2MSRE/MSD (TNT-1F5/2RE Not Used) LDC Report# 4565P40	Tetryl	45 (50-150)	49 (50-150)	-	NA (UJ non-detect - Not Used)	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Tables
 Summary of QC Outliers (Page 17 of 17)

Table 2.4-6M MS/MSD Issues for SW8330M - PETN/Nitroglycerin

Sample	Nitroglycerin/PETN: EPA Method SW8330M Compound	Finding	Criteria	Flag	A or P
All samples in SDG 000108: LB-4/4.5 LB-5/4.5 LB-6/4.5 LDC Report# 4567124	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None	P

Note:

MS/MSD analyses were performed at an overall frequency that exceeded the requirement of one MS/MSD per 20 samples per matrix. The effect of no MS/MSD for these three samples on the quality of the data is not expected to be significant.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 1 of 13)

Table 2.4-7A LCS/LCSD for General Chemistry Method SW9060

LCS ID	Associated Samples	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/415.1/SW9060 Analyte	%R (Limits)	Flag	A or P
LCSS LDC Report# 4556A6	TW-2/B TW-2/C	Total organic carbon	75 (80-120)	J- (all detects)	P
LCS/LCSD LDC Report# 4556B6	PE-TCUP-TOC	Total organic carbon	75 (80-120)/ 77 (80-120)	J- (all detects)	P
LCSS TW-8/15.5 LDC Report# 4556L6	TW-8/15.5	Total organic carbon	75 (80-120)	J- (all detects)	P

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-7B LCS/LCSD for SW8015B - TEPH

LCS ID (Associated Samples)	TEPH: EPA Method SW8015B Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/LCSD 120499 (RSP4-C RSP4-D RSP4-B RSP4-A RSP3-A RSP3-D RSP3-B RSP3-C) LDC Report# 456518	TPH as extractables	53 (60-117)	-	-	J- (all detects) UJ (all non- detects)	P

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 2 of 13)

Table 2.4-7B LCS/LCSD for SW8015B - TEPH

LCS ID (Associated Samples)	TEPH: EPA Method SW8015B Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS 991209 (PE-TCUP-DSL HF 2/0.5 HF 2/4 HF 2/4.5 HF 2/10 RSP8 RSP1 HF-3/15 HF-3/20 RSP5) LDC Report# 4565I8	TPH as extractables	37 (60-117)	-	-	J- (all detects) UJ (all non- detects)	P
LCS 991210 (HF-1/0.5 HF-1/1 HF-1/4.5 HF-3/0.5 HF-3/5 HF-3/10 HF-4/0.5 HF-4/4 HF-4/10 HF-4/15 SP-1C) LDC Report# 4565J8	TPH as extractables	39 (60-117)	-	-	J- (all detects) UJ (all non- detects)	P
LCS/LCSD 121899 (TW-7/K TW-4/K TW-3 TW-3-1 TW-4 TW-4K) LDC Report# 4565N8	TPH as diesel	47 (60-117)	-	-	J- (all detects) UJ (all non- detects)	P

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 3 of 13)

Table 2.4-7C LCS/LCSD for SW8260B - VOCs

LCS ID	Associated Samples	VOCs: EPA Method SW8260B Compound	%R (Limits)	Flag	A or P
LCS.99121218	HF2/K HF-3/K TW-6/K** TW-8/K** TW-9/K TW-1/K TW-7/K Trip Blank 1206 Trip Blank 1207 Trip Blank 1207D Trip Blank 1208A Trip Blank 1209A Trip Blank 1211A LDC Report# 4565A1	Vinyl acetate 2-Butanone 2-Chloroethylvinyl ether 4-Methyl-2-pentanone 2-Hexanone	17 (65-135) 146 (65-135) 144 (65-135) 140 (65-135) 152 (65-135)	UJ (all non-detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	P
LCS.991214	TW-4/K TW-3 TW-3-1 TW-4K TW-4 Trip Blank 1211B LDC Report# 4565A1	Vinyl acetate	14 (65-135)	UJ (all non-detects)	P
LCS122799	All samples in SDG VW-2 TW-12 SRC-1 SRC-2 Trip Blank 122299A LDC Report# 4565B1	Dichlorodifluoromethane Chloromethane Vinyl acetate	36 (65-135) 60 (65-135) 12 (65-135)	UJ (all non-detects)	P
LCS120899	HF-2/0.5 HF-2/10 HF-3/15 HF-3/20 HF-1/0.5 HF-1/1 HF-1/4.5 HF-2C/4 HF-3/0.5 HF-3/5 HF-3/10 HF-2C/4.5 (NOT USED) HF-4/4 (NOT USED) LDC Report# 4565C1	Vinyl acetate	13 (65-135)	UJ (all non-detects)	P

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 4 of 13)

Table 2.4-7C LCS/LCSD for SW8260B - VOCs

LCS ID	Associated Samples	VOCs: EPA Method SW8260B Compound	%R (Limits)	Flag	A or P
LCS120999	PE-TCUP-VOC HF-4/0.5 HF-4/10 HF-4/15 HF-4/20 HF-2C/4.5RE HF-4/4RE LDC Report# 4565C1	Vinyl acetate Naphthalene	14 (65-135) 64 (65-135)	UJ (all non-detects)	P
LCS121099	TW-6/0.5 LDC Report# 4565C1 and TW-6/4 TW-6/8.5 TW-5/0.5 TW-5/5 TW-5/10 TW-5/14.5 TW-1/4 TW-1/10 TW-1/15 TW-1/20 TW-1/22 TW-9/11 TW-1/0.5 TW-8/15.5 (NOT USED) AR-3/0.5 (NOT USED) LDC Report# 4565D1	Vinyl acetate Acetone 2-Butanone 2-Hexanone	13 (65-135) 176 (65-135) 157 (65-135) 147 (65-135)	UJ (all non-detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	P
LCS 121399#1	AR-3/10 TW-8/15.5RE AR-3/0.5RE AR-3/4.0 (NOT USED) LDC Report# 4565D1 and AR-3/13 AR-3/17.5 AR-1/8 AR-1/0.5 AR-1/1.0 AR-2/0.5 AR-2/4 AR-2/4.5 AR-2/10 AR-1/4 LDC Report# 4565E1	Vinyl acetate Acetone 2-Butanone 2-Hexanone	12 (65-135) 199 (65-135) 160 (65-135) 172 (65-135)	UJ (all non-detects) J+ all detects Sample AR-3/17.5 Only; All others ND NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND VERIFY	P

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 5 of 13)

Table 2.4-7C LCS/LCSD for SW8260B - VOCs

LCS ID	Associated Samples	VOCs: EPA Method SW8260B Compound	%R (Limits)	Flag	A or P
LCS.121399#2	AR-4/0.5 AR-4/4 LDC Report# 4565E1 and AR-4/10 AR-4/15 AR-4/20 TW-7/0.5 TW-7/4 TW-7/7 TW-4/0.5 TW-4/10 TW-4/15 TW-4/20 TW-4/20.5 AR-4/25 (NOT USED) AR-4/30 (NOT USED) TW-4/4.5 (NOT USED) LDC Report# 4565F1	Dichlorodifluoromethane Vinyl acetate	62 (65-135) 11 (65-135)	UJ (all non-detects)	P
LCS 121499	AR-3/4.0RE LDC Report# 4565D1 and AR-1/0.5RE (NOT USED) AR-1/1.0RE (NOT USED) LDC Report# 4565E1 and TW-4/4.5RE AR-4/25RE AR-4/30RE AR-4/20RE (NOT USED) TW-7/0.5RE (NOT USED) LDC Report# 4565F1	Vinyl acetate Acetone 2-Butanone 2-Hexanone	15 (65-135) 281 (65-135) 235 (65-135) 211 (65-135)	UJ (all non-detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	P
LCS121699	TW-11-15.5 LDC Report# 4565F1	Dichlorodifluoromethane Vinyl acetate Acetone 2-Butanone 2-Hexanone	62 (65-135) 13 (65-135) 229 (65-135) 197 (65-135) 188 (65-135)	UJ (all non-detects) UJ (all non-detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	P

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 6 of 13)

Table 2.4-7D LCS/LCSD for SW8310 - PAHs

LCS ID (Associated Samples)	PAHs: EPA Method SW8310 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D 12/22 AR-2/4.5 AR-2/0.5 AR-4/0.5 AR-4/4 AR-4/10 AR-4/15 AR-4/20 AR-4/25 AR-4/30 TW-7/0.5 TW-7/4 TW-7/7 TW-4/0.5 TW-4/4.5 TW-4/10 TW-4/15 TW-4/20 TW-4/20.5 DA1-3W1 DA1-3W2)	Naphthalene Acenaphthylene	18 (30-135) 22 (30-135)	25 (30-135) 24 (30-135)	- -	UJ (all non- detects)	P
LDC Report# 4565G9						
LCS/D 12/12 (HF 2/K HF-3/K TW-6/K** TW-5/K** TW-9/K1 TW-1/K)	Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene	40 (55-135) 39 (55-135) 38 (55-135) 34 (40-135) 37 (55-135) 42 (55-135) 43 (55-135)	- 53 (55-135) 52 (55-135) 48 (40-135) 49 (55-135) - 52 (55-135)	- - - - - - -	UJ (all non- detects)	P
LDC Report# 4565H9						
LCS/D 12/23 (TW-8/K1 DA3-3/K TW-12 SRC-1 SRC-2 SW-1 SW-2)	Naphthalene Acenaphthylene Acenaphthene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Benzo(a)pyrene Benzo(g,h,i)perylene	46 (55-135) 48 (55-135) 48 (55-135) 52 (55-135) 33 (55-135) 52 (55-135) 49 (55-135) 52 (55-135) 51 (55-135) 51 (55-135)	- - - - - - - - - -	- - - - - - - - - -	UJ (all non- detects)	P
LDC Report# 4565H9						

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 7 of 13)

Table 2.4-7D LCS/LCSD for SW8310 - PAHs

LCS ID (Associated Samples)	PAHs: EPA Method SW8310 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D 12/20	Phenanthrene	156 (30-135)	220 (30-135)	-	NA (J+ all detects)	P
(HF-4/0.5	Fluoranthene	196 (30-135)	272 (30-135)	-	NA (J+ all detects)	
HF-4/4	Pyrene	212 (30-135)	276 (30-135)	-	NA (J+ all detects)	
HF-4/10	Benzo(a)anthracene	260 (30-135)	304 (30-135)	-	NA (J+ all detects)	
HF-4/15	Chrysene	276 (30-135)	336 (30-135)	-	NA (J+ all detects)	
RSP-1C	Benzo(b)fluoranthene	288 (30-135)	348 (30-135)	-	NA (J+ all detects)	
SP-2C	Benzo(k)fluoranthene	284 (30-135)	336 (30-135)	-	NA (J+ all detects)	
HF-4/20	Benzo(a)pyrene	264 (30-135)	348 (30-135)	-	NA (J+ all detects)	
HF-4/23	Dibenz(a,h)anthracene	284 (30-135)	336 (30-135)	-	NA (J+ all detects)	
TW-6/0.5	Benzo(g,h,i)perylene	276 (30-135)	322 (30-135)	-	NA (J+ all detects)	
TW-6/4	Indeno(1,2,3-cd)pyrene	276 (30-135)	364 (30-135)	-	NA (J+ all detects)	
TW-6/8.5	Naphthalene	-	164 (30-135)	-	NA (J+ all detects)	
TW-5/0.5	Acenaphthylene	-	228 (30-135)	-	NA (J+ all detects)	
TW-5/5	Acenaphthene	-	224 (30-135)	-	NA (J+ all detects)	
TW-5/10	Fluorene	-	236 (30-135)	-	NA (J+ all detects)	
TW-5/14.5	Anthracene	-	228 (30-135)	-	NA (J+ all detects)	
TW-5/20					No samples	
TW8/15.5) -					qualified, all ND	
LDC Report# 4565G9						
LCS/D12/21	Pyrene	196 (30-135)	180 (30-135)	-	NA (J+ all detects)	
(TW-1/4	Benzo(a)anthracene	188 (30-135)	152 (30-135)	-	NA (J+ all detects)	
TW-1/10	Chrysene	240 (30-135)	192 (30-135)	-	NA (J+ all detects)	
TW-1/15	Benzo(k)fluoranthene	244 (30-135)	188 (30-135)	-	NA (J+ all detects)	
TW-1/20	Dibenz(a,h)anthracene	240 (30-135)	199 (30-135)	-	NA (J+ all detects)	
TW-1/22	Fluoranthene	172 (30-135)	176 (30-135)	-	NA (J+ all detects)	
TW-9/11.0	Benzo(b)fluoranthene	-	184 (30-135)	-	NA (J+ all detects)	
TW-1/0.5	Benzo(a)pyrene	-	192 (30-135)	-	NA (J+ all detects)	
AR-3/0.5	Indeno(1,2,3-cd)pyrene	-	160 (30-135)	-	NA (J+ all detects)	
AR-3/4.0					No samples	
AR-3/10					qualified, all ND	
AR-3/13						
AR-3/17.5						
AR-1/4						
AR-1/8						
AR-1/0.5						
AR-1/1.0						
AR-2/10						
AR-2/4						
AR-2/4.5						
AR-2/0.5						
TNT-1C5/1)						
LDC Report# 4565G9						

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 8 of 13)

Table 2.4-7D LCS/LCSD for SW8310 - PAHs

LCS ID (Associated Samples)	PAHs: EPA Method SW8310 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D 12/17 (TW-7/K TW-4/K TW-3 TW-3-1 TW-4 TW-4K1) LDC Report# 4565H9	Naphthalene	141 (50-135)	201 (50-135)	-	NA (J+ all detects)	P
	Acenaphthylene	249 (50-135)	190 (50-135)	-	NA (J+ all detects)	
	Acenaphthene	229 (50-135)	181 (50-135)	-	NA (J+ all detects)	
	Fluorene	220 (40-135)	161 (40-135)	-	NA (J+ all detects)	
	Phenanthrene	261 (50-135)	202 (50-135)	-	NA (J+ all detects)	
	Anthracene	273 (50-135)	226 (50-135)	-	NA (J+ all detects)	
	Fluoranthene	280 (50-135)	301 (50-135)	-	NA (J+ all detects)	
	Pyrene	306 (50-135)	335 (50-135)	-	NA (J+ all detects)	
	Benzo(a)anthracene	296 (50-135)	296 (50-135)	-	NA (J+ all detects)	
	Chrysene	313 (50-135)	331 (50-135)	-	NA (J+ all detects)	
	Benzo(b)fluoranthene	292 (50-135)	295 (50-135)	-	NA (J+ all detects)	
	Benzo(k)fluoranthene	298 (50-135)	300 (50-135)	-	NA (J+ all detects)	
	Benzo(a)pyrene	311 (50-135)	318 (50-135)	-	NA (J+ all detects)	
	Dibenz(a,h)anthracene	310 (50-135)	317 (50-135)	-	NA (J+ all detects)	
Benzo(g,h,i)perylene	352 (50-135)	364 (50-135)	-	NA (J+ all detects)		
Indeno(1,2,3-cd)pyrene	294 (50-135)	306 (50-135)	-	NA (J+ all detects)		
					<i>No samples qualified, all ND</i>	
LCS/D 12/18 (DA3-5/K) LDC Report# 4565H9	Naphthalene	136 (55-135)	-	-	NA (J+ all detects)	P
	Phenanthrene	136 (55-135)	-	-	NA (J+ all detects)	
	Fluoranthene	136 (55-135)	-	-	NA (J+ all detects)	
	Benzo(a)anthracene	148 (55-135)	144 (55-135)	-	NA (J+ all detects)	
	Chrysene	164 (55-135)	156 (55-135)	-	NA (J+ all detects)	
	Benzo(b)fluoranthene	160 (55-135)	152 (55-135)	-	NA (J+ all detects)	
	Benzo(k)fluoranthene	156 (55-135)	148 (55-135)	-	NA (J+ all detects)	
	Benzo(a)pyrene	152 (55-135)	148 (55-135)	-	NA (J+ all detects)	
	Dibenz(a,h)anthracene	160 (55-135)	156 (55-135)	-	NA (J+ all detects)	
	Benzo(g,h,i)perylene	156 (55-135)	152 (55-135)	-	NA (J+ all detects)	
	Indeno(1,2,3-cd)pyrene	160 (55-135)	152 (55-135)	-	NA (J+ all detects)	
					<i>No samples qualified, all ND</i>	

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 10 of 13)

Table 2.4-7F LCS/LCSD for SW8330 - Explosives

LCS ID (Associated Samples)	Explosives: EPA Method SW8330 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D W-17 (TW-7/K TW-4/K TW-3 TW-3-1 TW-4 TW-4K1 TNT-5F/K TW-9/K1** TW-1/K**) LDC Report# 4567A40	HMX	34 (65-135)	32 (65-135)	-	J- (all detects) UJ (all non- detects)	P
	RDX	42 (65-135)	38 (65-135)	-		
	1,3,5-TNB	31 (65-135)	33 (65-135)	-		
	1,3-DNB	31 (65-135)	33 (65-135)	-		
	Nitrobenzene	29 (65-135)	31 (65-135)	-		
	Tetryl	24 (50-150)	21 (50-150)	+		
	2,4,6-TNT	26 (65-135)	25 (65-135)	-		
	2,6-DNT	29 (65-135)	30 (65-135)	-		
	2,4-DNT	29 (65-135)	30 (65-135)	-		
	2-Nitrotoluene	29 (65-135)	30 (65-135)	-		
	4-Nitrotoluene	32 (65-135)	34 (65-135)	-		
3-Nitrotoluene	29 (65-135)	31 (65-135)	-			
Amino-DNTs	0 (65-135)	0 (65-135)	-	J- (all detects: Sample TW-4 only) R (all non-detects: all remaining samples)		
LCS/D 23-EXP (DA3-3/K DA3-5/K TW-12 SRC-1 SRC-2 TNT-5L/K TW-8/K1 TNT-1N/K TNT-5A8/K) LDC Report# 4567A40	HMX	-	14 (65-135)	135.7 (≤ 20)	J (all detects) UJ (all non- detects)	P
	RDX	-	13 (65-135)	143.9 (≤ 20)		
	1,3,5-TNB	-	15 (65-135)	136.7 (≤ 20)		
	1,3-DNB	-	15 (65-135)	136.1 (≤ 20)		
	Nitrobenzene	-	17 (65-135)	124.3 (≤ 20)		
	Tetryl	-	10 (50-150)	142.2 (≤ 20)		
	2,4,6-TNT	-	14 (65-135)	139.8 (≤ 20)		
	2,6-DNT	-	15 (65-135)	133.9 (≤ 20)		
	2,4-DNT	-	15 (65-135)	135.0 (≤ 20)		
	2-Nitrotoluene	-	11 (65-135)	147.2 (≤ 20)		
	4-Nitrotoluene	-	18 (65-135)	124.6 (≤ 20)		
3-Nitrotoluene	-	18 (65-135)	126.7 (< 20)			
Amino-DNTs	0 (65-135)	0 (65-135)	-	R (all non-detects)		
LCS/D EXP-29 (SW-1 SW-2) LDC Report# 4567A40	HMX	23 (65-135)	14 (65-135)	46.8 (≤ 20)	J (all detects) UJ (all non- detects)	P
	RDX	22 (65-135)	14 (65-135)	40.0 (≤ 20)		
	1,3,5-TNB	24 (65-135)	14 (65-135)	50.0 (≤ 20)		
	1,3-DNB	23 (65-135)	13 (65-135)	57.8 (≤ 20)		
	Nitrobenzene	22 (65-135)	11 (65-135)	66.7 (≤ 20)		
	Tetryl	18 (50-150)	12 (50-150)	42.1 (≤ 20)		
	2,4,6-TNT	24 (65-135)	15 (65-135)	44.9 (≤ 20)		
	2,6-DNT	24 (65-135)	12 (65-135)	66.7 (≤ 20)		
	2,4-DNT	25 (65-135)	12 (65-135)	69.6 (≤ 20)		
	4-Nitrotoluene	24 (65-135)	13 (65-135)	60.9 (≤ 20)		
	2-Nitrotoluene	22 (65-135)	22 (65-135)	-		
3-Nitrotoluene	22 (65-135)	8 (65-135)	94.7 (≤ 20)	R (all non-detects) R (all non-detects)		
Amino-DNTs	0 (65-135)	0 (65-135)	-			

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 11 of 13)

Table 2.4-7F LCS/LCSD for SW8330 - Explosives

LCS ID (Associated Samples)	Explosives: EPA Method SW8330 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P	
LCS/D W-17 1/15/00 (TW-7/KRE (NOT USED))	1,3,5-TNB	58 (65-135)	38 (65-135)	41.3 (≤ 20)	J (all detects) UJ (all non-detects)	P	
TW-4/KRE (NOT USED)	1,3-DNB	62 (65-135)	38 (65-135)	46.4 (≤ 20)			
TW-3RE (NOT USED)	Nitrobenzene	41 (65-135)	58 (65-135)	34.1 (≤ 20)			
TW-3-1RE (NOT USED)	2,4,6-TNT	54 (65-135)	30 (65-135)	56.6 (≤ 20)			
TW-4RE (NOT USED)	2,6-DNT	56 (65-135)	38 (65-135)	39.3 (≤ 20)			
TW-4K1RE (NOT USED)	2,4-DNT	54 (65-135)	31 (65-135)	54.2 (≤ 20)			
TNT-5F/KRE (NOT USED)	4-Nitrotoluene	55 (65-135)	41 (65-135)	30.0 (≤ 20)			
TW-9/K1RE (NOT USED)**	HMX	-	40 (65-135)	73.4 (≤ 20)			
TW-1/KRE (NOT USED)**	RDX	-	45 (65-135)	50.7 (≤ 20)			
	3-Nitrotoluene	-	41 (65-135)	50.0 (≤ 20)			
	2-Nitrotoluene	54 (65-135)	47 (65-135)	-			
	Tetryl	32 (65-135)	38 (65-135)	-			
LDC Report# 4567A40	Amino-DNTs	0 (50-150)	0 (50-150)				J- (all detects: Sample TW-4 only) R (all non-detects: all remaining samples)
LCS/D S-3RE (RSP9RE (NOT USED)) RSP6RE (NOT USED) RSP7RE (NOT USED) TNT-1C8/0RE (NOT USED) TNT-1C8/1RE (NOT USED) TNT-1C8/2RE (NOT USED) TNT-1C8/4RE (NOT USED) TNT-1F5/0RE (NOT USED) TNT-1F5A/0 (NOT USED) TNT-1F5/1RE (NOT USED) TNT-1F5/2RE (NOT USED)	Tetryl	36 (65-135)	44 (65-135)	-			UJ (all non-detects)
LDC Report# 4565P40							

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 12 of 13)

Table 2.4-7F LCS/LCSD for SW8330 - Explosives

LCS ID (Associated Samples)	Explosives: EPA Method SW8330 Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCSA/D S-17 (LB-2/14.5 DA1/3W1 DA1/3W2 TW-11-16 FA6/1 FA6/1.5 DA3-3/5.5 DA3-3/10 DA3-3/15 DA3-6/5 DA3-6/10 DA3-6/15.5 DA3-6/16)	2,6- Dinitrotoluene	136 (65-135)	137 (65-135)	-	NA (J+ all detects) <i>No samples qualified, all ND</i>	P
LDC Report# 4565V40						

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 2.4-7. Laboratory Control Samples (LCS) Tables
 Summary of QC Outliers (Page 13 of 13)

Table D.2.4-7G LCS/LCSD for SW8330M - PETN/Nitroglycerin

LCS ID (Associated Samples)	Nitroglycerin/PETN: EPA Method SW8330M Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D W-17 (TW-7/K TW-4/K TW-3 TW-3-1 (TW-3A) TW-4 TW-4K1) LDC Report# 4567D24	Nitroglycerin PETN	15 (50-150) 7 (50-150)	32 (50-150) 11 (50-150)	72.1 (≤ 50) -	UJ (all non- detects) R (all non-detects)	P
LCS/D 23-Nitro (DA3-3/K TW-12 SRC-1 SRC-2 TW-8/K1) LDC Report# 4567D24	Nitroglycerin PETN	18 (50-150) 17 (50-150)	26 (50-150) 21 (50-150)	- -	UJ (all non- detects) UJ (all non- detects)	P
LCS/D Nitro-29 (SW-1 SW-2) LDC Report# 4567D24	Nitroglycerin PETN	34 (50-150) 30 (50-150)	22 (50-150) -	- 52.7 (≤ 50)	J- (all detects) UJ (all non- detects) UJ (all non- detects)	P

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-8. Duplicate Sample Analysis Tables
Summary of QC Outliers (Page 1 of 1)

Table 2.4-8. Duplicate Sample Analysis for SW6010B/7470A/7471A - Metals

DUP ID (Associated Samples)	Metals: EPA Methods SW6010B/SW7470A/SW7471A Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
TW-6/0.5DUP (All soil samples in SDG G9L100226) HF-4/4.5 HF-4/10.5 HF-4/15.5 HF-4/20.5 HF-4/23.5 SP-2C SP-1C TNT-1C3/3.5 HF-4A/0.5 TW-6/4.5 TW-6/9 TW-6/0.5 LDC Report# 4556A4	Calcium	51 (<35)	-	J (all detects) UJ (all non-detects)	A
AR-2/5.5DUP (AR-3/13.5 AR-3/18 AR-1/4.5 AR-1A/0.5 AR-1A/1.0 AR-2/5.5 AR-2/10.5 AR-2/5) LDC Report# 4556K4	Arsenic Manganese	62 (<35) 48 (<35)	- -	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

This table was reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-9. ICP Serial Dilution Tables for SW6010B - Metals
 Summary of QC Outliers (Page 1 of 5)

Diluted Sample	Associated Samples	Metals: EPA Method SW6010B Analyte	%D (Limits)	Flag	A or P
TW-6/0.5L HF-4/4.5L	All soil samples in SDG G9L100226 HF-4/10.5 HF-4/15.5 HF-4/20.5 HF-4/23.5 SP-2C SP-1C TNT-1C3/3.5 HF-4A/0.5 TW-6/4.5 TW-6/9 TW-6/0.5 <i>Lead Only</i> (Should not be qualified for sodium, %D acceptable in TW-6/0.5L) HF-4/4.5 <i>Sodium Only</i> (Should not be qualified for lead, %D acceptable in HF-4/4.5L) LDC Report# 4556A4	Sodium Lead	17.4 (≤ 10) 12.0 (≤ 10)	J (all detects) UJ (all non-detects)	A
PE-TCUP-MDUPL	All samples in SDG G9L020289: PE-TCUP-M LDC Report# 4556B4	Antimony Thallium Arsenic Lead Selenium	12.0 (≤ 10) 11.2 (≤ 10) 13.4 (≤ 10) 11.4 (≤ 10) 16.4 (≤ 10)	J (all detects) UJ (all non-detects)	A
RSP6L	All soil samples in SDG G9L080235: RSP 8 RSP 1 LDC Report# 4556C4 and All samples in SDG G9L080242: RSP 9 RSP 6 RSP 7 LDC Report# 4556D4 and All samples in SDG G9L080277: RSP-2 RSP-2A LDC Report# 4556G4	Sodium Zinc Lead	17.3 (≤ 10) 11.3 (≤ 10) 11.3 (≤ 10)	J (all detects) UJ (all non-detects)	A

Table 2.4-9. ICP Serial Dilution Tables for SW6010B - Metals
 Summary of QC Outliers (Page 2 of 5)

Diluted Sample	Associated Samples	Metals: EPA Method SW6010B Analyte	%D (Limits)	Flag	A or P
TNT-1C7A/1L	All samples in SDG G9L080262: TNT-1C5A/0 TNT-1C3A/0 TNT-1C3A/1 TNT-1C3A/2 TNT-1C6/4.5 TNT-1C4/3.5 LDC Report# 4556F4 and All samples in SDG G9L080300: TNT-1C6A/0 TNT-1C6A/0.5 TNT-1C6A/1 TNT-1C6A/2 TNT-1C7A/0 TNT-1C7A/1 TNT-1C7A/1.5 TNT-1C4A/0 TNT-1C4A/1 LDC Report# 4556I4	Lead Zinc	11.0 (≤ 10) 10.5 (≤ 10)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
RSP-4L	All samples in SDG G9L080293: RSP-4 RSP-3 LDC Report# 4556H4	Lead	13.5 (≤ 10)	J (all detects) UJ (all non-detects)	A
HF 3/20.5L	All soil samples in SDG G9L090246: HF 1/5 HF 1A/0.5 HF 1A/1 HF 3/5.5 HF 3/10.5 HF 3/15.5 HF 3/20.5 HF 3A/0.5 RSP 5 LDC Report# 4556J4	Arsenic Lead	12.6 (≤ 10) 11.1 (≤ 10)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Table 2.4-9. ICP Serial Dilution Tables for SW6010B - Metals
 Summary of QC Outliers (Page 3 of 5)

Diluted Sample	Associated Samples	Metals: EPA Method SW6010B Analyte	%D (Limits)	Flag	A or P
AR-4A/0.5L	TW-1A/0.5 AR-3/4.5 AR-3/10.5 AR-3A/0.5 AR-2A/0.5 TW-7/0.5 TW-7/4.5 TW-7/7.5 TW-7/8 AR-4A/0.5 AR-4/4.5 AR-4/11 AR-4/15.5 AR-4/20.5 AR-4/25.5 AR-4/30.5 LDC Report# 4556K4	Arsenic Lead	13.6 (≤ 10) 13.2 (≤ 10)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
AR-2/5.5L	AR-3/13.5 AR-3/18 AR-1/4.5 AR-1A/0.5 AR-1A/1.0 AR-2/5.5 AR-2/10.5 AR-2/5 LDC Report# 4556K4	Nickel Lead	13.0 (≤ 10) 11.4 (≤ 10)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
TW-1/5.5L	All soil samples in SDG G9L110172: TW-1/5.5 TW-1/10.5 TW-1/15.5 TW-1/19.5 TW-8/15.5 TW-5A/0.5 TW-5/20.5 TW-5/5.5 TW-5/10.5 LDC Report# 4556L4	Lead	11.1 (≤ 10)	J (all detects) UJ (all non-detects)	A

Table 2.4-9. ICP Serial Dilution Tables for SW6010B - Metals
 Summary of QC Outliers (Page 4 of 5)

Diluted Sample	Associated Samples	Metals: EPA Method SW6010B Analyte	%D (Limits)	Flag	A or P
TW-4A/0.5L	All soil samples in SDG G9L150204: TW-4A/0.5 TW-4/5 TW-4/10.5 TW-4/15.5 TW-4/21 TW-4/21.5 DA1-3W1 DA1-3W2 LDC Report# 4556M4 All soil samples in SDG G9L210200: DA 3-4/5.5 DA 3-4/10.5 DA 3-5/7.5 DA 3-3/6 DA 3-3/10.5 DA 3-3/15.5 DA 3-6/5.5 DA 3-6/10.5 DA 3-6/16.5 LB-3A/4.5 TNT-1C10A/0 TNT-1C10A/2 LDC Report# 4556O4	Sodium	25.5 (≤ 10)	J (all detects) UJ (all non-detects)	A
FA-5/0L	All soil samples in SDG G9L170254: FA-5/0 FA-5/0.5 FA-5/1 FA-5/2 FA-5/5 FA-6A/1 FA-6A/1.5 FA-6/2 FA-6/3 FA-4/0 FA-4/0.5 FA-4/1 TW-11-16.5 FA-4/2.5 FA-4/3 LDC Report# 4556N4 WET-1 WET-2 WET-2A LDC Report# 4556P4	Zinc	11.4 (≤ 10)	J (all detects) UJ (all non-detects)	A

Table 2.4-9. ICP Serial Dilution Tables for SW6010B - Metals
 Summary of QC Outliers (Page 5 of 5)

Diluted Sample	Associated Samples	Metals: EPA Method SW6010B Analyte	%D (Limits)	Flag	A or P
179L	179 118 129 132 146 170 173 184 89 50 68 241 210 238 19 27 44 38 99 100 LDC Report# 4556P4	Arsenic Lead	17.5 (≤ 10) 10.5 (≤ 10)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 2.4-10. TEPH Target Compound Identification Tables
(Page 1 of 4)

Sample	TEPH: EPA Method SW8015B Hydrocarbon Pattern
PE-TCUP-DSL	Chromatogram pattern was similar to TPH as diesel.
PE-TCUP-DSL DL	Chromatogram pattern was similar to TPH as diesel.
AR-1/0.5	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-1/1.0	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-1/4	ND
AR-1/8	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-2/0.5	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-2/4	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-2/4.5	Chromatogram pattern was similar to TPH as diesel.
AR-2/10	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-3/0.5	Chromatogram pattern was similar to TPH as motor oil.
AR-3/4.0	ND
AR-3/10	ND
AR-3/13	ND
AR-3/17.5	Chromatogram pattern was similar to TPH as diesel.
AR-3/17.5DL (NOT USED)	Chromatogram pattern was similar to TPH as diesel.
AR-4/0.5	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-4/4	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-4/10	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-4/15	Chromatogram pattern was similar to TPH as motor oil.
AR-4/20	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-4/25	Chromatogram pattern was similar to TPH as motor oil and diesel.
AR-4/30	Chromatogram pattern was similar to TPH as diesel and motor oil.
HF-1/0.5	ND
HF-1/1	ND
HF-1/4.5	ND
HF-2/0.5	Chromatogram pattern was similar to TPH as motor oil.
HF-2/4	ND

Table 2.4-10. TEPH Target Compound Identification Tables
(Page 2 of 4)

Sample	TEPH: EPA Method SW8015B Hydrocarbon Pattern
HF-2/4.5	ND
HF-2/10	ND
HF-2/K	ND
HF-3/0.5	Chromatogram pattern was similar to TPH as motor oil.
HF-3/5	ND
HF-3/10	ND
HF-3/15	ND
HF-3/20	ND
HF-3/K	ND
HF-4/0.5	ND
HF-4/4	ND
HF-4/10	ND
HF-4/15	ND
HF-4/20	ND
HF-4/23	ND
RSP1	Chromatogram pattern was similar to TPH as motor oil and TPH as diesel.
RSP1/K	ND
RSP2	Chromatogram pattern was similar to TPH as motor oil.
RSP2-A	Chromatogram pattern was similar to TPH as motor oil.
RSP3-A	ND
RSP3-B	ND
RSP3-C	ND
RSP3-D	Chromatogram pattern was similar to TPH as motor oil.
RSP4-A	ND
RSP4-B	ND
RSP4-BRE	ND
RSP4-C	ND
RSP4-D	ND

Table 2.4-10. TEPH Target Compound Identification Tables

(Page 3 of 4)

Sample	TEPH: EPA Method SW8015B Hydrocarbon Pattern
RSP5	Chromatogram pattern was similar to TPH as motor oil.
RSP5/K	ND
RSP6	Chromatogram pattern was similar to TPH as motor oil.
RSP7	Chromatogram pattern was similar to TPH as motor oil.
RSP8	ND
RSP9	Chromatogram pattern was similar to TPH as motor oil.
SP-1C	Chromatogram pattern was similar to TPH as motor oil.
SP-2C	Chromatogram pattern was similar to TPH as motor oil.
SRC-1	ND
SRC-2	ND
TW-1/0.5	ND
TW-1/4	ND
TW-1/10	ND
TW-1/15	ND
TW-1/20	ND
TW-1/22	Chromatogram pattern was similar to TPH as diesel.
TW-1/K	ND
TW-3	Chromatogram pattern was similar to TPH as diesel.
TW-3-1	Chromatogram pattern was similar to TPH as diesel.
TW-4/10	ND
TW-4/4.5	ND
TW-4/0.5	Chromatogram pattern was similar to TPH as motor oil.
TW-4/15	Chromatogram pattern was similar to TPH as motor oil.
TW-4/20	Chromatogram pattern was similar to TPH as motor oil.
TW-4/20.5	ND
TW-4	Chromatogram pattern was similar to TPH as motor oil and TPH as diesel.
TW-4/K	ND
TW-4K	ND

Table 2.4-10. TEPH Target Compound Identification Tables
(Page 4 of 4)

Sample	TEPH: EPA Method SW8015B Hydrocarbon Pattern
TW-5/0.5	ND
TW-5/5	Chromatogram pattern was similar to TPH as motor oil.
TW-5/10	Chromatogram pattern was similar to TPH as motor oil.
TW-5/14.5	ND
TW-5/20	ND
TW-5/K**	ND
TW-6/0.5	ND
TW-6/4	ND
TW-6/8.5	ND
TW-6/K**	ND
TW-7/0.5	Chromatogram pattern was similar to TPH as diesel and motor oil.
TW-7/4	Chromatogram pattern was similar to TPH as diesel and motor oil.
TW-7/7	Chromatogram pattern was similar to TPH as motor oil.
TW-7/K	ND
TW-8/15.5	ND
TW-9/11.0	ND
TW-9/K	ND
TW-11-16	ND

ND = Not Detected, Chromatographic Pattern Identification Not Applicable

This table was reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. All TEPH chromatograms were reviewed and characterized by the laboratory, LDC, and Earth Tech chemists, as presented in the findings in this table. All results reported as detections for specific TEPH fuels represent a characteristic match to the specified chromatographic fuel patterns, and may include inexact matches such as weathered fuel or additional peaks in the pattern.

Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
 Onsite Environmental Laboratories Method Detection Limits
 Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
 (Page 1 of 9)

Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG		
TEPH - Soil							
as Diesel	SW8015B	mg/kg	1.0	0.45	--	--	--
as Kerosene	SW8015B	mg/kg	1.0	NA ⁽²⁾	--	--	--
as Motor Oil	SW8015B	mg/kg	10.0	4.01	--	--	--
TEPH - Water							
as Diesel	SW8015B	µg/L	50	14	--	--	--
as Kerosene	SW8015B	µg/L	50	NA ⁽²⁾	--	--	--
as Motor Oil	SW8015B	µg/L	500	200	--	--	--
VOCs - Soil							
Acetone	SW8260B	mg/kg	0.020	0.0031	1600	PRG	PRG
Benzene	SW8260B	mg/kg	0.005	0.0025	0.67	PRG	PRG
Bromobenzene	SW8260B	mg/kg	0.005	0.0028	28	PRG	PRG
Bromochloromethane	SW8260B	mg/kg	0.005	0.0024	--	--	--
Bromodichloromethane	SW8260B	mg/kg	0.005	0.0026	1.0	PRG	PRG
Bromoform	SW8260B	mg/kg	0.005	0.0028	62	PRG	PRG
Bromomethane	SW8260B	mg/kg	0.010	0.0020	3.9	PRG	PRG
2-Butanone	SW8260B	mg/kg	0.020	0.012	7,300	PRG	PRG
n-Butylbenzene	SW8260B	mg/kg	0.005	0.0048	140	PRG	PRG
sec-Butylbenzene	SW8260B	mg/kg	0.005	0.0044	110	PRG	PRG
tert-Butylbenzene	SW8260B	mg/kg	0.005	0.0039	130	PRG	PRG
Carbon Disulfide	SW8260B	mg/kg	0.005	0.0022	360	PRG	PRG
Carbon Tetrachloride	SW8260B	mg/kg	0.005	0.0026	0.24	PRG	PRG
Chlorobenzene	SW8260B	mg/kg	0.005	0.0029	150	PRG	PRG
Chloroethane	SW8260B	mg/kg	0.010	0.0024	3.0	PRG	PRG

Note: Compounds with MDLs greater than the specified action level (PRG) are highlighted in bold. MDLs that exceed ½ the PQL are highlighted in italics.

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
2-Chloroethyl vinyl ether	SW8260B	mg/kg	0.005	0.0025	--	--	
Chloroform	SW8260B	mg/kg	0.005	0.0025	0.24	PRG	
Chloromethane	SW8260B	mg/kg	0.010	0.0026	1.2	PRG	
2-Chlorotoluene	SW8260B	mg/kg	0.005	0.0032	--	--	
4-Chlorotoluene	SW8260B	mg/kg	0.005	0.0031	--	--	
Dibromochloromethane	SW8260B	mg/kg	0.005	0.0028	1.1	PRG	
1,2-Dibromo-3-chloropropane	SW8260B	mg/kg	0.010	0.0030	0.062	PRG	
1,2-Dibromoethane	SW8260B	mg/kg	0.005	0.0028	0.0069	PRG	
Dibromomethane	SW8260B	mg/kg	0.005	0.0026	--	--	
1,2-Dichlorobenzene	SW8260B	mg/kg	0.005	0.0031	370	PRG	
1,3-Dichlorobenzene	SW8260B	mg/kg	0.005	0.0032	130	PRG	
1,4-Dichlorobenzene	SW8260B	mg/kg	0.005	0.0033	3.4	PRG	
Dichlorodifluoromethane	SW8260B	mg/kg	0.010	0.0040	94	PRG	
1,1-Dichloroethane	SW8260B	mg/kg	0.005	0.0024	590	PRG	
1,2-Dichloroethane	SW8260B	mg/kg	0.005	0.0026	0.35	PRG	
1,1-Dichloroethene	SW8260B	mg/kg	0.005	0.0024	0.054	PRG	
cis-1,2-Dichloroethene	SW8260B	mg/kg	0.005	0.0023	43	PRG	
trans-1,2-Dichloroethene	SW8260B	mg/kg	0.005	0.0022	63	PRG	
1,2-Dichloropropane	SW8260B	mg/kg	0.005	0.0025	0.35	PRG	
1,3-Dichloropropane	SW8260B	mg/kg	0.005	0.0029	--	--	
2,2-Dichloropropane	SW8260B	mg/kg	0.005	0.0023	--	--	
1,1-Dichloropropene	SW8260B	mg/kg	0.005	0.0025	0.082	PRG	
cis-1,3-Dichloropropene	SW8260B	mg/kg	0.005	0.0024	0.082	PRG	
trans-1,3-Dichloropropene	SW8260B	mg/kg	0.005	0.0024	0.082	PRG	
Ethylbenzene	SW8260B	mg/kg	0.005	0.0030	230	PRG	
Hexachlorobutadiene	SW8260B	mg/kg	0.005	0.0070	6.2	PRG	
2-Hexanone	SW8260B	mg/kg	0.020	0.012	--	--	
Isopropylbenzene	SW8260B	mg/kg	0.005	0.0034	160	PRG	

Note: Compounds with MDLs greater than the specified action level (PRG) are **highlighted in bold**. MDLs that exceed ½ the PQL are *highlighted in italics*.

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
p-Isopropyltoluene	SW8260B	mg/kg	0.005	0.0041	--	--	--
Methylene chloride	SW8260B	mg/kg	0.020	0.0041	8.9	PRG	PRG
4-Methyl-2-pentanone	SW8260B	mg/kg	0.020	0.0043	790	PRG	PRG
Methyl(tert)butylether	SW8260B	mg/kg	0.005	0.0028	--	--	--
Naphthalene	SW8260B	mg/kg	0.010	0.0025	56	PRG	PRG
n-Propylbenzene	SW8260B	mg/kg	0.005	0.0036	140	PRG	PRG
Styrene	SW8260B	mg/kg	0.005	0.0031	1700	PRG	PRG
1,1,1,2-Tetrachloroethane	SW8260B	mg/kg	0.005	0.0028	3.0	PRG	PRG
1,1,2,2-Tetrachloroethane	SW8260B	mg/kg	0.005	0.0030	0.38	PRG	PRG
Tetrachloroethene	SW8260B	mg/kg	0.005	0.0030	5.7	PRG	PRG
Toluene	SW8260B	mg/kg	0.005	0.0025	520	PRG	PRG
1,2,3-Trichlorobenzene	SW8260B	mg/kg	0.005	0.0030	--	--	--
1,2,4-Trichlorobenzene	SW8260B	mg/kg	0.005	0.0031	650	PRG	PRG
1,1,1-Trichloroethane	SW8260B	mg/kg	0.005	0.0027	770	PRG	PRG
1,1,2-Trichloroethane	SW8260B	mg/kg	0.005	0.0028	0.84	PRG	PRG
Trichloroethene	SW8260B	mg/kg	0.005	0.0024	2.8	PRG	PRG
Trichlorofluoromethane	SW8260B	mg/kg	0.010	0.0029	390	PRG	PRG
1,2,3-Trichloropropane	SW8260B	mg/kg	0.005 ⁽¹⁾	0.0031	0.0014	PRG	PRG
1,1,2-Trichlorotrifluoroethane	SW8260B	mg/kg	0.005	0.0033	5,600	PRG	PRG
1,2,4-Trimethylbenzene	SW8260B	mg/kg	0.005	0.0034	5.7	PRG	PRG
1,3,5-Trimethylbenzene	SW8260B	mg/kg	0.005	0.0035	21	PRG	PRG
Vinyl Acetate	SW8260B	mg/kg	0.010	0.0025	430	PRG	PRG
Vinyl Chloride	SW8260B	mg/kg	0.010	0.0030	0.022	PRG	PRG
m & p-Xylene	SW8260B	mg/kg	0.010	0.0059	210	PRG	PRG
o-Xylene	SW8260B	mg/kg	0.005	0.0029	210	PRG	PRG

VOCs - Water

Note: Compounds with MDLs greater than the specified action level (PRG) are highlighted in bold. MDLs that exceed ½ the PQL are highlighted in italics.

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
Acetone	SW8260B	µg/L	10	2.4	610	PRG	
Benzene	SW8260B	µg/L	1 ⁽¹⁾	0.30	0.41	PRG	
Bromobenzene	SW8260B	µg/L	1	0.36	20	PRG	
Bromochloromethane	SW8260B	µg/L	1	0.41	--	--	
Bromodichloromethane	SW8260B	µg/L	1 ⁽¹⁾	0.26	0.18	PRG	
Bromoform	SW8260B	µg/L	1	0.33	8.5	PRG	
Bromomethane	SW8260B	µg/L	2	0.52	8.7	PRG	
2-Butanone	SW8260B	µg/L	10	1.66	1,900	PRG	
n-Butylbenzene	SW8260B	µg/L	1	0.30	61	PRG	
sec-Butylbenzene	SW8260B	µg/L	1	0.44	61	PRG	
tert-Butylbenzene	SW8260B	µg/L	1	0.39	61	PRG	
Carbon Disulfide	SW8260B	µg/L	1	0.24	1,000	PRG	
Carbon Tetrachloride	SW8260B	µg/L	1 ⁽¹⁾	0.23	0.17	PRG	
Chlorobenzene	SW8260B	µg/L	1	0.31	110	PRG	
Chloroethane	SW8260B	µg/L	2	0.30	4.6	PRG	
2-Chloroethyl vinyl ether	SW8260B	µg/L	2	0.26	--	--	
Chloroform	SW8260B	µg/L	1 ⁽¹⁾	0.25	0.16	PRG	
Chloromethane	SW8260B	µg/L	2 ⁽¹⁾	0.46	1.5	PRG	
2-Chlorotoluene	SW8260B	µg/L	1	0.38	--	--	
4-Chlorotoluene	SW8260B	µg/L	1	0.34	--	--	
Dibromochloromethane	SW8260B	µg/L	1 ⁽¹⁾	0.25	0.13	PRG	
1,2-Dibromo-3-chloropropane	SW8260B	µg/L	2 ⁽¹⁾	0.39	.0047	PRG	
1,2-Dibromoethane	SW8260B	µg/L	1 ⁽¹⁾	0.23	.00076	PRG	
Dibromomethane	SW8260B	µg/L	1	0.24	--	--	
1,2-Dichlorobenzene	SW8260B	µg/L	1	0.26	370	PRG	
1,3-Dichlorobenzene	SW8260B	µg/L	1	0.25	5.5	PRG	
1,4-Dichlorobenzene	SW8260B	µg/L	1 ⁽¹⁾	0.21	0.50	PRG	
Dichlorodifluoromethane	SW8260B	µg/L	2	0.30	390	PRG	

Note: Compounds with MDLs greater than the specified action level (PRG) are **highlighted in bold**. MDLs that exceed ½ the PQL are *highlighted in italics*.

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
1,1-Dichloroethane	SW8260B	µg/L	3	0.28	810	PRG	
1,2-Dichloroethane	SW8260B	µg/L	1 ⁽¹⁾	0.32	0.12	PRG	
1,1-Dichloroethene	SW8260B	µg/L	1 ⁽¹⁾	0.25	0.046	PRG	
cis-1,2-Dichloroethene	SW8260B	µg/L	1	0.27	61	PRG	
trans-1,2-Dichloroethene	SW8260B	µg/L	1	0.28	120	PRG	
1,2-Dichloropropane	SW8260B	µg/L	1 ⁽¹⁾	0.35	0.16	PRG	
1,3-Dichloropropane	SW8260B	µg/L	1	0.14	--	--	
2,2-Dichloropropane	SW8260B	µg/L	1	0.18	--	--	
1,1-Dichloropropene	SW8260B	µg/L	1 ⁽¹⁾	0.24	0.081	PRG	
cis-1,3-Dichloropropene	SW8260B	µg/L	1	0.18	0.081	PRG	
trans-1,3-Dichloropropene	SW8260B	µg/L	1	0.16	0.081	PRG	
Ethylbenzene	SW8260B	µg/L	1	0.27	1300	PRG	
Hexachlorobutadiene	SW8260B	µg/L	1 ⁽¹⁾	0.49	0.86	PRG	
2-Hexanone	SW8260B	µg/L	10	0.52	--	--	
Isopropylbenzene	SW8260B	µg/L	1	0.40	660	PRG	
p-Isopropyltoluene	SW8260B	µg/L	1	0.35	--	--	
Methylene chloride	SW8260B	µg/L	2	1.8	4.3	PRG	
4-Methyl-2-pentanone	SW8260B	µg/L	10	0.31	160	PRG	
Methyl(tert)butylether	SW8260B	µg/L	2	0.58	20	PRG	
Naphthalene	SW8260B	µg/L	1	0.41	6.2	PRG	
n-Propylbenzene	SW8260B	µg/L	1	0.36	61	PRG	
Styrene	SW8260B	µg/L	1	0.28	1600	PRG	
1,1,1,2-Tetrachloroethane	SW8260B	µg/L	1 ⁽¹⁾	0.27	0.43	PRG	
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	1 ⁽¹⁾	0.14	0.055	PRG	
Tetrachloroethene	SW8260B	µg/L	1	0.35	1.1	PRG	
Toluene	SW8260B	µg/L	1	0.29	720	PRG	
1,2,3-Trichlorobenzene	SW8260B	µg/L	1	0.28	--	--	
1,2,4-Trichlorobenzene	SW8260B	µg/L	1	0.27	190	PRG	

Note: Compounds with MDLs greater than the specified action level (PRG) are **highlighted in bold**. MDLs that exceed ½ the PQL are *highlighted in italics*.

Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
1,1,1-Trichloroethane	SW8260B	µg/L	1	0.23	790		PRG
1,1,2-Trichloroethane	SW8260B	µg/L	1 ⁽¹⁾	0.14	0.20		PRG
Trichloroethene	SW8260B	µg/L	1	0.27	1.6		PRG
Trichlorofluoromethane	SW8260B	µg/L	2	0.32	1300		PRG
1,2,3-Trichloropropane	SW8260B	µg/L	2 ⁽¹⁾	0.22	0.0016		PRG
1,1,2-Trichlorotrifluoroethane	SW8260B	µg/L	1	0.24	59,000		PRG
1,2,4-Trimethylbenzene	SW8260B	µg/L	1	0.26	12		PRG
1,3,5-Trimethylbenzene	SW8260B	µg/L	1	0.36	12		PRG
Vinyl Acetate	SW8260B	µg/L	5	0.85	410		PRG
Vinyl Chloride	SW8260B	µg/L	2 ⁽¹⁾	0.45	0.0020		PRG
m & p-Xylene	SW8260B	µg/L	1	0.61	1400		PRG
o-Xylene	SW8260B	µg/L	1	0.23	1400		PRG
PAHs - Soil							
Acenaphthene	SW8310	mg/kg	0.4	0.0013	3,700		PRG
Acenaphthylene	SW8310	mg/kg	0.4	0.0009			----
Anthracene	SW8310	mg/kg	0.14	0.0011	22,000		PRG
Benzo(a)anthracene	SW8310	mg/kg	0.02	0.0010	0.62		PRG
Benzo(a)pyrene	SW8310	mg/kg	0.02	0.0008	0.062		PRG
Benzo(b)fluoranthene	SW8310	mg/kg	0.03	0.0013	0.62		PRG
Benzo(g,h,i)perylene	SW8310	mg/kg	0.02	0.0020	--		--
Benzo(k)fluoranthene	SW8310	mg/kg	0.02	0.0008	0.61		PRG
Chrysene	SW8310	mg/kg	0.04	0.0018	6.10		PRG
Dibenzo(a,h)anthracene	SW8310	mg/kg	0.04	0.0012	0.062		PRG
Fluoranthene	SW8310	mg/kg	0.05	0.0030	2,300		PRG
Fluorene	SW8310	mg/kg	0.04	0.0045	2,600		PRG
Indeno(1,2,3-c,d)pyrene	SW8310	mg/kg	0.04	0.0046	0.62		PRG

Note: Compounds with MDLs greater than the specified action level (PRG) are **highlighted in bold**. MDLs that exceed ½ the PQL are *highlighted in italics*.

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels**
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
Naphthalene	SW8310	mg/kg	0.4	0.0014	56	PRG	
Phenanthrene	SW8310	mg/kg	0.12	0.0012	--	--	
Pyrene	SW8310	mg/kg	0.06	0.0009	2,300	PRG	
PAHs - Water							
Acenaphthene	SW8310	µg/L	10	2.5	370	PRG	
Acenaphthylene	SW8310	µg/L	10	5.0	--	--	
Anthracene	SW8310	µg/L	10	0.7	1,800	PRG	
Benzo(a)anthracene	SW8310	µg/L	10 ⁽¹⁾	0.3	0.092	PRG	
Benzo(a)pyrene	SW8310	µg/L	10 ⁽¹⁾	0.3	0.0015	PRG	
Benzo(b)fluoranthene	SW8310	µg/L	10 ⁽¹⁾	0.5	0.092	PRG	
Benzo(g,h,i)perylene	SW8310	µg/L	10	0.5	--	--	
Benzo(k)fluoranthene	SW8310	µg/L	10 ⁽¹⁾	0.5	0.92	PRG	
Chrysene	SW8310	µg/L	10	0.3	9.2	PRG	
Dibenzo(a,h)anthracene	SW8310	µg/L	10	1.0	0.0092	PRG	
Fluoranthene	SW8310	µg/L	10	0.5	1,500	PRG	
Fluorene	SW8310	µg/L	10	0.5	240	PRG	
Indeno(1,2,3-c,d)pyrene	SW8310	µg/L	10 ⁽¹⁾	0.5	0.092	PRG	
Naphthalene	SW8310	µg/L	10	2.5	6.2	PRG	
Phenanthrene	SW8310	µg/L	10	0.6	--	--	
Pyrene	SW8310	µg/L	10	0.5	180	PRG	
Explosives - Soil							
2-Amino-4,6-dinitrotoluene	SW8330	mg/kg	0.8**	0.70.3**	--	--	
4-Amino-2,6-dinitrotoluene	SW8330	mg/kg	0.8**	0.70.3**	--	--	
1,3-Dinitrobenzene	SW8330	mg/kg	0.4	0.3/0.1*	6.1	PRG	

Note: Compounds with MDLs greater than the specified action level (PRG) are **highlighted in bold**. MDLs that exceed ½ the PQL are *highlighted in italics*.

Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
2,4-Dinitrotoluene	SW8330	mg/kg	0.4	0.3/0.1*	120	PRG	
2,6-Dinitrotoluene	SW8330	mg/kg	0.4	0.4/0.1*	61	PRG	
Hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine (HMX)	SW8330	mg/kg	0.4	0.3/0.1*	--	--	
Nitrobenzene	SW8330	mg/kg	0.4	0.3/0.1*	20	PRG	
2-Nitrotoluene	SW8330	mg/kg	0.4	0.4/0.1*	370	PRG	
3-Nitrotoluene	SW8330	mg/kg	0.4	0.4/0.2*	--	--PRG	
4-Nitrotoluene	SW8330	mg/kg	0.4	0.3/0.2*	370	PRG	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (RDX)	SW8330	mg/kg	0.4	0.3/0.1*	3,100	PRG	
Tetryl	SW8330	mg/kg	0.4	0.4/0.1*	610	PRG	
1,3,5-Trinitrobenzene	SW8330	mg/kg	0.4	0.3/0.1*	1,800	PRG	
2,4,6-Trinitrotoluene	SW8330	mg/kg	0.4	0.4/0.1*	16	PRG	
Nitroglycerin	SW8330M	mg/kg	0.5	0.2	35	PRG	
Pentaerythritol tetranitrate (PETN)	SW8330M	mg/kg	0.5 or 1.0 ⁽²⁾	0.4	--	--	
Explosives - Water							
2-Amino-4,6-dinitrotoluene	SW8330	µg/L	10**	4.8**	--	--	
4-Amino-2,6-dinitrotoluene	SW8330	µg/L	10**	4.8**	--	--	
1,3-Dinitrobenzene	SW8330	µg/L	5.0	2.9	6.1	PRG	
2,4-Dinitrotoluene	SW8330	µg/L	5.0	2.7	120	PRG	
2,6-Dinitrotoluene	SW8330	µg/L	5.0	3.2	61	PRG	
Hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine (HMX)	SW8330	µg/L	5.0	2.2	--	--	
Nitrobenzene	SW8330	µg/L	5.0	2.9	20	PRG	
2-Nitrotoluene	SW8330	µg/L	5.0	3.7	370	PRG	
3-Nitrotoluene	SW8330	µg/L	5.0	2.9	370	PRG	
4-Nitrotoluene	SW8330	µg/L	5.0	3.2	370	PRG	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (RDX)	SW8330	µg/L	5.0	2.7	3,100	PRG	
Tetryl	SW8330	µg/L	5.0	0.8	360	PRG	
1,3,5-Trinitrobenzene	SW8330	µg/L	5.0	2.1	1,800	PRG	
2,4,6-Trinitrotoluene	SW8330	µg/L	5.0	2.3	16	PRG	

**Table 2.4-11. Benicia TCUP Project - December 1999 Sampling Event
Onsite Environmental Laboratories Method Detection Limits
Cross Referenced to Project Practical Quantitation Limits and Project Action Levels**
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Parameter	Method	Units	PQL ⁽¹⁾	Reference Concentrations			Action Level
				MDL	PRG	PRG	
Nitroglycerin	SW8330M	µg/L	25	11.2	35	PRG	
<u>Pentaerythritol Tetranitrate (PETN)</u>	<u>SW8330M</u>	<u>µg/L</u>	<u>50</u>	<u>10.4</u>	<u>--</u>	<u>--</u>	

Notes:

Compounds with MDLs greater than the specified action level (PRG) are highlighted in bold.

MDLs that exceed ½ the PQL are *highlighted in italics*. The compound is not highlighted unless the MDL does not meet the specified project action level. With the exception of 1,2,3-Trichloropropane in soils by SW8260B, all compounds with MDLs greater than ½ the PQL meet specified project action levels.

(1) MDL is indicated for use when PQL > action level. If MDL > action level, use laboratory reported MDL below which parameter is assumed not to be present.

(2) MDL study for kerosene not performed as chromatogram for kerosene too similar to chromatogram for diesel to distinguish. Diesel range hydrocarbons reported instead of kerosene.

(3) 1.0 PQL may be reported for some samples not associated with the TNT Strips

* SW8330 MDL studies performed 12/04/99 and 01/04/00. 01/04/00 MDL study used lower concentrations under same conditions as first MDL study.

** 2-Amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene co-elute and the MDLs and sample results were reported as one summed result. There are no PRGs for these analytes.

Definitions:

PQL = Practical quantitation limit. Uncorrected laboratory limit is shown; laboratory limit for each soil sample analysis is corrected for moisture.

MDL = Method detection limit. Uncorrected laboratory limit is shown; laboratory limit for each soil sample analysis is corrected for moisture.

PRG = Preliminary Remediation Goals established by United States Environmental Protection Agency (EPA) Region IX (October 1999). Bold PRGs are California Environmental Protection Agency (Cal-EPA) modified values.

-- = No established value (per EPA Region IX PRG table)

mg/kg = Milligrams per kilogram, or parts per million

µg/L = Micrograms per liter, or parts per billion

NA = Not Analyzed

N/A = Not applicable

EPA Method SW8260B for volatile organic compounds (VOCs)

EPA Method SW8310 for polynuclear aromatic hydrocarbons (PAHs)

EPA Method SW8330 for explosives

EPA Method SW8330M for nitroglycerin and PETN

EPA Method SW8015B/California Leaking Underground Fuel Tank (LUFT) Modified EPA Method SW8015 for total extractable petroleum hydrocarbons (TEPH)

Table 2.4-12. Remedial Investigation Field Duplicate and Replicate Samples Collected and Analyzed
(Page 1 of 3)

Sample ID	Depth ft bgs	Matrix	Lab	ONSITE MOBILE LAB						QUANTERRA (QES) LAB						BARC	
				Explosives SW8330	Nitroglycerin & PETN SW8330	PAHs SW8310	VOCs SW8260B	M801SD/MO	M8015K	Dioxins / Furans SW8290	Explosives SW8330	Nitroglycerin & PETN SW8330	Metals	Metals (dissolved)	Nitrate/Nitrite-N E300.0		General Water Chemistry
AR-1/0.5	0.5-1.0	Soil	Onsite	1	1	1	1	1	1								
AR-1/1.0	1.0-1.5	Soil Dup	Onsite	1	1	1	1	1	1								
AR-1A/0.5	0.5-1.0	Soil	QES									1			1		
AR-1A/1.0	1.0-1.5	Soil Dup	QES									1			1		
AR-2/4	4.0-4.5	Soil	Onsite	1	1	1	1	1	1								
AR-2/4.5	4.5-5.0	Soil Dup	Onsite	1	1	1	1	1	1								
AR-2/5	5.0-5.5	Soil	QES									1			1		
AR-2/5.5	5.5-6.0	Soil Dup	QES									1			1		
DA3-6/15.5	15.0-15.5	Soil	Onsite	1		1											
DA3-6/16	15.5-16.0	Soil Dup	Onsite	1		1											
FA-4/0	0.0-0.5	Soil	QES									1					
FA-4/0.5	0.5-1.0	Soil Dup	QES									1					
FA-4/2.5	2.5-3.0	Soil	QES									1					
FA-4/3	3.0-3.5	Soil Dup	QES									1					
FA-5/0	0.0-0.5	Soil	QES									1					
FA-5/0.5	0.5-1.0	Soil Dup	QES									1					
FA-6/1	1.0-1.5	Soil	Onsite	1	1	1											
FA-6/1.5	1.5-2.0	Soil Dup	Onsite	1	1	1											
FA-6A/1	1.0-1.5	Soil	QES							1		1			1		
FA-6A/1.5	1.5-2.0	Soil Dup	QES							1		1			1		
HF-1/0.5	0.5-1.0	Soil	Onsite	1		1	1	1	1								
HF-1/1	1.0-1.5	Soil Dup	Onsite	1		1	1	1	1								
HF-1A/0.5	0.5-1.0	Soil	QES									1			1		
HF-1A/1	1.0-1.5	Soil Dup	QES									1			1		
HF-2/4	4.0-4.5	Soil	Onsite	1	1	1		1	1								
HF-2/4.5	4.5-5.0	Soil Dup	Onsite	1	1	1		1	1								
HF-2/5	5.0-5.5	Soil	QES									1			1		
HF-2/5.5	5.5-6.0	Soil Dup	QES									1			1		
HF-2C/4	4.0-4.5	Soil	QES				1										
HF-2C/4.5	4.5-5.0	Soil Dup	QES				1										
RSP2-A,-B,-C,-D	2.0-2.5	Soil Comp	Onsite	1				1									
RSP2A-A,-B,-C-D	2.0-2.5	Soil Comp Dup	Onsite	1				1									
RSP2A-A,-B,-C,-D	2.5-3.0	Soil Comp	QES									1					
RSP2A-A,-B,-C,-D	2.5-3.0	Soil Comp Dup	QES									1					
TNT-1C2/0	0.0-0.5	Soil	Onsite	1													
TNT-1C2/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-1C2A/0	0.0-0.5	Soil	QES								1	1					
TNT-1C2A/0.5	0.5-1.0	Soil Dup	QES								1	1					
TNT-1C2/2	2.0-2.5	Soil	Onsite	1													
TNT-1C2/2.5	2.5-3.0	Soil Dup	Onsite	1													
TNT-1C2A/2	2.0-2.5	Soil	QES								1	1					
TNT-1C2A/2.5	2.5-3.0	Soil Dup	QES								1	1					
TNT-1C2Y/0	0.0-0.5	Soil	Onsite	1		1											
TNT-1C2Y/0.5	0.5-1.0	Soil Dup	Onsite	1		1											
TNT-1C2AY/0	0.0-0.5	Soil	QES								1	1					
TNT-1C2AY/0.5	0.5-1.0	Soil Dup	QES								1	1					
TNT-1C2Y/2	2.0-2.5	Soil	Onsite	1		1											
TNT-1C2Y/2.5	2.5-3.0	Soil Dup	Onsite	1		1											
TNT-1C2AY/2	2.0-2.5	Soil	QES								1	1					
TNT-1C2AY/2.5	2.5-3.0	Soil Dup	QES								1	1					
TNT-1C5/0.5	0.5-1.0	Soil	Onsite	1		1											
TNT-1C5/1.0	1.0-1.5	Soil Dup	Onsite	1		1											
TNT-1C6/0	0.0-0.5	Soil	Onsite	1		1											
TNT-1C6/0.5	0.5-1.0	Soil Dup	Onsite	1		1											
TNT-1C6A/0	0.0-0.5	Soil	QES									1					
TNT-1C6A/0.5	0.5-1.0	Soil Dup	QES									1					
TNT-1C7/1	1.0-1.5	Soil	Onsite	1		1											
TNT-1C7/1.5	1.5-2.0	Soil Dup	Onsite	1		1											
TNT-1C7A/1	1.0-1.5	Soil	QES									1					
TNT-1C7A/1.5	1.5-2.0	Soil Dup	QES									1					
TNT-1E/0	0.0-0.5	Soil	Onsite	1													
TNT-1E/0.5	0.5-1.0	Soil Dup	Onsite	1													

Table 2.4-12. Remedial Investigation Field Duplicate and Replicate Samples Collected and Analyzed
(Page 2 of 3)

Sample ID	Depth ft bgs	Matrix	Lab	ONSITE MOBILE LAB						QUANTERRA (QES) LAB						BABK PERC	
				Explosives SW8330	Nitroglycerin & PETN SW6330	PAHs SW8310	VOCs SW6260B	M8015D/MO	M8015K	Dioxins / Furans SW8290	Explosives SW8330	Nitroglycerin & PETN SW6330	Metals	Metals (dissolved)	Nitrate/Nitrite-N E300.0		General Water Chemistry
TNT-1F/0	0.0-0.5	Soil	Onsite	1													
TNT-1F/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-1F5/0	0.0-1.0	Soil	Onsite	1													
TNT-1F5A/0	1.0-1.0	Soil Dup	Onsite	1													
TNT-1F9/0	0.0-0.5	Soil	Onsite	1													
TNT-1F9A/0	0.0-0.5	Soil Dup	Onsite	1													
TNT-1F9/1	1.0-1.5	Soil	Onsite	1													
TNT-1F9/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-1G/1	1.0-1.5	Soil	Onsite	1													
TNT-1G/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-1H/3.5	3.5-4.0	Soil	Onsite	1													
TNT-1H/4	4.0-4.5	Soil Dup	Onsite	1													
TNT-1J/0	0.0-0.5	Soil	Onsite	1													
TNT-1J/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-1K/0	0.0-0.5	Soil	Onsite	1													
TNT-1K/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-1L/1	1.0-1.5	Soil	Onsite	1													
TNT-1L/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-1M/0	0.0-0.5	Soil	Onsite	1													
TNT-1MA/0	0.0-0.5	Soil Dup	Onsite	1													
TNT-4C2/0	0.0-0.5	Soil	Onsite	1													
TNT-4C2/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C2/2	2.0-2.5	Soil	Onsite	1													
TNT-4C2/2.5	2.5-3.0	Soil Dup	Onsite	1													
TNT-4C3/1	1.0-1.5	Soil	Onsite	1													
TNT-4C3/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-4C4/0	0.0-0.5	Soil	Onsite	1													
TNT-4C4/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C5/0	0.0-0.5	Soil	Onsite	1													
TNT-4C5/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C6/0	0.0-0.5	Soil	Onsite	1													
TNT-4C6/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C7/1	1.0-1.5	Soil	Onsite	1													
TNT-4C7A/1	1.0-1.5	Soil Dup	Onsite	1													
TNT-4C8/0	0.0-0.5	Soil	Onsite	1													
TNT-4C8/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C9/0	0.0-0.5	Soil	Onsite	1													
TNT-4C9/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-4C9/4	4.0-4.5	Soil	Onsite	1													
TNT-4C9/4.5	4.5-5.0	Soil Dup	Onsite	1													
TNT-4C11/1	1.0-1.5	Soil	Onsite	1													
TNT-4C11A/1	1.0-1.5	Soil Dup	Onsite	1													
TNT-4C13/0	0.0-0.5	Soil	Onsite	1													
TNT-4C13A/0	0.0-0.5	Soil Dup	Onsite	1													
TNT-4C13/1	1.0-1.5	Soil	Onsite	1													
TNT-4C13A/1	1.0-1.5	Soil Dup	Onsite	1													
TNT-4C14/2	2.0-2.5	Soil	Onsite	1													
TNT-4C14A/2	2.0-2.5	Soil Dup	Onsite	1													
TNT-5A1/1	1.0-1.5	Soil	Onsite	1													
TNT-5A1/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-5A2/0	0.0-0.5	Soil	Onsite	1													
TNT-5A2/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-5A3/0	0.0-0.5	Soil	Onsite	1													
TNT-5A3/0.5	0.5-1.0	Soil Dup	Onsite	1													
TNT-5A3/6	6.0-6.5	Soil	Onsite	1													
TNT-5A3/6.5	6.5-7.0	Soil Dup	Onsite	1													
TNT-5A4/0	0.0-0.5	Soil	Onsite	1													
TNT-5A4B/0	0.0-0.5	Soil Dup	Onsite	1													
TNT-5A5/1	1.0-1.5	Soil	Onsite	1													
TNT-5A5/1.5	1.5-2.0	Soil Dup	Onsite	1													
TNT-5A6/4	4.0-4.5	Soil	Onsite	1													
TNT-5A6/4.5	4.5-5.0	Soil Dup	Onsite	1													

Table 2.4-12. Remedial Investigation Field Duplicate and Replicate Samples Collected and Analyzed
(Page 3 of 3)

Sample ID	Depth ft bgs	Matrix	Lab	ONSITE MOBILE LAB						QUANTERRA (QES) LAB							BABK	
				Explosives SW8330	Nitroglycerin & PETN SW8330	PAHs SW8310	VOCs SW8260B	MB015D/MO	MB015K	Dioxins / Furans SW8290	Explosives SW8330	Nitroglycerin & PETN SW8330	Metals	Metals (dissolved)	Nitrate/Nitrite-N E300.0	General Water Chemistry		TOC SW9060 & TOC 415.1
TNT-5A8/2	2.0-2.5	Soil	Onsite	1														
TNT-5A8A/2	2.0-2.5	Soil Dup	Onsite	1														
TNT-5A9/2	2.0-2.5	Soil	Onsite	1														
TNT-5A9A/2	2.5-3.0	Soil Dup	Onsite	1														
TNT-5A10/2	2.0-2.5	Soil	Onsite	1														
TNT-5A10A/2	2.0-2.5	Soil Dup	Onsite	1														
TNT-5L/2	2.0-2.5	Soil	Onsite	1														
TNT-5LA/2	2.0-2.5	Soil Dup	Onsite	1														
TW-2/B	15.0-15.5	Soil (bulk)	QES															1
TW-2/C	15.5-16.0	Soil Dup (bulk)	QES															1
TW-4/20	20.0-20.5	Soil	Onsite	1	1	1	1	1	1									
TW-4/20.5	20.5-21.0	Soil Dup	Onsite	1	1	1	1	1	1									
TW-4/21	21.0-21.5	Soil	QES							1	1	1		1				
TW-4/21.5	21.5-22.0	Soil Dup	QES							1	1	1		1				
TW-7/7.5	7.5-8.0	Soil	QES									1		1				
TW-7/8	8.0-8.5	Soil Dup	QES									1		1				
TW-3	NA	Water	Onsite	1	1	1	1	1	1									
TW-3-1	NA	Water Dup	Onsite	1	1	1	1	1	1									
TW-3	NA	Water	BABK															1
TW-3-1	NA	Water Dup	BABK															1
TW-3	NA	Water	QES									1	1	1				
TW-3-1	NA	Water Dup	QES									1	1	1				
TW-12	NA	Water (Filtered)	QES									1						
TW-12/A	NA	Water (Filtered) Dup	QES									1						
WET-2	0.0-0.5	Sediment	Onsite	1	1	1												
WET-2A	0.0-0.5	Sediment Dup	Onsite	1	1	1												
WET-2	0.0-0.5	Sediment	QES									1		1				
WET-2A	0.0-0.5	Sediment Dup	QES									1		1				

TOTAL NORMAL ANALYSES*	323	83	98	60	79	63	3	13	13	115	5	65	7	5	6
TOTAL DUPLICATES	53	7	14	6	7	6	1	5	5	14	2	9	1	1	1
% OF TOTAL ANALYSES	16%	8%	14%	10%	9%	10%	33%	38%	38%	12%	40%	14%	14%	20%	17%

TOTAL NORMAL ANALYSES*	Water	5	5	5	3	2	2	0	0	0	3	5	2	5	1	4
TOTAL DUPLICATES		1	1	1	1	1	1	0	0	0	2	1	1	0	1	
% OF TOTAL ANALYSES		20%	20%	20%	33%	50%	50%	NA	NA	NA	0%	40%	50%	20%	0%	25%
TOTAL NORMAL ANALYSES*	Soil	318	78	93	57	77	61	3	13	13	112	0	63	1	4	2
TOTAL DUPLICATES		52	6	13	5	6	5	1	5	5	14	0	8	0	1	0
% OF TOTAL ANALYSES		16%	8%	14%	9%	8%	8%	33%	38%	38%	13%	NA	13%	0%	25%	0%

Notes:
 * Actual field samples not including replicates or duplicates.
 20 metals background samples not included in count for duplicates
 Dup = Duplicate soil and water samples

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
(Page 1 of 28)

Table 2.4-13A. Field Duplicate/Replicate Detected Results Precision for General Chemistry
Methods: EPA Methods 160.1, 160.2, 300.0 and 415.1/SW9060

Analyte or Method	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TW-2/B	TW-2/C		
Total organic carbon	1770	2530	35 (≤ 35)*	-
Total organic carbon	1760	2480	34 (≤ 35)*	-
Total organic carbon	1630	2400	38 (≤ 35)*	-
Total organic carbon	1670	2550	42 (≤ 35)*	-
Total organic carbon LDC Report# 4556A6	Reported Result is Average: 1710	Reported Result is Average: 2490	37 (≤ 35)*	-
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	HF-2/5	HF-2/5.5		
Nitrate as N LDC Report# 4556E6	0.24	0.22	-	0.02 mg/Kg (≤ 1.0)
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	HF 1A/0.5	HF 1A/1		
Nitrate as N LDC Report# 4556J6	0.70	0.34	-	0.36 mg/Kg (≤ 1.0)
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TW-7/7.5	TW-7/8		
Nitrate as N LDC Report# 4556K6	0.29	0.29	-	0 mg/Kg (≤ 1.0)
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-1A/0.5	AR-1A/1.0		
Nitrate as N	2.5	0.80	-	1.7 mg/Kg (≤ 1.0)
Nitrite as N LDC Report# 4556K6	0.16	0.26	-	0.1 mg/Kg (≤ 1.0)
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-2/5.5	AR-2/5		
Nitrate as N	1.1	1.4	-	0.3 mg/Kg (≤ 1.0)

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13A. Field Duplicate/Replicate Detected Results Precision for General Chemistry
Methods: EPA Methods 160.1, 160.2, 300.0 and 415.1/SW9060

Nitrite as N	0.27	0.29U	-	0.02 mg/Kg (≤ 1.0)
LDC Report# 4556K6				
	Concentration (mg/L)			
Analyte	TW-3	TW-3-1	RPD (Limits)	Difference (Limits)
Chloride	154	150	3 (≤ 35)*	-
Nitrate as N	2.7	2.6	4 (≤ 35)*	-
Total suspended solids	3230	3590	11 (≤ 35)*	-
Sulfate	110	115	4 (≤ 35)*	-
Total dissolved solids	888	892	0.4 (≤ 35)*	-
LDC Report# 4556M6				
	Concentration (mg/Kg)			
Analyte	FA-6A/1	FA-6A/1.5	RPD (Limits)	Difference (Limits)
Nitrate as N	2.2	0.82	-	1.38 mg/Kg (≤ 100)
Nitrite as N	0.23	0.27U	-	0.04 mg/Kg (≤ 100)
LDC Report# 4556N6				
	Concentration (mg/Kg)			
Analyte	WET-2	WET-2A	RPD (Limits)	Difference (Limits)
Nitrate as N	0.69	0.52	-	0.17 mg/Kg (≤ 200)
LDC Report# 4556P6				

Notes:

Results exceeding field precision criteria are highlighted in **bold**. Results are not qualified for field precision.

* The control limits listed in the LDC DVRs were incorrect. The correct control limits for field duplicate precision specified in table 3.2-2 of the QAPP have been inserted for each method.

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	HF-2/5	HF-2/5.5		
Aluminum	21600	19600	10 (≤ 35)*	-
Antimony	0.61	0.75	-	0.14 mg/Kg (≤ 6.0)
Arsenic	7.6	24.7	106 (≤ 35)*	-
Barium	209	184	13 (≤ 35)*	-
Beryllium	0.70	0.63	-	0.13 mg/Kg (≤ 0.8)
Calcium	5360	4110	26 (≤ 35)*	-
Chromium	55.1	59.1	7 (≤ 35)*	-
Cobalt	14.3	16.1	12 (≤ 35)*	-
Copper	73.2	59.1	21 (≤ 35)*	-
Iron	41300	43000	4 (≤ 35)*	-
Lead	10.1	8.2	21 (≤ 35)*	-
Magnesium	10300	9750	5 (≤ 35)*	-
Manganese	278	280	0.7 (≤ 35)*	-
Mercury	0.098	0.12	-	0.022 mg/Kg (≤ 0.2)
Nickel	62.4	64.3	3 (≤ 35)*	-
Potassium	1320	1140	-	180 mg/Kg (≤ 1000)
Sodium	196	168	-	27 mg/Kg (≤ 400)
Vanadium	57.2	59.5	4 (≤ 35)*	-
Zinc	100	91.7	9 (≤ 35)*	-
Molybdenum	0.574	0.92	-	0.35 mg/Kg (≤ 8.0)
Phosphorous	1470	261	140 (≤ 35)*	-
LDC Report# 4556E4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	RSP-2	RSP-2A		
Aluminum	20900	21200	1 (≤ 35)*	-
Antimony	0.83	0.63	-	0.20 mg/Kg (≤ 6.0)
Arsenic	13.4	8.7	43 (≤ 35)*	-
Barium	224	236	5 (≤ 35)*	-
Beryllium	0.70	0.73	-	0.03 mg/Kg (≤ 0.8)
Calcium	15200	15600	3 (≤ 35)*	-
Chromium	52.2	52.7	1 (≤ 35)*	-
Cobalt	18.8	19.0	1 (≤ 35)*	-
Copper	57.8	53.2	8 (≤ 35)*	-
Iron	39000	39000	0 (≤ 35)*	-
Lead	18.9	20.0	6 (≤ 35)*	-
Magnesium	10200	9830	4 (≤ 35)*	-
Manganese	782	883	12 (≤ 35)*	-
Nickel	57.9	56.9	2 (≤ 35)*	-
Potassium	1380	1350	-	30 mg/Kg (≤ 1000)
Sodium	225	231	-	6 mg/Kg (≤ 400)
Vanadium	63.4	66.4	5 (≤ 35)*	-
Zinc	93.5	93.7	0.2 (≤ 35)*	-
Phosphorous	302	300	1 (≤ 35)*	-
LDC Report# 4556G4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C7A/1	TNT-1C7A/1.5		
Aluminum	28600	24500	15 (≤ 35)*	-
Antimony	0.96	0.74	-	0.22 mg/Kg (≤ 6.0)
Arsenic	14.9	11.6	25 (≤ 35)*	-
Barium	271	220	21 (≤ 35)*	-
Beryllium	0.95	0.83	-	0.12 mg/Kg (≤ 0.8)
Calcium	6490	5500	17 (≤ 35)*	-
Chromium	67.5	60.7	11 (≤ 35)*	-
Cobalt	22.7	19.3	16 (≤ 35)*	-
Copper	78.0	68.5	13 (≤ 35)*	-
Iron	47800	45100	6 (≤ 35)*	-
Lead	19.5	11.5	51 (≤ 35)*	-
Magnesium	8510	8920	5 (≤ 35)*	-
Manganese	1380	910	41 (≤ 35)*	-
Mercury	0.059	0.071	-	0.012 mg/Kg (≤ 0.02)
Nickel	73.4	63.8	14 (≤ 35)*	-
Potassium	2190	1700	-	490 mg/Kg (≤ 1000)
Sodium	127	115	-	12 mg/Kg (≤ 400)
Vanadium	82.7	67.0	21 (≤ 35)*	-
Zinc	99.6	91.8	8 (≤ 35)*	-
Phosphorous	298	259	14 (≤ 35)*	-
LDC Report# 455614				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C6A/0	TNT-1C6A/0.5		
Aluminum	25700	25200	2 (≤ 35)*	-
Antimony	1.2	1.3	-	0.1 mg/Kg (≤ 6.0)
Arsenic	14.9	13.3	11 (≤ 35)*	-
Barium	257	251	2 (≤ 35)*	-
Beryllium	0.90	0.89	-	0.01 mg/Kg (≤ 0.8)
Calcium	4140	4430	7 (≤ 35)*	-
Chromium	62.3	60.7	3 (≤ 35)*	-
Cobalt	22.2	20.5	8 (≤ 35)*	-
Copper	70.5	68.3	3 (≤ 35)*	-
Iron	42900	43100	0.5 (≤ 35)*	-
Lead	25.5	24.4	4 (≤ 35)*	-
Magnesium	9220	8710	6 (≤ 35)*	-
Manganese	1400	1180	17 (≤ 35)*	-
Mercury	0.085	0.085	-	0 mg/Kg (≤ 0.2)
Nickel	68.4	65.3	5 (≤ 35)*	-
Potassium	2960	1970	-	990 mg/Kg (≤ 1000)
Sodium	125	128	-	3 mg/Kg (≤ 400)
Vanadium	76.5	73.3	4 (≤ 35)*	-
Zinc	91.4	92.6	1 (≤ 35)*	-
Molybdenum	0.75	0.57U	-	0.18 mg/Kg (≤ 8.0)
Phosphorous	298	266	11 (≤ 35)*	-
LDC Report# 455614				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	HF 1A/0.5	HF 1A/1		
Aluminum	20400	20700	1 (≤ 35)*	-
Antimony	0.56	0.47	-	0.09 mg/Kg (≤ 6.0)
Arsenic	14.4	15.1	5 (≤ 35)*	-
Barium	302	302	0 (≤ 35)*	-
Beryllium	0.55	0.69	-	0.14 mg/Kg (≤ 0.8)
Calcium	27700	10700	89 (≤ 35)*	-
Chromium	56.4	53.1	6 (≤ 35)*	-
Cobalt	24.5	20.4	18 (≤ 35)*	-
Copper	66.6	73.9	10 (≤ 35)*	-
Iron	39500	41500	5 (≤ 35)*	-
Lead	16.9	10.4	48 (≤ 35)*	-
Magnesium	9520	9670	2 (≤ 35)*	-
Manganese	2950	1770	50 (≤ 35)*	-
Mercury	0.099	0.10	-	0.001 mg/Kg (≤ 0.2)
Nickel	75.9	76.8	1 (≤ 35)*	-
Potassium	1780	1420	-	360 mg/Kg (≤ 1000)
Sodium	153	146	-	7 mg/Kg (≤ 400)
Vanadium	56.9	57.0	0.2 (≤ 35)*	-
Zinc	114	101	4 (≤ 35)*	-
Phosphorus	336	231	37 (≤ 35)*	-
LDC Report# 4556J4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TW-7/7.5	TW-7/8		
Aluminum	19400	18700	4 (≤ 35)*	-
Antimony	1.1	0.41	-	0.69 mg/Kg (≤ 6.0)
Arsenic	13.3	23.4	55 (≤ 35)*	-
Barium	255	371	37 (≤ 35)*	-
Beryllium	0.51	0.50	-	0.01 mg/Kg (≤ 0.8)
Calcium	4110	4000	3 (≤ 35)*	-
Chromium	45.7	39.8	14 (≤ 35)*	-
Cobalt	21.0	24.2	14 (≤ 35)*	-
Copper	67.6	77.0	13 (≤ 35)*	-
Iron	40500	43200	6 (≤ 35)*	-
Lead	10.3	9.1	12 (≤ 35)*	-
Magnesium	9740	9180	6 (≤ 35)*	-
Manganese	1550	3230	70 (≤ 35)*	-
Mercury	0.074	0.056	-	0.018 mg/Kg (≤ 0.2)
Nickel	63.7	76.6	18 (≤ 35)*	-
Potassium	1360	1100	-	260 mg/Kg (≤ 1000)
Selenium	0.32U	1.2	-	0.88 mg/Kg (≤ 4.0)
Sodium	913	913	-	0 mg/Kg (≤ 400)
Vanadium	54.5	59.6	9 (≤ 35)*	-
Zinc	104	111	7 (≤ 35)*	-
Molybdenum	0.58	1.3	-	0.72 mg/Kg (≤ 8.0)
Phosphorus	230	186	-	44 mg/Kg (≤ 1000)
LDC Report# 4556K4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-1A/0.5	AR-1A/1.0		
Aluminum	19400	19800	2 (≤ 35)*	-
Antimony	1.2	0.84	-	0.36 mg/Kg (≤ 6.0)
Arsenic	12.8	11.1	14 (≤ 35)*	-
Barium	290	314	8 (≤ 35)*	-
Beryllium	0.56	0.79	-	0.23 mg/Kg (≤ 0.8)
Calcium	3990	3020	25 (≤ 35)*	-
Chromium	60.0	51.9	14 (≤ 35)*	-
Cobalt	24.7	31.4	24 (≤ 35)*	-
Copper	59.3	59.0	0.5 (≤ 35)*	-
Iron	39600	35400	11 (≤ 35)*	-
Lead	135	12.6	166 (≤ 35)*	-
Magnesium	5490	5660	3 (≤ 35)*	-
Manganese	1630	2690	49 (≤ 35)*	-
Mercury	0.12	0.016	-	0.104 mg/Kg (≤ 0.2)
Nickel	50.4	74.4	38 (≤ 35)*	-
Potassium	1850	1420	-	430 mg/Kg (≤ 1000)
Sodium	269	520	-	251 mg/Kg (≤ 400)
Vanadium	75.0	69.4	8 (≤ 35)*	-
Zinc	80.5	64.4	22 (≤ 35)*	-
Molybdenum	1.3	1.3	-	0 mg/Kg (≤ 8.0)
Phosphorus	283	200	-	83 mg/Kg (≤ 1000)

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-2/5.5	AR-2/5		
Aluminum	20300	19400	5 (≤ 35)*	-
Antimony	0.88	0.70	-	0.18 mg/Kg (≤ 6.0)
Arsenic	27.1	9.4	97 (≤ 35)*	-
Barium	467	221	72 (≤ 35)*	-
Beryllium	0.67	0.75	-	0.08 mg/Kg (≤ 0.8)
Calcium	3970	3640	9 (≤ 35)*	-
Chromium	46.7	44.4	5 (≤ 35)*	-
Cobalt	45.7	18.8	83 (≤ 35)*	-
Copper	70.9	76.5	8 (≤ 35)*	-
Iron	42500	38200	11 (≤ 35)*	-
Lead	16.5	10.6	44 (≤ 35)*	-
Magnesium	9670	9200	5 (≤ 35)*	-
Manganese	1560	646	83 (≤ 35)*	-
Mercury	0.096	0.11	-	0.014 mg/Kg (≤ 0.2)
Nickel	106	61.9	53 (≤ 35)*	-
Potassium	1140	1130	-	10 mg/Kg (≤ 1000)
Selenium	0.34U	0.45	-	0.11 mg/Kg (≤ 4.0)
Sodium	1120	1120	0 (≤ 35)*	-
Vanadium	53.8	45.5	17 (≤ 35)*	-
Zinc	109	101	8 (≤ 35)*	-
Molybdenum	2.0	0.85	-	1.15 mg/Kg (≤ 8.0)
Phosphorus	233	205	13 (≤ 35)*	-
LDC Report# 4556E4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TW-4/21	TW-4/21.5		
Aluminum	24800	21900	12 (<35)*	-
Antimony	0.54	0.50	-	0.04 mg/Kg (<6.0)
Arsenic	11.6	11.2	4 (<35)*	-
Barium	334	302	10 (<35)*	-
Beryllium	0.69	0.65	-	0.04 mg/Kg (<0.8)
Calcium	3900	3620	7 (<35)*	-
Chromium	51.1	46.6	9 (<35)*	-
Cobalt	22.0	22.8	4 (<35)*	-
Copper	56.5	51.0	10 (<35)*	-
Iron	41900	39200	7 (<35)*	-
Lead	9.8	9.8	0 (<35)*	-
Magnesium	8690	7820	11 (<35)*	-
Manganese	1200	1300	8 (<35)*	-
Mercury	0.038	0.027	-	0.011 mg/Kg (<0.2)
Nickel	55.9	51.7	8 (<35)*	-
Potassium	2930	2880	2 (<35)*	-
Selenium	1.1	0.88	-	0.22 mg/Kg (<4.0)
Sodium	280	254	-	26 mg/Kg (<400)
Vanadium	66.2	61.9	7 (<35)*	-
Zinc	94.1	87.0	8 (<35)*	-
Molybdenum	0.68	0.79	-	0.11 mg/Kg (<8.0)
Phosphorus	241	234	3 (<35)*	-
LDC Report# 4556M4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)
	TW-3	TW-3-1		
Aluminum	0.77	0.043U	-	0.727 mg/L (≤ 0.200)
Barium	0.072	0.065	-	0.007 mg/L (≤ 0.010)
Calcium	88.5	86.2	3 (≤ 35)*	-
Copper	0.0051	0.0028	-	0.0023 mg/L (≤ 0.025)
Iron	0.89	0.021	190 (≤ 35)*	-
Magnesium	57.6	55.3	4 (≤ 35)*	-
Manganese	0.077	0.057	30 (≤ 35)*	-
Nickel	0.0026	0.0013	-	0.0013 mg/L (≤ 0.020)
Potassium	5.6	5.3	-	0.3 mg/L (≤ 5.0)
Sodium	164	155	6 (≤ 35)*	-
Zinc	0.0029	0.0021U	-	0.0008 mg/L (≤ 0.020)
LDC Report# 4556M4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	FA-5/0	FA-5/0.5		
Aluminum	19300	19400	0.5 (≤ 35)*	-
Antimony	0.31	0.26	-	0.05 mg/Kg (≤ 6.0)
Arsenic	10.5	11.1	6 (≤ 35)*	-
Barium	217	203	7 (≤ 35)*	-
Beryllium	0.59	0.60	-	0.01 mg/Kg (≤ 0.8)
Calcium	4550	3910	15 (≤ 35)*	-
Chromium	44.4	47.5	8 (≤ 35)*	-
Cobalt	18.3	18.0	2 (≤ 35)*	-
Copper	69.4	61.4	12 (≤ 35)*	-
Iron	37800	38500	2 (≤ 35)*	-
Lead	57.0	17.5	106 (≤ 35)*	-
Magnesium	8460	7690	10 (≤ 35)*	-
Manganese	827	900	8 (≤ 35)*	-
Mercury	0.098	0.059	-	0.039 mg/Kg (≤ 0.2)
Nickel	52.0	52.2	0.4 (≤ 35)*	-
Potassium	2140	1790	-	350 mg/Kg (≤ 1000)
Selenium	1.7	1.5	-	0.2 mg/Kg (≤ 4.0)
Sodium	141	138	-	3 mg/Kg (≤ 400)
Vanadium	58.7	59.4	1 (≤ 35)*	-
Zinc	99.7	91.5	9 (≤ 35)*	-
Phosphorus	351	273	25 (≤ 35)*	-
LDC Report# 4556N4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	FA-6A/1	FA-6A/1.5		
Aluminum	20700	19100	8 (≤ 35)*	-
Antimony	1.9	0.35U	-	1.55 mg/Kg (≤ 6.0)
Arsenic	9.2	10.7	15 (≤ 35)*	-
Barium	20000	3750	137 (≤ 35)*	-
Beryllium	0.50	0.53	-	0.03 mg/Kg (≤ 0.8)
Calcium	3880	1030	116 (≤ 35)*	-
Chromium	54.5	54.8	0.6 (≤ 35)*	-
Cobalt	27.6	42.8	43 (≤ 35)*	-
Copper	623	77.4	156 (≤ 35)*	-
Iron	39400	43100	9 (≤ 35)*	-
Lead	973	28.7	189 (≤ 35)*	-
Magnesium	12100	9690	22 (≤ 35)*	-
Manganese	564	1630	97 (≤ 35)*	-
Mercury	0.080	0.057	-	0.023 mg/Kg (≤ 0.2)
Nickel	64.5	90.9	34 (≤ 35)*	-
Potassium	3980	4920	21 (≤ 35)*	-
Selenium	1.4	0.69	-	0.71 mg/Kg (≤ 4.0)
Sodium	137	112	-	25 mg/Kg (≤ 400)
Vanadium	53.9	51.0	6 (≤ 35)*	-
Zinc	158	98.8	46 (≤ 35)*	-
Phosphorus	287	273	5 (≤ 35)*	-
LDC Report# 4556N4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	FA-4/0	FA-4/0.5		
Aluminum	23700	17500	30 (≤ 35)*	-
Antimony	0.49	0.73	-	0.24 mg/Kg (≤ 6.0)
Arsenic	7.2	7.1	1 (≤ 35)*	-
Barium	676	307	75 (≤ 35)*	-
Beryllium	0.42	0.36	-	0.06 mg/Kg (≤ 0.8)
Cadmium	0.53U	0.53	-	0 mg/Kg (≤ 2.0)
Calcium	5630	6810	19 (≤ 35)*	-
Chromium	24.3	23.5	3 (≤ 35)*	-
Cobalt	16.3	15.0	8 (≤ 35)*	-
Copper	5630	104	192 (≤ 35)*	-
Iron	36000	37900	5 (≤ 35)*	-
Lead	595	384	43 (≤ 35)*	-
Magnesium	7570	7820	3 (≤ 35)*	-
Manganese	544	646	17 (≤ 35)*	-
Mercury	0.091	0.069	-	0.022 mg/Kg (≤ 0.2)
Nickel	26.4	27.3	3 (≤ 35)*	-
Potassium	998	946	-	52 mg/Kg (≤ 1000)
Selenium	1.3	1.4	-	0.1 mg/Kg (≤ 4.0)
Sodium	124	144	-	20 mg/Kg (≤ 400)
Vanadium	56.6	65.5	15 (≤ 35)*	-
Zinc	237	136	54 (≤ 35)*	-
Molybdenum	0.61U	0.71	-	0.10 mg/Kg (≤ 8.0)
Phosphorus	614	519	17 (≤ 35)*	-
LDC Report# 4556N4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	FA-4/2.5	FA-43.0		
Aluminum	18100	18300	1 (<35)	
Arsenic	37.4	27.1	32 (≤35)	
Barium	209	238	13 (≤35)	
Beryllium	0.59	0.58		0.01mg/Kg(≤0.92)
Calcium	5290	5660	3 (≤35)	
Chromium	50.3	47.4	6 (≤35)	
Cobalt	29.1	15.6	60 (≤35)	
Copper	73	70.6	3 (≤35)	
Iron	44100	35500	22 (≤35)	
Lead	10.3	10.6	3 (≤35)	
Magnesium	8990	9410	5 (≤35)	
Manganese	1280	323	119 (≤35)	
Mercury	0.04	0.033		0.007 mg/Kg(0.092)
Nickel	89.4	60.2	39 (≤35)	
Phosphorous	281	274	3 (≤35)	
Potassium	1180	1510	25 (≤35)	
Selenium	1.4	1.7		0.3 mg/Kg(≤9.2)
Sodium	186	201		15 mg/Kg(≤458)
Vanadium	42.7	45.2	6 (≤35)	
Zinc	101	94.1	7 (≤35)	

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)
	TW-12(Dissolved)	TW-12/A(Dissolved)		
Aluminum	0.046	0.68	-	0.634 mg/L (<0.2)
Barium	0.076	0.077	1 (≤30)	-
Calcium	69.1	74.5	8 (≤30)	-
Copper	0.0053	0.057	-	0.0517 mg/L (≤0.025)
Iron	0.044	0.034	-	0.010 mg/L (≤0.2)
Lead	0.0018U	0.012	-	0.0102 mg/L (≤0.003)
Magnesium	42.9	45.0	5 (≤30)	-
Manganese	0.17	0.12	34 (≤30)	-
Nickel	0.0020	0.0014	-	0.0006 mg/L (≤0.02)
Potassium	3.0	1.6	-	1.4 mg/L (≤5.0)
Sodium	114	103	10 (≤30)	-
Zinc	0.0021U	0.0023	-	0.0002 mg/L (≤0.020)
Molybdenum	0.0050	0.0046U	-	0.0004 mg/L (≤0.020)
LDC Report# 4556P4				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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Table 2.4-13B. Field Duplicate/Replicate Detected Results Precision for Metals: EPA Methods SW6010B/SW7470A/SW7471A				
Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	WET-2	WET-2A		
Aluminum	18400	18800	2 (≤ 35)*	-
Arsenic	9.9	8.9	11 (≤ 35)*	-
Barium	203	205	1 (≤ 35)*	-
Beryllium	0.38	0.43	-	0.05 mg/Kg (≤ 0.8)
Calcium	18700	11800	45 (≤ 35)*	-
Chromium	41.9	43.3	3 (≤ 35)*	-
Cobalt	13.5	13.2	2 (≤ 35)*	-
Copper	56.3	54.2	4 (≤ 35)*	-
Iron	36600	35700	2 (≤ 35)*	-
Lead	16.0	18.9	17 (≤ 35)*	-
Magnesium	8060	8220	2 (≤ 35)*	-
Manganese	1680	1250	29 (≤ 35)*	-
Nickel	39.0	36.9	6 (≤ 35)*	-
Potassium	1920	2000	-	80 mg/Kg (≤ 1000)
Selenium	2.1	1.4	-	0.7 mg/Kg (≤ 4.0)
Sodium	551	490	-	61 mg/Kg (≤ 400)
Vanadium	72.0	70.9	2 (≤ 35)*	-
Zinc	109	108	0.9 (≤ 35)*	-
Phosphorus	472	398	17 (≤ 35)*	-
LDC Report# 4556P4				
Notes: Results exceeding field precision criteria are highlighted in bold . Results are not qualified for field precision. * The control limits listed in the LDC DVRs were incorrect. The correct control limits for field duplicate precision specified in Table 3.2-2 of the QAPP have been inserted for each method.				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13C. Field Duplicate/Replicate Detected Results Precision for TEPH:
EPA Method SW8015B**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	RSP2	RSP2-A		
TPH as motor oil LDC Report# 4565J8	7.7	12	-	4.3 mg/Kg (≤ 22)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TW-4/20	TW-4/20.5		
TPH as motor oil LDC Report# 4565L8	18	12U	-	6 mg/Kg (≤ 24)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-1/0.5	AR-1/1.0		
TPH as diesel	3.2	1.1	-	2.1 mg/Kg (≤ 2.2)
TPH as motor oil LDC Report# 4565M8	67	24	-	43 mg/Kg (≤ 22)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	AR-2/4	AR-2/4.5		
TPH as diesel	4.9	1.3U	-	3.6 mg/Kg (≤ 2.6)
TPH as motor oil LDC Report# 4565M8	66	8.5	-	57.5 mg/Kg (≤ 26)
Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)
	TW-3	TW-3-1		
TPH as diesel LDC Report# 4565N8	170	56	-	114 ug/L (≤ 120)

Notes:

Results exceeding field precision criteria are highlighted in **bold**. Results are not qualified for field precision.

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13D. Field Duplicate/Replicate Detected Results Precision for Dioxins/Furans:
EPA Method SW8290**

Compound	Concentration (pg/g)		RPD (Limits)	RPD (Limits)
	FA-6A/1	FA-6A/1.5		
OCDD	10	2.8U	-	7.2 pg/kg (≤ 5.6)
2,3,7,8-TCDF LDC Report# 4556N21	1.3	0.49U	-	0.81 pg/kg (≤ 0.98)

Notes:

Results exceeding field precision criteria are highlighted in **bold**. Results are not qualified for field precision.

**Table 2.4-13E. Field Duplicate/Replicate Detected Results Precision for PAHs:
EPA Method SW8310**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	WET-2	WET-2A		
Benzo(b)fluoranthene LDC Report# 4565G9	0.094	0.072U	-	0.022 mg/Kg (≤ 0.144)

Notes:

Results exceeding field precision criteria are highlighted in **bold**. Results are not qualified for field precision.

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2/0	TNT-1C2/0.5		
RDX	49U	2.1	-	NA 46.9 mg/Kg (≤ 0.98)
1,3,5-Trinitrobenzene	54	71	27.2	17 mg/Kg (≤ 0.98)
1,3-Dinitrobenzene	49U	3	-	NA 46 mg/Kg (≤ 0.98)
Nitrobenzene	49U	1.7	-	NA 47.3 mg/Kg (≤ 0.98)
Tetryl	49U	5.7	-	NA 43.3 mg/Kg (≤ 0.98)
2,4,6-Trinitrotoluene	43000	1800	184 (≤ 40)	-
2,4-Dinitrotoluene	50	3.2	-	46.8 mg/Kg (≤ 98)
LDC Report# 4565W40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2Y/0	TNT-1C2Y/0.5		
RDX	0.93	0.72	-	0.21 mg/Kg (≤ 1.0)
1,3,5-Trinitrobenzene	55	98	56 (≤ 40)	-
1,3-Dinitrobenzene	2.7	7.5	94 (≤ 40)	-
Nitrobenzene	2.7	2	-	0.7 mg/Kg (≤ 1.0)
Tetryl	3.4	2	-	1.4 mg/Kg (≤ 1.0)
Amino-dinitrotoluenes	1U	2.1	-	1.1 mg/Kg (≤ 2.0)
2,4,6-Trinitrotoluene	88	14	145 (≤ 40)	-
2,4-Dinitrotoluene	1.4	0.92	-	0.48 mg/Kg (≤ 1.0)
LDC Report# 4565X40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2A/0	TNT-1C2A/0.5		
2,4,6-Trinitrotoluene	4800	15000	103 (≤ 40)	-
LDC Report# 4565P40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
(Page 22 of 28)

**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2AY/0	TNT-1C2AY/0.5		
1,3,5-Trinitrobenzene	64	110	-	46 mg/Kg (≤ 80)
2,4,6-Trinitrotoluene	80	270	-	190 mg/Kg (≤ 80)
LDC Report# 4565P40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2/2	TNT-1C2/2.5		
RDX	0.8	0.88	-	0.08 mg/Kg (≤ 1.08)
1,3,5-Trinitrobenzene	77	70	10 (≤ 40)	-
1,3-Dinitrobenzene	2	1.5	-	0.5 mg/Kg (≤ 1.08)
2,4,6-Trinitrotoluene	260	12	182 (≤ 40)	-
LDC Report# 4565W40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2AY/2	TNT-1C2AY/2.5		
1,3,5-Trinitrobenzene	100	64	44 (≤ 40)	-
2,4,6-Trinitrotoluene	8.4	40U	-	31.6 mg/kg (≤ 80)
LDC Report# 4565W40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2Y/2	TNT-1C2Y/2.5		
1,3,5-Trinitrobenzene	94	60	44 (≤ 40)	-
1,3-Dinitrobenzene	44	0.4U	200 (≤ 40)	-
2,4,6-Trinitrotoluene	1	310	199 (≤ 40)	-
Amino-DNTs	2.1	0.4U	200 (≤ 40)	-
LDC Report# 4565W40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C2A/2	TNT-1C2A/2.5		
1,3,5-Trinitrobenzene	83	64	-	19 mg/Kg (≤ 80)
2,4,6-Trinitrotoluene	1700	53	-	1647 mg/Kg (≤ 80)
LDC Report# 4565P40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C5/0.5	TNT-1C5/1.0		
Amino-Dinitrotoluene	2.7	1		1.7 mg/Kg (≤ 1.6)
2,4,6-Trinitrotoluene	7.1	0.5		6.6 mg/Kg (≤ 0.8)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C6/0	TNT-1C6/0.5		
1,3,5-Trinitrobenzene	0.74	0.48U	-	0.26 mg/Kg (≤ 0.96)
Tetryl	0.58	0.48U	-	0.1 mg/Kg (≤ 0.96)
Amino-Dinitrotoluene	32	8.6	115 (≤ 40)	-
2,4,6-Trinitrotoluene	260	49	137 (≤ 40)	-
2-Nitrotoluene	0.63	0.48U	-	0.15 mg/Kg (≤ 0.96)
LDC Report# 4565O40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1C7/1	TNT-1C7/1.5		
Amino-Dinitrotoluene	2.8	0.71	-	3.51 mg/Kg (≤ 1.84)
LDC Report# 4565O40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1F/0	TNT-1F/0.5		
2,4,6-Trinitrotoluene	44000	26000	51 (≤ 40)	-
LDC Report# 4565R40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1F5/0	TNT-1F5A/0		
Amino-dinitrotoluenes	1U	2.8	-	1.8 mg/Kg (≤ 2)
2,4,6-Trinitrotoluene	180	0.48U	-	179.5 mg/Kg (≤ 0.96)
LDC Report# 4565P40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-1F5/0RE (Not Used)	TNT-1F5A/0RE (Not Used)		
Amino-dinitrotoluenes	10U	3.8	-	6.2 mg/Kg (≤ 20)
2,4,6-Trinitrotoluene	180	0.53	-	179.5 mg/Kg (≤ 10.2)
LDC Report# 4565P40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C2/0	TNT-4C2/0.5		
2,4,6-Trinitrotoluene	4.2	1.9	-	2.3 mg/Kg (≤ 1.96)
LDC Report# 4565S40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C4/0	TNT-4C4/0.5		
Amino-dinitrotoluenes	9.2	11	18 (≤ 40)	-
2,4,6-Trinitrotoluene	0.76	14	-	13.2 mg/Kg (≤ 1.08)
LDC Report# 4565S40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C7/1	TNT-4C7A/1		
Amino-dinitrotoluenes	1.7	0.95U	-	1.6 mg/Kg (≤ 1.9)
2,4,6-Trinitrotoluene	2.7	0.47U	-	1.5 mg/Kg (≤ 0.94)
LDC Report# 4565S40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C8/0	TNT-4C8/0.5		
Amino-dinitrotoluenes	2	97U	-	95 mg/Kg (≤ 194)
2,4,6-Trinitrotoluene	1.1	720	-	749 mg/Kg (≤ 96)
LDC Report# 4565S40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C9/0	TNT-4C9/0.5		
1,3-Dinitrobenzene	1	0.47U	-	0.53 mg/Kg (≤ 0.94)
Amino-dinitrotoluenes	16	7	78 (≤ 40)	-
2,4,6-Trinitrotoluene	1.9	0.62	-	1.28 mg/Kg (≤ 0.94)
2-Nitrotoluene	1.4	0.97	-	0.43 mg/Kg (≤ 0.94)
4-Nitrotoluene	2.5	1.9	-	0.6 mg/Kg (≤ 0.94)
LDC Report# 4565S40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C9/4.0	TNT-1C9/4.5		
1,3,5-trinitrobenzene	3.6	3.7	3 (≤ 35)*	
2,4,6-Trinitrotoluene	4.4	1.3	109 (≤ 35)*	
Amino-dinitrotoluenes	0.97	1.1	-	0.13 mg/Kg (≤ 1.6)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C11/1	TNT-4C11A/1		
Amino-dinitrotoluenes	0.95U	1	-	0.05 mg/Kg (≤ 1.9)
LDC Report# 4565Y40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C13/0	TNT-4C13A/0		
Amino-dinitrotoluenes	12	11	9 (≤ 40)	-
2,4,6-Trinitrotoluene	4.9	49	164 (≤ 40)	-
LDC Report# 4565Y40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C13/1	TNT-4C13A/1		
Amino-dinitrotoluenes	13	11	17 (<40)	-
2,4,6-Trinitrotoluene	1.8	0.97	-	0.83 mg/Kg (≤ 1.0)
4-Nitrotoluene	11	0.5U	-	10.5 mg/Kg (≤ 1.0)
LDC Report# 4565Y40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-4C14/2	TNT-4C14A/2		
Amino-dinitrotoluenes	1.3	1.9	-	0.6 mg/Kg (≤ 2.0)
2,4,6-Trinitrotoluene	0.69	1.1	-	0.41 mg/Kg (≤ 1.0)
LDC Report# 4565Y40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A1/1	TNT-5A1/1.5		
Amino-dinitrotoluenes	6.8	1.4	-	5.4 mg/Kg (≤ 1.96)
2,4,6-Trinitrotoluene	0.8	0.49U	-	0.31 mg/Kg (≤ 0.98)
LDC Report# 4565T40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A2/0	TNT-5A2/0.5		
Amino-dinitrotoluenes	3.5	5.8	-	2.3 mg/Kg (≤ 20.8)
2,4,6-Trinitrotoluene	1.8	0.5	-	1.3 mg/Kg (≤ 11)
LDC Report# 4565T40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A3/0	TNT-5A3/0.5		
Amino-dinitrotoluenes	1.3	4.1	-	2.8 mg/Kg (≤ 1.96)
2,4,6-Trinitrotoluene	0.49U	0.71	-	0.22 mg/Kg (≤ 0.98)
LDC Report# 4565T40				

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A3/6.0	TNT-5A3/6.5		
2,4,6-Trinitrotoluene	0.49U	1.2	-	0.71 mg/Kg (≤ 0.8)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A4/0	TNT-5A4B/0		
2,4,6-Trinitrotoluene LDC Report# 4565T40	3500	9500	92 (≤ 40)	-
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A8/2	TNT-5A8A/2		
Amino-dinitrotoluenes	1.5	0.97U	-	0.53 mg/Kg (≤ 1.94)
2,4,6-Trinitrotoluene LDC Report# 4565Z40	3.5	0.75	-	2.75 mg/Kg (≤ 0.98)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5A10/2	TNT-5A10A/2		
HMX	0.82	0.52U	-	0.3 mg/Kg (≤ 1.04)
RDX	3.8	1.1	-	2.7 mg/Kg (≤ 1.04)
1,3,5-Trinitrobenzene	120	100	18 (≤ 40)	-
Nitrobenzene	3.7	0.52U	-	3.2 mg/Kg (≤ 1.04)
2,4,6-Trinitrotoluene	2000	1.8	199 (≤ 40)	1998.2 mg/Kg (≤ 1.04)
2,4-Dinitrotoluene LDC Report# 4565Z40	2.7	0.52U	-	2.18 mg/Kg (≤ 1.04)
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5I/0	TNT-5IA/0		
Amino-dinitrotoluenes LDC Report# 4565Y40	1.2	1.5	-	0.3 mg/Kg (≤ 2.0)

Table 2.4-13. Field Duplicate/Replicate Detected Results Precision Tables
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**Table 2.4-13F. Field Duplicate/Replicate Detected Results Precision for Explosives:
EPA Method SW8330**

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	TNT-5L/2	TNT-5LA/2		
Amino-dinitrotoluenes	1.7	4.2	-	2.5 mg/Kg (≤ 1.92)
2,4,6-Trinitrotoluene	5.2	4.4	17 (≤ 40)	-
LDC Report# 4565Z40				
Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)
	WET-2	WET-2A		
2,4,6-TNT	1.5	0.99U	-	0.91 mg/Kg (≤ 0.98)
LDC Report# 4567B40				

Notes:

Results exceeding field precision criteria are highlighted in **bold**. Results are not qualified for field precision.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only field duplicate/replicate samples with detected results were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies field duplicate/replicate sample results that exceed project precision criteria specified in Table 3.2-3 of the QAPP.

**Table 2.4-14. Remedial Investigation QC Split Samples Collected and Analyzed by Onsite and QES:
Detected Results Comparison Table**

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Lab Sampled	Code	Sample ID	SDG	Method SW8330 ANALYTE	Result	RPD	Units	Qual	MDL	PQL	Analyzed	Dilution
18-Dec-99 ONS	TNT-1C2/0	3F028		1,3,5-trinitrobenzene	54		MG/KG	0.4	0.4		23-Dec-99	1
				2,4,6-trinitrotoluene	43000	160	MG/KG	300	400		23-Dec-99	1000
				2,4-dinitrotoluene	50		MG/KG	30	40		07-Jan-00	100
18-Dec-99 QESS	TNT-1C2A/0	G9L230278		2,4,6-trinitrotoluene	4800	160	MG/KG	31	400		05-Jan-00	1000
				All others ND @ 400 mg/kg								
18-Dec-99 ONS	TNT-1C2Y/0	3F028		1,3,5-trinitrobenzene	55	15	MG/KG	0.3	0.4		22-Dec-99	1
				1,3-dinitrobenzene	2.7		MG/KG	0.3	0.4		22-Dec-99	1
				2,4,6-trinitrotoluene	88	10	MG/KG	0.4	0.4		22-Dec-99	1
				2,4-dinitrotoluene	1.4		MG/KG	0.3	0.4		22-Dec-99	1
				RDX	0.93		MG/KG	0.3	0.4		22-Dec-99	1
				nitrobenzene	2.3		MG/KG	0.3	0.4		22-Dec-99	1
				tetryl	3.4		MG/KG	0.4	0.4		22-Dec-99	1
18-Dec-99 QESS	TNT-1C2AY/0	G9L230278		1,3,5-trinitrobenzene	64	15	MG/KG	1.5	40		05-Jan-00	100
				2,4,6-trinitrotoluene	80	10	MG/KG	3.1	40		05-Jan-00	100
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2/0.5	3F027		1,3,5-trinitrobenzene	71		MG/KG	0.3	0.4		07-Jan-00	1
				1,3-dinitrobenzene	3		MG/KG	0.3	0.4		07-Jan-00	1
				2,4,6-trinitrotoluene	1800	157	MG/KG	40	40		23-Dec-99	100
				2,4-dinitrotoluene	3.2		MG/KG	0.3	0.4		07-Jan-00	1
				RDX	2.1		MG/KG	0.3	0.4		07-Jan-00	1
				nitrobenzene	1.7		MG/KG	0.3	0.4		07-Jan-00	1
				tetryl	5.7		MG/KG	0.4	0.4		07-Jan-00	1
18-Dec-99 QESS	TNT-1C2A/0.5	G9L230278		2,4,6-trinitrotoluene	15000	157	MG/KG	31	400		05-Jan-00	1000
				All others ND @ 400 mg/kg								
18-Dec-99 ONS	TNT-1C2Y/0.5	3F028		1,3,5-trinitrobenzene	98	12	MG/KG	0.3	0.4		22-Dec-99	1
				1,3-dinitrobenzene	7.5		MG/KG	0.3	0.4		22-Dec-99	1
				2,4,6-trinitrotoluene	14	180	MG/KG	0.4	0.4		22-Dec-99	1
				2,4-dinitrotoluene	0.92		MG/KG	0.3	0.4		22-Dec-99	1
				amino-dnts	2.1		MG/KG	0.6	0.8		22-Dec-99	1
				RDX	0.72		MG/KG	0.3	0.4		22-Dec-99	1
				nitrobenzene	2		MG/KG	0.3	0.4		22-Dec-99	1
				tetryl	2		MG/KG	0.4	0.4		22-Dec-99	1
18-Dec-99 QESS	TNT-1C2AY/0.5	G9L230278		1,3,5-trinitrobenzene	110	12	MG/KG	1.5	40		05-Jan-00	100
				2,4,6-trinitrotoluene	270	180	MG/KG	3.1	40		05-Jan-00	100
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2/1	3F027		1,3,5-trinitrobenzene	68	59	MG/KG	0.3	0.4		07-Jan-00	1
				1,3-dinitrobenzene	4.3		MG/KG	0.3	0.4		07-Jan-00	1
				2,4,6-trinitrotoluene	2500	115	MG/KG	40	40		23-Dec-99	100
				2,4-dinitrotoluene	5		MG/KG	0.3	0.4		07-Jan-00	1
				RDX	1.9		MG/KG	0.3	0.4		07-Jan-00	1
				nitrobenzene	0.93		MG/KG	0.3	0.4		07-Jan-00	1
tetryl	3.5		MG/KG	0.4	0.4		07-Jan-00	1				
18-Dec-99 QESS	TNT-1C2A/1	G9L230278		1,3,5-trinitrobenzene	37	59	MG/KG	15	400		05-Jan-00	1000
				2,4,6-trinitrotoluene	9200	115	MG/KG	31	400		05-Jan-00	1000
				All others ND @ 400 mg/kg								

**Table 2.4-14. Remedial Investigation QC Split Samples Collected and Analyzed by Onsite and QES:
Detected Results Comparison Table**

(Page 2 of 3)

Lab Sampled	Code	Sample ID	SDG	Method SW8330 ANALYTE	Result	RPD	Units	Qual	MDL	PQL	Analyzed	Dilution
18-Dec-99 ONS	TNT-1C2Y/1	3F028		1,3,5-trinitrobenzene	110	24	MG/KG	0.3	0.4	07-Jan-00	1	
				1,3-dinitrobenzene	6.8		MG/KG	0.3	0.4	07-Jan-00	1	
				2,4,6-trinitrotoluene	26000	200	MG/KG	300	400	22-Dec-99	1000	
				2,4-dinitrotoluene	17		MG/KG	0.3	0.4	07-Jan-00	1	
				RDX	5.7		MG/KG	0.3	0.4	07-Jan-00	1	
				tetryl	3.8		MG/KG	0.4	0.4	07-Jan-00	1	
18-Dec-99 QESS	TNT-1C2AY/1	G9L230278		1,3,5-trinitrobenzene	140	24	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	15	200	MG/KG	J	3.1	40	05-Jan-00	100
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2/2	3F027		1,3,5-trinitrobenzene	77	8	MG/KG	0.3	0.4	07-Jan-00	1	
				1,3-dinitrobenzene	2		MG/KG	0.3	0.4	07-Jan-00	1	
				2,4,6-trinitrotoluene	260	147	MG/KG	4	4	23-Dec-99	10	
				RDX	0.8		MG/KG	0.3	0.4	07-Jan-00	1	
18-Dec-99 QESS	TNT-1C2A/2	G9L230278		1,3,5-trinitrobenzene	83	8	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	1700	147	MG/KG	3.1	40	05-Jan-00	100	
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2Y/2	3F028		1,3,5-trinitrobenzene	94	6	MG/KG	0.3	0.4	22-Dec-99	1	
				1,3-dinitrobenzene	4.4		MG/KG	0.3	0.4	22-Dec-99	1	
				2,4,6-trinitrotoluene	1	157	MG/KG	0.4	0.4	22-Dec-99	1	
				amino-dnts	2.1		MG/KG	0.6	0.8	22-Dec-99	1	
18-Dec-99 QESS	TNT-1C2AY/2	G9L230278		1,3,5-trinitrobenzene	100	6	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	8.4	157	MG/KG	J	3.1	40	05-Jan-00	100
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2/2.5	3F027		1,3,5-trinitrobenzene	70	9	MG/KG	0.3	0.4	23-Dec-99	1	
				1,3-dinitrobenzene	1.5		MG/KG	0.3	0.4	23-Dec-99	1	
				2,4,6-trinitrotoluene	12	126	MG/KG	0.4	0.4	23-Dec-99	1	
				RDX	0.88		MG/KG	0.3	0.4	23-Dec-99	1	
18-Dec-99 QESS	TNT-1C2A/2.5	G9L230278		1,3,5-trinitrobenzene	64	9	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	53	126	MG/KG	3.1	40	05-Jan-00	100	
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2Y/2.5	3F028		1,3,5-trinitrobenzene	60	6	MG/KG	0.3	0.4	07-Jan-00	1	
				2,4,6-trinitrotoluene	310		MG/KG	4	4	07-Jan-00	10	
18-Dec-99 QESS	TNT-1C2AY/2.5	G9L230278		1,3,5-trinitrobenzene	64	6	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	ND		MG/KG	1.5	40	05-Jan-00	100	
				All others ND @ 40 mg/kg								
18-Dec-99 ONS	TNT-1C2/3.5	3F027		1,3,5-trinitrobenzene	67	11	MG/KG	0.3	0.4	23-Dec-99	1	
				1,3-dinitrobenzene	1.8		MG/KG	0.3	0.4	23-Dec-99	1	
				2,4,6-trinitrotoluene	130	67	MG/KG	0.4	0.4	23-Dec-99	1	
				RDX	2.1		MG/KG	0.3	0.4	23-Dec-99	1	
18-Dec-99 QESS	TNT-1C2A/3.5	G9L230278		1,3,5-trinitrobenzene	60	11	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	65	67	MG/KG	3.1	40	05-Jan-00	100	
				All others ND @ 40 mg/kg								

**Table 2.4-14. Remedial Investigation QC Split Samples Collected and Analyzed by Onsite and QES:
Detected Results Comparison Table**

(Page 3 of 3)

Lab Sampled	Code	Sample ID	SDG	Method SW8330 ANALYTE	Result	RPD	Units	Qual	MDL	PQL	Analyzed	Dilution
18-Dec-99	ONS	TNT-1C2Y/3.5	3F028	1,3,5-trinitrobenzene	54	9	MG/KG	0.3	0.4	22-Dec-99	1	
				2,4,6-trinitrotoluene	3.4	199	MG/KG	0.4	0.4	22-Dec-99	1	
18-Dec-99	QESS	TNT-1C2AY/3.5	G9L230278	1,3,5-trinitrobenzene	59	9	MG/KG	1.5	40	05-Jan-00	100	
				2,4,6-trinitrotoluene	1700	199	MG/KG	3.1	40	05-Jan-00	100	
				All others ND @ 40								
04-Dec-99	ONS	TNT-1C3/1	3F015	2,4,6-trinitrotoluene	290	187	MG/KG	4	4	05-Dec-99	10	
				amino-dnts	15	173	MG/KG	0.6	0.8	06-Dec-99	1	
04-Dec-99	QESS	TNT-1C3A/1	G9L080262	2,4,6-trinitrotoluene	10	187	MG/KG	J+	0.031	0.40	16-Dec-99	1
				4-amino-2,6-dinitrotoluene	1.1	173	MG/KG	0.098	0.40	16-Dec-99	1	
04-Dec-99	ONS	TNT-1C6/4	3F015	All ND	0.48		MG/KG	U	0.4	0.4	06-Dec-99	1
04-Dec-99	QESS	TNT-1C6/4.5	G9L080262	All ND	0.40		MG/KG	U	0.015	0.40	16-Dec-99	1
10-Dec-99	QESS	TW-1/19.5	G9L110172	All ND	0.40		MG/KG	U	0.049	0.40	21-Dec-99	1
10-Dec-99	ONS	TW-1/20	3F020	All ND	0.48		MG/KG	U	0.3	0.4	12-Dec-99	1
13-Dec-99	ONS	TW-4/20.5	3F022	All ND	0.5		MG/KG	U	0.4	0.4	23-Dec-99	1
13-Dec-99	QESS	TW-4/21	G9L150204	All ND	0.40		MG/KG	U	0.015	0.40	21-Dec-99	1
13-Dec-99	QESS	TW-4/21.5	G9L150204	All ND	0.40		MG/KG	U	0.015	0.40	22-Dec-99	1
13-Dec-99	QESS	TW-4A/0.5	G9L150204	All ND	0.40		MG/KG	U	0.015	0.40	21-Dec-99	1
13-Dec-99	ONS	TW-4/0.5	3F022	All ND	0.5		MG/KG	U	0.3	0.4	23-Dec-99	1

Table 2.4-15. Equipment Blank Omissions

Date of Sampling	Lab	Associated Analyses Not Performed
12/4/99	ONS	8015D
12/4/99	QESS	Metals
12/6/99	ONS	8015D
12/9/99	QESS	8290, Gen Chem.
12/10/99	QESS	8330(Including PETN and NG) [Additional analyses requested
12/15/99	ONS	8330,8310,8260,8015D
12/16/99	ONS	8330(Including PETN and NG), 8310
12/16/99	QESS	8290, Metals, E300.0
12/17/99	QESS	Metals(total), E300.0
12/18/99	ONS	8330(Including PETN and NG)
12/18/99	QESS	Metals(total), 8330
12/22/99	BABK	Perchlorate
12/22/99	ONS	8310, PETN and NG
12/23/99	ONS	8330(Including PETN and NG),8310

Table 2.7-1. Completeness Table for Remedial Investigation, December 1999

Analysis	Total Samples	Total analytes	(P)		Completeness		(R)	
			Contract	%	Analytical	%	Technical	%
Volatiles	84	6460	129	98.1	489	92.4	18	99.7
TEPH	98	280	93	67.0	94	66.4	0	100.0
PAHs	126	2016	166	91.8	286	85.8	5	99.8
Explosives(Onsite)	401	5588	461	91.8	463	91.7	39	99.3
Explosives(Quanterra)	21	294	0	100.0	5	98.3	1	99.7
Metals	165	4124	0	100.0	999	75.8	10	99.8
ANIONS	93	206	12	94.2	61	70.4	1	99.5
TOC	11	11	4	63.6	9	18.2	0	100.0
TDS	9	9	0	100.0	0	100.0	0	100.0
TSS	9	9	0	100.0	0	100.0	0	100.0
Dioxins	6	2	31	69.6	32	68.6	18	82.4
Perchlorate	9	9	7	22.2	7	22.2	0	100.0
NG-PETN	123	246	46	77.9	48	80.5	8	96.7

Table 2.7-2.
Rejected Results for the Redial Investigation, December 1999
(1 of 2)

EPA Method	Sample ID	Matrix	ANALYTE	Qualifier	Sampling Date	Lab Code	SDG
SW8260B	TW-3	Groundwater	acetone	R	14-Dec-99	ONS	VW-1
SW8260B	TW-3A	Groundwater	acetone	R	14-Dec-99	ONS	VW-1
SW8260B	TW-4	Groundwater	acetone	R	14-Dec-99	ONS	VW-1
SW8330	TW-12	Groundwater	amino-dnts	R	22-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3	Groundwater	amino-dnts	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	1,3,5-trinitrobenzene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	1,3-dinitrobenzene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	2,4,6-trinitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	2,4-dinitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	2,6-dinitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	2-nitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	3-nitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	4-nitrotoluene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	amino-dnts	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	RDX	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	nitrobenzene	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	HMX	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-3A	Groundwater	tetryl	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-3	Groundwater	nitroglycerin	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-3	Groundwater	PETN	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-4	Groundwater	nitroglycerin	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-4	Groundwater	PETN	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW6010B	WET-1	Sediment (Assoc. with WS)	antimony	R	23-Dec-99	QESS	G9L230278
SW6010B	WET-2	Sediment (Assoc. with WS)	antimony	R	23-Dec-99	QESS	G9L230278
SW6010B	WET-2A	Sediment (Assoc. with WS)	antimony	R	23-Dec-99	QESS	G9L230278
E300-NO2N	LB-3A/4.5	Soil	nitrogen, nitrite (as N)	R	18-Dec-99	QESS	G9L210200
SW6010B	FA-4/2.5	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	FA-4/3	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	FA-5/1	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	FA-5/5	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	FA-6/3	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	FA-6A/1.5	Soil	antimony	R	16-Dec-99	QESS	G9L170254
SW6010B	TW-11/16.5	Soil	antimony	R	15-Dec-99	QESS	G9L170254
SW8260B	AR-1/1	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-1/4	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-1/8	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-2/0.5	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-2/10	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-2/4	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-2/4.5	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-3/0.5	Soil	methylene chloride	R	10-Dec-99	ONS	VS-2
SW8260B	AR-3/10	Soil	methylene chloride	R	10-Dec-99	ONS	VS-2
SW8260B	AR-3/13	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	AR-3/17.5	Soil	methylene chloride	R	11-Dec-99	ONS	VS-3
SW8260B	TW-4/10	Soil	vinyl acetate	R	13-Dec-99	ONS	VS-4
SW8260B	TW-8/15.5	Soil	methylene chloride	R	09-Dec-99	ONS	VS-2
SW8290	TW-5/10.5	Soil	1,2,3,4,6,7,8-HpCDD	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	1,2,3,4,6,7,8-HpCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	1,2,3,4,7,8,9-HpCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	1,2,3,4,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	1,2,3,6,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	1,2,3,7,8,9-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	2,3,4,6,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	OCDD	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/10.5	Soil	OCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	1,2,3,4,6,7,8-HpCDD	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	1,2,3,4,6,7,8-HpCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	1,2,3,4,7,8,9-HpCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	1,2,3,4,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	1,2,3,6,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	2,3,4,6,7,8-HxCDF	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	OCDD	R	09-Dec-99	QESS	G9L110172
SW8290	TW-5/5.5	Soil	OCDF	R	09-Dec-99	QESS	G9L110172
SW8310	TW-8/15.5	Soil	acenaphthene	R	09-Dec-99	ONS	PAH-S
SW8310	TW-8/15.5	Soil	acenaphthylene	R	09-Dec-99	ONS	PAH-S
SW8310	TW-8/15.5	Soil	fluoranthene	R	09-Dec-99	ONS	PAH-S
SW8310	TW-8/15.5	Soil	naphthalene	R	09-Dec-99	ONS	PAH-S
SW8310	TW-8/15.5	Soil	phenanthrene	R	09-Dec-99	ONS	PAH-S
SW8330	TNT-1C3A/1	Soil	2-amino-4,6-dinitrotoluene	R	04-Dec-99	QESS	G9L080262

Table 2.7-2.
Rejected Results for the Remedial Investigation, December 1999
 (2 of 2)

SW8330	SW-1	Surface Water	3-nitrotoluene	R	23-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	SW-1	Surface Water	amino-dnts	R	23-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	SW-2	Surface Water	3-nitrotoluene	R	23-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	SW-2	Surface Water	amino-dnts	R	23-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8260B	TRIP BLANK 12/11/99B	Water QC Matrix	acetone	R	14-Dec-99	ONS	VW-1
SW8260B	TW-4/K	Water QC Matrix	acetone	R	13-Dec-99	ONS	VW-1
SW8330	DA3-3/K	Water QC Matrix	amino-dnts	R	17-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	DA3-5/K	Water QC Matrix	amino-dnts	R	17-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	HF-2/K	Water QC Matrix	amino-dnts	R	06-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	HF-3/K	Water QC Matrix	amino-dnts	R	07-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	RSP1/K2	Water QC Matrix	amino-dnts	R	06-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	RSP5/K1	Water QC Matrix	amino-dnts	R	07-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	SRC-1	Water QC Matrix	amino-dnts	R	21-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	SRC-2	Water QC Matrix	amino-dnts	R	21-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-1D/K	Water QC Matrix	amino-dnts	R	07-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-1F3/K	Water QC Matrix	amino-dnts	R	06-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-1N/K	Water QC Matrix	amino-dnts	R	19-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-5A8/K	Water QC Matrix	amino-dnts	R	21-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-5F/K	Water QC Matrix	amino-dnts	R	10-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TNT-5L/K	Water QC Matrix	amino-dnts	R	22-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-1/K	Water QC Matrix	amino-dnts	R	10-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-4/K	Water QC Matrix	amino-dnts	R	13-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-4/K1	Water QC Matrix	amino-dnts	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-7/K	Water QC Matrix	amino-dnts	R	11-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-8/K1	Water QC Matrix	amino-dnts	R	09-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330	TW-9/K1	Water QC Matrix	amino-dnts	R	10-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-4/K	Water QC Matrix	PETN	R	13-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-4/K1	Water QC Matrix	nitroglycerin	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-4/K1	Water QC Matrix	PETN	R	14-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro
SW8330M	TW-7/K	Water QC Matrix	PETN	R	11-Dec-99	ONS	12/12.W-17.Nitro-29.23-Nitro

3.0. QUALITY CONTROL SUMMARY REPORT FOR THE DATA GAPS 1 AND 2 INVESTIGATION SAMPLING EVENT FEBRUARY TO MAY 2000

EXECUTIVE SUMMARY

This Quality Control Summary Report (QCSR) was prepared in accordance with Section 5.8 of the Environmental Data Quality Management Program Specifications, U.S. Army Corps of Engineers (USACE), Sacramento District, Draft Version 1.08 (1999) for work conducted from February through May, 2000 at the Tourtelot Property (Project Site) in Benicia, California. Quality assurance/quality control (QA/QC) activities for field, sampling, analytical, and data management for this project were performed according to the *Technical Memorandum for Remedial Investigation*, dated March 2, 2000 (the "Tech Memo"), which updates plans and requirements specified in the *Final Non-Ordnance and Explosives Remedial Investigation (RI)/Feasibility Study (FS) Work Plan, Tourtelot Cleanup Project, Benicia, California*, dated February 15, 2000 (the "Final Work Plan").

This QCSR discusses the quality and usability of the definitive-level analytical data for all samples collected from February through May, 2000 for this phase of the non-ordnance and explosives remedial investigation (non-OE RI), known as the data gaps 1 and 2 investigations (referred to hereafter as the data gaps investigation sampling event), and includes discussion of deviations from procedures specified in the Sampling and Analysis Plan (SAP), Chapter 2.0 of the Final Work Plan and Section 6.0 of the Tech Memo; and the Quality Assurance Project Plan, Chapter 3.0 of the Final Work Plan (QAPP), with Addendum to the Quality Assurance Project Plan, Appendix A of the Tech Memo, referred to collectively as "the QAPP." Discussions of usability of data with respect to decision-making for project objectives are based on the data quality objectives (DQOs) presented in Chapter 2.0 of the Final Work Plan.

Data review and validation were performed on the entire definitive-level data set, including evaluation of results for performance evaluation (PE) samples analyzed by the laboratories receiving the samples for this sampling event. The results indicate the definitive-level data collected for this project meet project objectives except where specified as rejected. No samples with severely impacted (rejected) data were found to be critical to the project objectives. Quality control (QC) results for each QC parameter are summarized in Section 3.4.1 of this QCSR. Data quality and completeness for each method are summarized in Sections 3.6 and 3.7 of this QCSR. PE results demonstrated acceptable accuracy for each method, and are discussed in Section 2.4.3. Completeness goals are discussed in Section 2.7.

Approximately 1.1 percent of the definitive-level data were qualified as rejected and 9.7 percent of the definitive-level data were qualified as estimated for exceeding data quality criteria which include accuracy, precision, completeness, representativeness, comparability, and sensitivity. The remaining definitive-level data met the data quality criteria. Of the rejected data, approximately 80 percent were for 2-chloroethylvinyl ether in soils; for 2-chloroethylvinyl ether and dibromo-3-chloropropane in waters (most of which were field blanks); and for several ketones in several field blanks. These rejections have no effect on project objectives.

Definitive-level laboratory analyses of standardized analytical methods for the data gaps sampling event were performed by Severn Trent Laboratories in West Sacramento, California (STL), formerly Quanterra Environmental Services (QES), according to the methods and requirements specified in the QAPP. The methods include U.S. Environmental Protection Agency (EPA) Methods 160.1 for total dissolved solids (TDS), 160.2 for total suspended solids (TSS), 300.0 for common anions (chloride, nitrate-N, nitrite-N, and sulfate), 415.1 for total organic carbon (TOC) in waters, SW9060 for TOC in soils, SW8015B for Total extractable petroleum hydrocarbons (TEPH) by gas chromatography (GC), SW8081A for organochlorine pesticides by GC, SW8082 for polychlorinated biphenyls (PCBs) by GC, SW8260B for volatile organic

compounds (VOCs) by gas chromatography/mass spectrometry (GC/MS), SW8270C for semivolatile organic compounds (SVOCs) by GC/MS, SW8270CWM for chloropicrin by GC/MS, SW8290 for dioxins/furans by high resolution GC/MS (HRGC/MS), SW8310 for polynuclear aromatic hydrocarbons (PAHs) by high performance liquid chromatography (HPLC), SW8330 for nitroaromatics/nitramines by HPLC, and modified SW8330M for nitroglycerin/PETN by HPLC. QES/STL is certified by the California Environmental Laboratories Accreditation Program (ELAP) and the USACE to perform the analyses included in the scope of work for this site. Note that QES was acquired by STL in February of 2000. All references to Severn Trent Laboratories in this report will be to QES/STL.

Special analytical services for the analysis of perchlorate were performed by E. S. Babcock & Sons, Inc. (Babcock) of Riverside, California according to the proprietary modification of the California Department of Health Services (CADHS) Sanitation and Radiation Laboratories Branch (SRLB) modification of EPA Method 300.0 (CADHS 300.0M). The method was updated to meet the requirements of the newly promulgated EPA Method 314.0 for the analysis of perchlorate during the course of this investigation. Definitive-level laboratory analyses for special analytical services were performed according to the methods and requirements specified in the QAPP.

Special analytical services for the analysis of speciated hydrazines were performed by Truesdail Analytical Laboratories (Truesdail) of Tustin, California according to the proprietary modification of EPA Method SW8315 (SW8315M). Definitive-level laboratory analyses for special analytical services were performed according to the methods and requirements specified in the QAPP.

All analyses were performed according to the requirements for these methods in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (U.S. EPA SW-846, Third Edition, Third Update, December 1996), *Methods for Chemical Analysis of Water and Wastes*, U.S. EPA Manual 600/4-79-020 (U.S. EPA, 1983 with additions), or modifications to the specified methods presented in the QAPP. The testing methods used, parameters and analytes reported, and practical quantitation limits (PQLs) required for the analytical program are listed in Table 3.1-1 of the QAPP. Holding time and sample container and preservation requirements are specified in Table 3.1-2 of the QAPP. QA/QC requirements, control limits, and corrective actions are specified in Table 3.2-1 through 3.2-5 of the QAPP. Data validation flagging conventions are specified in Table 3.4-1 of the QAPP.

Approximately 90 percent of the definitive-level analytical data were provided by the project laboratories in EPA Level III format. This included the case narratives, completed chain-of-custody (COC) documentation, laboratory analysis results reporting forms, and QC summary forms. Greater than 10 percent of the definitive-level analytical data provided by Onsite and QES/STL and all of the definitive-level data for special analytical services were reported in EPA Level IV format, which included the raw data generated from each analytical method performed in addition to the information provided under Level III format. Raw data consists of sample preparation sheets, instrument run logs, calibration data, chromatograms, mass spectra, calculation sheets, and instrument generated quantitation reports and printouts.

Data validation was performed by Laboratory Data Consultants (LDC) of Carlsbad, California. The QC summary tables and discussions of the QC results are based upon the tables and findings presented in the LDC data validation reports (DVRs), with further review by Earth Tech chemists in San Jose, California. All data qualifiers reported in the results tables presented in Tables 5-1 through 5-24E are a result of this third party validation and Earth Tech review. Complete data packages from the analytical laboratories and LDC DVRs have been submitted to the California Department of Toxic Substances Control (DTSC) and USACE, Sacramento District, for technical review.

3.1 PROJECT SCOPE

The overall objective of the non-OE RI was to evaluate the nature and extent of chemicals of potential concern (excluding OE) which may have impacted either the soil, sediment, surface, and/or groundwater as a result of DOD-related activities at the Project Site so appropriate remedial action alternatives could be fully evaluated in the FS; the ultimate goal being to remediate the Project Site to levels acceptable for residential land use.

Non-OE RI data collection was achieved during four phases of field work conducted between May 1999 and August 2000. The four phases of field work are identified in this document as follows: the interim investigation; the remedial investigation; the data gaps 1, 2, and 3 investigations; and, the removal action investigation. Collectively, these investigations are referred to as the non-OE RI. This QCSR summarizes the chemical data quality of the sample analyses performed for the data gaps 1 and 2 investigations conducted from February through May, 2000 (referred to hereafter as the data gaps investigation sampling event). A complete list of the samples and analyses performed is presented in Table 3.1-1.

Detailed descriptions of the scope of work associated with each phase of field work are presented in Sections 4.2.1, 4.2.2, 4.2.3, and 4.2.4 and summarized in Tables 4-4, 4-5, 4-6, and 4-7 of the RI/FS.

3.2 PROJECT DESCRIPTION

A detailed description of the Project Site, including environmental setting, regional geology and hydrogeology/hydrology, and site history is presented in Chapter 2.0 of the RI/FS.

3.3 SAMPLING PROCEDURES

With the exception of the interim investigation, all field investigation activities were conducted in accordance with the protocols and procedures presented in Chapter 2.0 of the Final Work Plan, Chapter 6.0 of the Tech Memo and Chapter 8.0 of the *Removal Action Work Plan*, dated May 9, 2000 (the "RAW"), as described in Appendix C of the RI/FS. It should be noted that the interim investigation was conducted prior to the development of a formal work plan; however, samples collected during the interim investigation were collected in accordance with industry standard protocols and procedures as described in Appendix C. This QCSR summarizes the chemical data quality for the data gaps investigation conducted in February through May, 2000.

Protocols and procedures used for the collection of samples during the non-OE RI are described in the following sections of Appendix C:

Soil and bedrock sample collection, including discrete sampling and continuous coring: see Section C.6.1

Groundwater sample collection, including purging and sample withdrawal: see Section C.8.4

Sediment, surface water and seep sample collection: see Section C.9

Stockpile sample collection: see Section C.10

Sample handling and shipment, including sample sealing, sample identification, sample labeling, and sample packaging and shipment: see Section C.15.

Samples were collected as specified in the Tech Memo, as presented in Table 3.3-1. Deviations from the sampling plan are presented in the table and are discussed individually in Section 3.7.1 of this QCSR and in the sections of the RI/FS for each site. Field completeness with respect to the sampling plan was in excess of 99 percent.

3.4 QUALITY CONTROL ACTIVITIES

QA/QC activities were performed as specified in the field sampling plan (FSP) and QAPP, and are summarized in the following sections.

3.4.1 Laboratory Quality Control: Data Validation Assessment

Data validation is a systematic and independent process of reviewing and qualifying the definitive-level analytical data presented against an established set of criteria. Validation is performed to ensure the quality of the definitive-level data collected and to assess limitations on usability based on the accuracy, precision, completeness, representativeness, comparability, and sensitivity parameters defined in the QAPP, as well as to evaluate laboratory compliance with specified methods and protocols.

Laboratory QC was evaluated in the data validation process. The definitive-level analytical data for all samples collected at the project site during the data gaps sampling event were validated according to the QC requirements and control limits specified in the QAPP, consistent with guidelines and procedures outlined in the *EPA Contract Laboratory Program National Functional Guidelines For Organic Data Review* (EPA-540/R-94/012, February 1994) and *National Functional Guidelines For Inorganic Data Review* (EPA-540/R-94-013, February 1994), referred to collectively as the "Functional Guidelines." The reviewer's professional judgment was used to evaluate data quality when called for in the Functional Guidelines and in instances with no clear policy or conflicting guidance on how the data should be qualified.

The data validation process was performed by Laboratory Data Consultants (LDC) in Carlsbad, California. The data were validated at EPA Level IV for a minimum of 10 percent of the samples for each matrix for each method for the non-OE RI as a whole. The remainder were validated at Level III. LDC data validation project summaries which specify the levels of validation are presented in Attachment 1. Validated results with data validation qualifiers are presented in Tables 5-1 through 5-24E of the RI/FS.

The results of the data validation are summarized and discussed for each QC parameter in the following subsections. Summary tables presenting validation qualifications and findings presented in Tables 3.4-1 through 3.4-11 and D4.3-13 were compiled from the LDC DVRs with further review by the Earth Tech project chemist. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation.

Whenever QC criteria were exceeded, re-extractions and/or reanalyses were performed as required in the QAPP unless otherwise specified in the subsections for each QC parameter, and both sets of data were reported by the laboratory and validated by the validators. The data which most closely met the QAPP requirements and DQOs were selected by the validators and reviewed by the project chemist, and used for project reporting and decision-making purposes. All data qualified but not used for reporting purposes are included in the QC summary tables with a "Not Used" designation and were not included in completeness calculations. LDC findings in the QC summary tables based upon technical validation criteria are indicated in the tables with an "A" and findings related to a protocol/contractual deviation are indicated with a "P."

Qualifiers were assigned by the reviewer to all definitive-level data which failed to meet specified analytical and quality control criteria. Data qualified as "R" are rejected and considered unusable. Data qualified with the "J" qualifier are considered estimated and usable as assessed in validation for decision-making

purposes. "J+" indicates the possibility that the result may be biased high, and that the actual chemical level may be lower than the reported result. "J-" indicates the possibility that the result may be biased low, and that the actual chemical level may be higher than the reported result or detection limit reported for a non-detected result. The "U" qualifier indicates that the result is non-detected at or above the reporting limit specified, and is applied to all non-detected results.

3.4.1.1 CHAIN-OF-CUSTODY, SAMPLE PRESERVATION, AND HOLDING TIMES

The quality of the analytical data collected is highly dependent on the integrity of the samples from site collection to laboratory receipt and eventual analysis. The COC records are an integral link in the legal documentation intended to ensure this integrity. Review of the completed COC records includes all entries for custody signatures and dates, sample description, sample collection times and dates, sample container types and preservatives, analyses requested, and condition of the sample containers upon receipt at the laboratory. COC records were properly signed and dated.

Samples were collected in appropriate containers with correct preservatives. The COCs were reviewed for documentation of cooler temperatures. The sample coolers and containers used in this project were received cold (2 to 6 degrees Celsius), sealed, and intact by QES/STL, Babcock, and Truesdail with the following exception. Several coolers delivered directly to QES/STL were received marginally above the required temperature. The samples did not have adequate time to drop to the required range, and the quality of the data was not affected. All cooler temperatures met validation criteria.

Technical holding times are the maximum allowable times between sample collection and sample preparation or extraction (if applicable), and analysis. Technical holding time criteria are derived from requirements specified for the analytical methods used, and are specified for both aqueous and solid samples in Table 3.1-2 of the QAPP.

Holding times were evaluated by comparing the sample collection dates on the COC forms with the sample preparation, extraction, and analysis dates shown on the laboratory summary reports, extraction logs, or analysis run logs. When holding times were exceeded, all detected results were qualified as estimated (J or J-). When holding times were exceeded by two times or less, all non-detected results were qualified as estimated (UJ). When holding times were grossly exceeded (factor of two or more), all non-detected results were qualified as rejected (R).

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1.

Approximately 0.5 percent of the data were qualified as estimated (J/UJ) due to exceeded holding times, and less than 0.1 percent of the data were rejected. A summary and tables for the qualification of data by each analytical method due to holding times are presented in the following sub-sections.

3.4.1.1.1 Holding Times for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1A. The result for nitrate-N in one soil sample and results for nitrite-N in all six soil samples were rejected (R), and results for nitrate-N and nitrite-N were estimated in two of 18 aqueous field samples and two equipment blanks due to holding time exceedance. For nitrate-N and nitrite-N, the potential impact of the holding time qualifications would be for nitrite-N to convert to nitrate-N, with marginal effect on the sum of the two analytes. The six soil samples were collected from the boring of monitoring well 6 (MW-6). Unqualified results for nitrate-N at 0.5' (same depth as the rejected nitrate-N result, above) and nitrite-N results at various depths for this general location are available from the samples collected during the boring of

temporary well 6 (TW-6) during the remedial investigation, and confirm that nitrate-N was non-detected at 0.5', and that nitrite-N was not found at detectable concentrations at the site. The estimated results are usable for decision-making purposes. Project objectives are not significantly affected for these methods.

3.4.1.1.2 *Holding Times for Perchlorate: Method CADHS 300.0-Mod*

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.3 *Holding Times for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)*

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.4 *Holding Times for EPA Method SW8015 for TEPH*

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1B. Non detected results for TEPH in three of 126 soil samples were rejected due to holding time exceedance. No other data used for reporting purposes were qualified due to holding time or preservation requirements. The effect of the small number of qualifications on the project objectives is not expected to be significant.

3.4.1.1.5 *Holding Times for EPA Method SW8081A for Pesticides*

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1C. No data used for reporting purposes were qualified due to holding time or preservation requirements.

3.4.1.1.6 *Holding Times for EPA Method SW8082 for PCBs*

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1C. Results for the PCBs were rejected in approximately 2.9 percent of the PCB data and estimated in approximately 31 percent due to holding time criteria.

Results for the PCBs were rejected in sample TNT-1P/0 due to exceedance of extraction holding time marginally beyond the two-time technical criteria for rejection. The location at TNT-1P/0 is known to contain high levels of explosives requiring remedial action, so the rejection of the results for this method do not significantly affect project objectives. Results for the PCBs were estimated in eleven samples due to holding times. PCBs are extremely stable and are not likely to dissipate due to storage prior to extraction, so the non-detected results may be considered to indicate that PCBs are not present in any of the qualified samples. The holding time qualifications do not significantly affect the project objectives.

3.4.1.1.7 *Holding Times for EPA Method SW8260B for VOCs*

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.8 *Holding Times for EPA Method SW8270C for SVOCs*

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.9 Holding Times for Modified Method SW8270CWM for Chloropicrin

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.10 Holding Times for EPA Method SW8290 for Dioxins/Furans

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.11 Holding Times for EPA Method SW8310 for PAHs

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1D. No data used for reporting purposes were qualified due to holding time or preservation requirements.

3.4.1.1.12 Holding Times for Modified Method SW8315M for Hydrazines

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.13 Holding Times for EPA Method SW8330 for Explosives

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.1.14 Holding Times for EPA Method SW8330M for PETN and Nitroglycerin

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

3.4.1.2 INSTRUMENT PERFORMANCE CRITERIA

In order to ensure the validity of data generated, several analytical methods specify instrument performance criteria that must be met before sample analysis can proceed. These methods are the gas chromatography/mass spectrometry (GC/MS) analyses of VOCs by EPA Method SW8260B and SVOCs by EPA Method SW8270C, and the high resolution GC/MS (HRGC/MS) analyses of dioxins and furans by EPA Method SW8290.

The GC/MS performance checks are performed to ensure acceptable mass resolution, correct identification and relative abundance of ions, and acceptable instrument sensitivity. Footnotes a, b, and c of Table 3.2-5 of the QAPP show the instrument performance criteria for EPA Methods SW8260B, SW8270C, and SW8290, respectively. For each analytical method, conformance is demonstrated by analyzing a standard material and meeting specified criteria. Failure to meet the GC/MS instrument performance criteria results in the qualification of the data as either estimated (J/UJ) or rejected and considered unusable (R), depending on the severity of the problem.

Conformance with the instrument performance criteria was verified by reviewing the appropriate quality assurance summary forms. There were no data qualified as estimated due to GC/MS instrument performance results for EPA Methods SW8260B, SW8270C, and SW8290.

3.4.1.3 CALIBRATION

Calibration criteria ensure that the analytical instruments are capable of producing accurate and reproducible data. The QAPP specifies the calibration procedures that must be followed, the calibration frequency requirements, and the acceptance criteria that must be met to demonstrate satisfactory conformance based on requirements in the methods and other guidance documents. Table 3.1-5 of the QAPP summarizes the calibration procedures and criteria used by the laboratories.

For both organic and inorganic analyses, the initial calibration demonstrates that the system is capable of producing acceptable data at the beginning of the analytical sequence utilizing linear response with an acceptable correlation coefficient (r) or non-linear coefficient of determination (r^2) for the calibration curve. For GC/MS and HRGC/MS analyses, review of the initial calibration also includes evaluation of the response factor (RF), percent relative standard deviation (%RSD) of the RFs, and retention times for each analyte in the target list.

When the initial calibration correlation coefficient or the %RSD was outside of control limits for an analyte or compound, associated results were qualified as estimated (J/UJ). If the correlation coefficient or the %RSD was grossly outside of control limits (r less than 0.990, r^2 less than 0.980, or RSD greater than two times the control limit), or if the RF did not meet the minimum criterion of 0.05 specified in Table 3.4-1 of the QAPP, associated non-detected results were qualified as rejected (R), with the following exception. Compounds with RFs between 0.01 and 0.05 are considered usable by EPA, and non-detected results are estimated (UJ) according to the Functional Guidelines and EPA Region IX data validation protocols instead of rejected (R). For compounds with detection limits raised such that the lowest standard used has an absolute response that demonstrates acceptable sensitivity at the reported practical quantitation limit (PQL), non-detected results were qualified as estimated (UJ) not rejected (R). For the data set included in this QCSR, this exception applies to non-detected ketones with RFs between 0.01 and 0.05. These data demonstrate acceptable instrument response at the reported PQLs, and are defensible and usable for decision-making purposes. Therefore, the DQOs are not adversely affected by the use of these data.

Initial calibration verification (ICV) samples for inorganic methods and continuing calibration verification (CCV) standards for all methods are performed by analyzing standards of known concentration at the frequency specified for each analytical method used. Acceptable recoveries of the ICV and CCVs indicate conformance with the analytical requirements. For GC/MS analyses, continuing calibration review includes the evaluation of the RF and the percent difference (%D) between the RF of the continuing calibration standard and the average RF of the initial calibration curve, or the percent drift (also referred to as percent D) between the true and reported concentrations of the CCV. Results associated with ICVs or CCVs outside of specified control limits were qualified as estimated (J/UJ) if marginally outside of QC limits, or qualified as rejected (R) if non-detected and grossly outside of QC limits (greater than two times the control limit), according to EPA guidelines.

Approximately 0.9 percent of the data were rejected and 3.4 percent of the data were qualified as estimated due to calibration problems. A summary and tables for the qualification of data by each analytical method due to calibration criteria are presented in the following sub-sections.

3.4.1.3.1 Calibration for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)

Initial and continuing calibrations are not required for EPA Methods 160.1 and 160.2. Balance calibrations for these gravimetric methods were reviewed and were acceptable. Initial calibrations for EPA Methods 300.0 and 415.1/SW9060 were performed according to method requirements. All correlation coefficients (r) exceeded the 0.995 criterion, and all percent recoveries (%R) for the ICVs and CCVs met the 90-110%R criteria, with the exception presented in Table 3.4-2A..

One result for nitrite-N was qualified as estimated for a low CCV recovery. The 85%R of the CCV marginally exceeds the 90-110%R criteria. The associated result may be biased low. The effect on the quality of the data is not significant.

3.4.1.3.2 Calibration for Perchlorate: Method CADHS 300.0-Mod

Initial calibrations were performed according to method requirements, with the exception presented in Table 3.4-2B. Section 3.2.7.2 of the QAPP specifies the use of a minimum of three calibration standards and a blank to establish the calibration curve for all ion chromatography methods. Table 3.2-5 specifies a minimum of three calibration standards. The laboratory used five calibration standards and a blank for most of the analyses; however, for the 15 samples in Table 3.4-2B, the blank was not included in the calibration curve. This was because the laboratory began using EPA Method 314.0, newly promulgated in December of 1999. Method 314.0 does not specify the use of a blank in the initial calibration. The laboratory was contacted during the sampling event, and the use of the blank in the initial calibration was resumed for this project. The calibrations were compliant with EPA Method 314.0 and there is no effect on the quality of the data.

All correlation coefficients (r) exceeded the 0.995 criterion, and all %Rs for the ICVs and CCVs met the 90-110%R criteria.

3.4.1.3.3 Calibration for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)

Initial calibrations for EPA Method SW6010B were performed according to method requirements. All %RSDs met the less than 5 percent criteria, and all %Rs for the ICVs and CCVs met the 90-110%R criteria.

Initial calibrations for EPA Methods SW7470A for waters and SW7471A for soils were performed according to method requirements. All correlation coefficients (r) exceeded the 0.995 criterion, and all %Rs for the ICVs and CCVs met the 80-120%R criteria.

3.4.1.3.4 Calibration for EPA Method SW8015 for TEPH

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion.

3.4.1.3.5 Calibration for EPA Method SW8081A for Pesticides

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion, with the exception presented in Table 3.4-2C.

No qualifications were required as all results were non-detected and the CCVs indicated the possibility of high bias. The quality of the data was not affected.

3.4.1.3.6 Calibration for EPA Method SW8082 for PCBs

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion, with the exception presented in Table 3.4-2D.

No qualifications were required as all results were non-detected and the CCVs indicated the possibility of high bias. The quality of the data was not affected.

3.4.1.3.7 Calibration for EPA Method SW8260B for VOCs

Initial calibrations were performed according to method requirements using required standard concentrations. A curve fit, based on the initial calibration, was established for quantitation for selected compounds. Average relative response factors (RRFs) for all volatile target compounds and system monitoring compounds were within validation criteria. Percent RSDs for RRFs were less than or equal to 30.0 percent, or for selected compounds the coefficient of determination (r^2) was greater than or equal to 0.990, with the exceptions noted in Table 3.4-2E. Average RRFs were within validation criteria, with the exceptions noted in Table 3.4-2F.

Continuing calibration was performed at the required frequencies. All of the continuing calibration %Ds between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0 percent, with the exceptions noted in Table 3.4-2G. All of the continuing calibration RRF values were within validation criteria, with the exceptions noted in Table 3.4-2H.

Initial and continuing calibration was not performed for 2-chloroethylvinyl ether in any of the soils samples. The SW8260B analyses were not able to be performed within the 48 hour holding time for unpreserved samples, and the methanol preservation performed according to preparation method SW5035 destroyed this compound. Therefore, there were no recoveries for any QC analyses of this compound, and the initial and continuing calibrations were not reported. For reporting purposes, the results for 2-chloroethylvinyl ether in all of the soils samples have been qualified as rejected (R) and unusable wherever they are reported. As 2-chloroethylvinyl ether is not a concern at the project site, and as the method destroys the compound such that it cannot be reported, there is no effect on the project objectives. The data qualified as rejected for this compound should not be counted in the completeness evaluation.

Data qualification for initial calibrations resulted in the estimation (UJ) of non-detected results for acetone in all of the water samples and one soil sample, for vinyl acetate in most of the water samples, and for 2-hexanone in one soil sample for %RSDs above 30 percent. Results for 2-chloroethylvinyl ether were rejected in all of the water samples and 1,2-dibromo-3-chloropropane was rejected in four aqueous water samples and 10 field blanks due to RFs less than 0.5 and low sensitivity at the PQLs. Acetone and 2-butanone were estimated in all of the water samples and 2-hexanone was estimated in four aqueous water samples and 10 field blanks due to RFs less than 0.5 but greater than 0.01 with adequate sensitivity at the PQLs due to raised PQLs.

Data qualification for continuing calibrations resulted in the rejection (R) and estimation (J/UJ) of the same compounds in the same water samples as in the initial calibrations due to low RFs. Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for various ketones, bromomethane, dichlorodifluoromethane, 2,2-dichloropropane, and vinyl acetate in some samples.

Approximately 4.2 percent of the SW8260B results were qualified as estimated and one percent as rejected due to exceeded calibration criteria, which is within normal parameters for this method. Estimated data are usable in decision-making for project objectives. The small number of rejected results for 2-chloroethylvinyl ether and 1,2-dibromo-3-chloropropane do not affect the project objectives as neither compound is a chemical of potential concern.

3.4.1.3.8 Calibration for EPA Method SW8270C for SVOCs

Initial calibrations were performed according to method requirements using required standard concentrations. A curve fit, based on the initial calibration, was established for quantitation for selected compounds. Average RRFs for all semivolatile target compounds and system monitoring compounds were within validation criteria. Percent RSDs for RRFs were less than or equal to 30.0 percent, or for selected compounds the coefficient of determination (r^2) was greater than or equal to 0.990, with the exceptions noted in Table 3.4-2I.

Continuing calibration was performed at the required frequencies. All of the continuing calibration %Ds between the initial calibration RF and the continuing calibration RRF were less than or equal to 25.0 percent, with the exceptions noted in Table 3.4-2J. All of the continuing calibration RRF values were within validation criteria, with the exceptions noted in Table 3.4-2K.

Results for benzidine were rejected in all seven soil samples for high %RSDs and for RRFs less than 0.05 in the continuing calibrations. Rejection of benzidine results is not unusual for this method, benzidine is not a chemical of concern for this project, and the project objectives are not affected.

Non-detected results for three additional compounds in all seven soil samples were qualified as estimated (UJ) for initial and continuing calibrations, and the detected results for two additional compounds in two soil samples were qualified as estimated (J+) for continuing calibrations. None of the qualified SVOC data were for PAHs, with the exception of the detected results for indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene in the two soil samples qualified for potential high bias.

The SW8270C analyses of these seven soil samples were the reanalyses of re-collected samples unsuccessfully analyzed for PAHs by SW8310 during the remedial investigation sampling event, so the non-PAH compounds were not included in the DQOs for these samples by this method. Although approximately 7.5 percent of the SW8270C results were qualified as estimated and 2.4 percent as rejected due to exceeded calibration criteria, only the four detected results for PAHs estimated for potential high bias were for chemicals of concern for this project. The rejected results for benzidine and the other non-PAH estimated data do not affect the project objectives. The four estimated PAH results may be biased slightly high, and are usable in decision-making for project objectives.

3.4.1.3.9 Calibration for Modified Method SW8270CWM for Chloropicrin

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion.

3.4.1.3.10 Calibration for EPA Method SW8290 for Dioxins/Furans

Initial calibrations were performed with a five point initial calibration according to method requirements. All %RSDs for the RFs were less than or equal to 20.0 percent for unlabeled compounds (natives) and less than or equal to 30.0 percent for labeled compounds (internal standards). Signal-to-noise requirements and ion abundance ratios for all polychlorinated-dibenzodioxins (PCDDs) and polychlorinated-dibenzofurans (PCDFs) were within validation criteria.

Routine (continuing) calibration was performed at the required frequencies. All of the routine calibration %Ds between the initial calibration RF and the routine calibration RF were less than or equal to 20.0 percent for unlabeled compounds and less than or equal to 30.0 percent signal-to-noise, with the

exceptions presented in Table 3.4-2L. The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for six compounds in four soil samples and two field blanks and seven compounds in one sediment sample (approximately 18 percent of the SW8290 data) due to routine calibration %Ds between the initial calibration RF and the routine calibration RF internal standard greater than the specified control limit. All of the compounds have low toxicity equivalence factors (TEFs) and are therefore of relatively low importance compared to the unqualified compounds for these samples. The effect of these qualifications on project objectives is not expected to be significant.

3.4.1.3.11 Calibration for EPA Method SW8310 for PAHs

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than 0.995 criteria.

Calibration verification was performed at required frequencies. The percent recoveries of amounts in continuing standard mixtures were within the 85-115 percent QC limits, with the exceptions presented in Table 3.4-2M.

Approximately 4.7 percent of the SW8310 results were qualified as estimated and no data were rejected due to exceeded calibration criteria. Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for six compounds in one water sample and two equipment blanks, and estimation (UJ, J-, and J+) of three compounds in an aqueous PE sample. The effect of the small number of qualifications on the quality of the data is not significant.

3.4.1.3.12 Calibration for Modified Method SW8315M for Hydrazines

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion, with the exceptions presented in Table 3.4-2M. The continuing calibrations exhibited a high bias and all results were non-detected, therefore no data were qualified.

3.4.1.3.13 Calibration for EPA Method SW8330 for Explosives

Initial calibrations were performed for the primary (quantitation) column and confirmation column according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than 0.995 criteria. Calibration verification was performed at the required frequencies. The percent recoveries of amounts in continuing standard mixtures were within the 85-115 percent QC limits.

3.4.1.3.14 Calibration for EPA Method SW8330M for PETN and Nitroglycerin

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than 0.995 criteria, and all %Ds for the CCVs met the less than or equal to 15%D criterion.

3.4.1.4 FIELD AND LABORATORY BLANKS

Contamination may occur in various stages of the sample collection and laboratory analytical processes and affect the validity of the data collected. The results from the analyses of field and laboratory blanks indicate the presence and magnitude of the contamination. The blanks collected during the data gaps field

sampling program consisted of equipment blanks and trip blanks. The QC requirements for these blanks and their frequency of collection are summarized in Table 3.2-1 of the QAPP.

Equipment blanks are used to evaluate the cleanliness of the sampling devices used and reflect the efficiency of the decontamination procedures employed in the field. They are prepared by collecting analyte-free (Type II) reagent water poured over or through the sampling device into an appropriate sample container. One set of equipment blanks was prepared for each day of soil sampling per sampling crew. For water samples collected with reusable (Teflon™) bailers, one equipment blank per day was collected. For water samples pumped through a sampling device (except for metal filtration chambers, which require a filtration blank), one equipment blank was collected per pump each day of sampling. Each set of equipment blanks was analyzed for the same parameters requested for the associated samples. Source water blanks were also analyzed for the same parameters requested for the associated samples.

Trip blanks are used to evaluate sample VOC contamination that may occur while the samples are in transit from the sampling site to the laboratory. They are prepared in the laboratory and are shipped to the sampling site where they remained unopened. Trip blanks are then returned to the laboratory with each shipment of samples requiring VOC analysis.

Blanks used to evaluate laboratory contamination consisted of method or preparation blanks and continuing calibration blanks. Method or preparation blanks are analyte-free (Type II) reagent water prepared and analyzed in exactly the same manner as the samples. One method or preparation blank is extracted and analyzed with each analytical batch of twenty samples or less. Calibration blanks are analyte-free solutions used to evaluate the cleanliness of the analytical instruments during the analytical runs. One calibration blank is analyzed with each analytical sequence according to frequency requirements specified in Table 3.2-1 of the QAPP for the analytical method used.

Whenever blank contamination was detected, the analytical data for the associated samples were evaluated to determine if data needed to be qualified. Sample results less than five times the maximum level found in the associated blanks or ten times the level of contamination for the common laboratory contaminants methylene chloride, acetone, and common phthalate esters were qualified according to the blank qualification rules. Results for common laboratory contaminants were qualified at concentrations less than ten times the PQL even when not found in associated blanks.

Results for 2-butanone (methyl ethyl ketone [MEK]), generally considered to be a common laboratory contaminant according to EPA Region IX data validation guidelines, have not been blank-qualified for common laboratory contamination by the validators for this project. Although not qualified for common laboratory contamination, the low level results for MEK in samples located throughout the site should be considered as potential laboratory artifacts due to association with MEK contamination from the pre-made Encore™ soils preservation vial caps used with the Encore™ samplers for preparation according to EPA Method SW5035. QES/STL has determined that the glue used to bind the septum to the teflon cap may produce low levels of MEK upon heating during sample purge. This type of Encore™ preservation vial cap was used for the samples in this project.

Blank-qualified results are considered to be non-detected (ND) at the reported level, therefore, the "U" qualifier is included with the "J" qualifier according to the blank qualification rules. If, in the data reviewer's professional judgment, a result for an analyte less than five times the level reported in an associated blank or less than ten times the PQL for a common laboratory contaminant was above the concentrations normally seen in blanks and was judged to be actually representative of the concentration of that compound in the sample, the result was blank-qualified as "J" without the "U" qualifier.

Equipment blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and EPA Region IX data validation protocols, field blanks (equipment, source-water, and trip blanks) cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

Approximately 0.7 percent of the data were qualified due to blank contamination. Low-level results for nitrate-N by modified EPA Method 300.0 were qualified as estimated (J) due to equipment blanks (see below). Additional results were blank-qualified (UJ) for several metals by EPA Method SW6010B and SW7471A; acetone in a large number of samples, naphthalene in four samples and hexachlorobutadiene in one sample by EPA Method SW8260B; and bis(2-ethylhexyl)phthalate in one sample by EPA Method SW8270C.

Laboratory and field contamination did not significantly affect the quality of the data. A summary and tables for the qualification of data by each analytical method due to blanks are presented in the following sub-sections.

3.4.1.4.1 *Blank Results for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)*

Method blanks were analyzed for each matrix as applicable. No contaminant concentrations were found in the method blanks, with the exceptions presented in Table 3.4-3A. All sample concentrations for non-blank field samples were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks. Samples with the suffix "/K" were identified as equipment blanks, and samples with the prefix "WAT" were identified as source water blanks. All other associated samples are field samples.

No contaminant concentrations were found in the equipment blanks, with the exceptions presented in Table 3.4-3B. Bold highlight in the tables indicates that associated non-blank field sample results were qualified for this analyte. All other field sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated blanks.

Field sample results qualified due to field (equipment and source water) blank contamination and equipment blank results qualified for method blank contamination are specified in Table 3.4-3C. One detected result for nitrate-N in one of 18 water field samples was blank-qualified (UJ) due to equipment blank results. No field sample results were qualified due to method blank contamination.

The blank-qualified nitrate-N result was reported at less than one-half the PQL. Blank contamination does not affect the project objectives for these analytical methods.

3.4.1.4.2 *Blank Results for Perchlorate: Method CADHS 300.0-Mod*

No contaminant concentrations were found above the reporting limit in the initial, continuing, preparation, and equipment blanks for this method.

3.4.1.4.3 *Blank Results for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)*

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found above the reporting limit in the initial, continuing and preparation blanks, with the

exceptions presented in Table 3.4-3D. No contaminant concentrations were found in the equipment and source water blanks, with the exceptions presented in Table 3.4-3E. Bold highlight in the tables indicates that associated non-blank field sample results were blank-qualified for this element. All other field sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated blanks. Samples with the suffix "/K" were identified as equipment blanks, and samples with the prefix "WAT" were identified as source water blanks. All other associated samples are field samples.

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs and field blanks. Sample results qualified due to blank contamination are specified in Table 3.4-3F.

Approximately 3.9 percent of the metals data were blank-qualified. Small numbers of results for various metals, mostly iron and manganese, were blank-qualified in water samples and equipment blanks due to laboratory blank results. As the affected results were all below the action levels specified in the Final Work Plan for this project for metals in water, blank contamination does not significantly affect the project objectives for metals.

3.4.1.4.4 Blank Results for EPA Method SW8015 for TEPH

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.5 Blank Results for EPA Method SW8081A for Pesticides

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.6 Blank Results for EPA Method SW8082 for PCBs

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.7 Blank Results for EPA Method SW8260B for VOCs

Method blanks were analyzed for each matrix as applicable. No volatile contaminants were found in the method blanks, with the exceptions presented in Table 3.4-3G. No contaminant concentrations were found in the trip, equipment, and source water blanks, with the exceptions presented in Table 3.4-3H. Bold highlight in the tables indicates that associated non-blank field sample results were blank-qualified for this compound. All other field sample concentrations were either not detected or were significantly greater (>5X blank contaminants, >10X for common contaminants) than the concentrations found in the associated blanks. Trip blanks were either identified as such in the sample ID, or by use of the prefix "TB." Samples with the suffix "/K" were identified as equipment blanks, and samples with the prefix "WAT" were identified as source water blanks. All other associated samples are field samples.

Sample concentrations were compared to the maximum contaminant concentrations detected in the blanks. Sample results qualified due to blank contamination are specified in Table 3.4-3I.

Approximately 0.8 percent of the VOC data were blank-qualified as estimated and non-detected at the reported concentrations. Results for acetone in 72 soil samples and one water sample, naphthalene in four soil samples, and hexachlorobutadiene in one soil sample were blank-qualified due to laboratory blank

results. Low concentration trace results (results less than the PQL) for methylene chloride in two water samples, and for acetone in four soil samples and a water sample were blank-qualified as common laboratory contaminants, as presented in Table 3.4-3J. No results for other VOCs were blank-qualified.

Acetone and methylene chloride are demonstrated common laboratory contaminants. Due to the prevalence of acetone in method and equipment blanks, all detected results for acetone, which were at low concentrations, were blank-qualified. The four acetone soils results blank-qualified for common laboratory contamination were reported at one-fifth to one-half the PQL. The single aqueous acetone result blank-qualified for common contamination was reported at one-fifth the PQL. Methylene chloride is a known common laboratory contaminant at QES/STL, as demonstrated by some project trip and equipment blank results, and by historical data. The single aqueous methylene chloride result blank-qualified for common contamination was reported at less than one-fifth the PQL and the single soil methylene chloride result blank-qualified for common contamination was reported at approximately one-fifth the PQL. These results are near the low limits of detection, and as demonstrated common laboratory contaminants, should not be reported unqualified.

In addition, MEK is generally considered to be a common laboratory contaminant according to EPA Region IX data validation guidelines. Results for MEK were not blank-qualified for common laboratory contamination by the validators for this project. However, QES/STL has determined that the glue used to bind the septum to the teflon caps to the Encore™ soils preservation vials used for SW5035 preparation may produce low levels of MEK upon heating during sample purge. This type of Encore™ preservation vial cap was used for the samples in this project. Method blanks were not generally placed in the Encore™ preservation vials, and equipment blanks and trip blanks did not undergo SW5035 preparation, so MEK detections would not be expected in these blanks, even if laboratory contamination were affecting project samples. Therefore, the unqualified low level results reported for MEK should be considered as potential laboratory artifacts. These MEK results were significantly lower (5 orders of magnitude) than the action level specified in the DQOs.

Blank-qualified results for naphthalene in soils due to method blanks were 30,000 to 60,000 times lower than the action levels specified in the DQOs. The blank-qualified result for hexachlorobutadiene was 4,000 times lower than the specified action level. Blank-qualified results for acetone in soils due to method blanks were 13,000 to 180,000 times lower than the action levels specified in the DQOs. Blank-qualified results for acetone in soils due to common laboratory contamination were 160,000 to 360,000 times lower than the specified action levels. Blank-qualified results for acetone in water were 290 times (due to method blanks) to 360 times (due to common laboratory contamination) lower than the specified action levels. Blank-qualified results for methylene chloride due to common laboratory contamination were 12 times (for the water result) and 1700 times (for the soil result) lower than the specified action levels.

The reported concentrations of the blank-qualified compounds for SW8260B in soils were 1,700 to 360,000 times lower than the action levels specified in the DQOs. The reported concentrations of the blank-qualified compounds for SW8260B in waters were 12 to 360 times lower than the action levels specified in the DQOs. Therefore, blank contamination does not significantly affect the project objectives for this analytical method.

3.4.1.4.8 Blank Results for EPA Method SW8270C for SVOCs

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method. A low level result for bis(2-ethylhexyl) phthalate was blank-qualified as a common laboratory contaminant in one sample, as presented in Table 3.4-3K. No results for other SVOCs were blank-qualified.

3.4.1.4.9 *Blank Results for Modified Method SW8270CWM for Chloropicrin*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.10 *Blank Results for EPA Method SW8290 for Dioxins/Furans*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method, with the exceptions presented in Table 3.4-3L.

Sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blank. No data were qualified, and there is no effect on the quality of the data.

3.4.1.4.11 *Blank Results for EPA Method SW8310 for PAHs*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.12 *Blank Results for Modified Method SW8315M for Hydrazines*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.4.13 *Blank Results for EPA Method SW8330 for Explosives*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method, with the exceptions presented in Table 3.4-3M.

Sample concentrations were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blank. No data were qualified, and there is no effect on the quality of the data.

3.4.1.4.14 *Blank Results for EPA Method SW8330M for PETN and Nitroglycerin*

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

3.4.1.5 **SYSTEM MONITORING COMPOUNDS (SURROGATES)**

Surrogate standards are used in most organic analyses to help evaluate the accuracy of the data collected. Surrogates are compounds that are not included in the target analyte list and are not expected to be present in environmental samples. A known concentration of the surrogate compound is added to all standards, blanks, and samples (including field and laboratory QC samples) before preparation and analysis, and the recovery of the compound is compared to control limits specified in the QAPP for each organic method to evaluate the performance of the analytical system and determine if there is any matrix interference affecting the method performance. The surrogate compounds and acceptance criteria for each method and matrix are shown in Table 3.2-4 of the QAPP. Samples with unacceptable surrogate recoveries were reanalyzed, and if the results of the reanalysis were still outside the limits, the problem was attributed to matrix effects if acceptable surrogate recoveries were obtained in the method blank and laboratory control sample (LCS) analyses.

If surrogate recoveries did not meet the specified criteria, the data were qualified as follows. Non-detected results for samples with surrogate recoveries less than 10 percent were qualified as rejected (R) and detected results for samples with surrogate recoveries less than 10 percent were qualified as estimated (J-). Results for samples with surrogate recoveries less than the lower control limit (LCL) but greater than 10 percent were qualified as estimated (J/UJ) and detected results for samples with surrogate recoveries greater than the upper control limit (UCL) were qualified as (J+).

Approximately 0.03 percent of the data were rejected and 1.9 percent of the data were qualified as estimated due to surrogate recoveries outside of specified control limits. Non-detected results for TEPH in two samples were rejected due to low surrogate recoveries caused by significant interference from high concentrations of TNT. Non-detected results for all target compounds in four samples for TEPH, three samples for VOCs, one sample for PAHs, and one sample for explosives for were qualified as estimated for low surrogate recoveries. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

A summary and tables for the qualification of data by each analytical method due to surrogate recovery criteria are presented in the following sub-sections.

3.4.1.5.1 Surrogate Recoveries for EPA Method SW8015 for TEPH

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exceptions presented in Table 3.4-4A.

Non-detected results for TEPH in two soil samples were rejected (R) due to low surrogate recoveries caused by significant interference from high concentrations of TNT. The location has known contamination so there is no effect on the project objectives. Non-detected results for TEPH in four soil samples were qualified as estimated (UJ) for low surrogate recoveries. 126 soil samples were analyzed for TEPH. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

3.4.1.5.2 Surrogate Recoveries for EPA Method SW8081A for Pesticides

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

3.4.1.5.3 Surrogate Recoveries for EPA Method SW8082 for PCBs

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

3.4.1.5.4 Surrogate Recoveries for EPA Method SW8260B for VOCs

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exceptions presented in Table 3.4-4B. Non-detected results for all target compounds in three soil samples for VOCs were qualified as estimated (UJ) for low surrogate recoveries. The detected result for MEK in one soil sample was qualified as estimated (J+) due to a high surrogate recovery. 91 soil samples were analyzed for VOCs. The small number of qualifications for surrogate recoveries (2.5 percent of the SW8260B data) does not significantly affect the project objectives.

3.4.1.5.5 Surrogate Recoveries for EPA Method SW8270C for SVOCs

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

3.4.1.5.6 Surrogate Recoveries for Modified Method SW8270CWM for Chloropicrin

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

3.4.1.5.7 Surrogate Recoveries for EPA Method SW8310 for PAHs

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exceptions presented in Table 3.4-4C. Non-detected results for all target compounds in one of 21 water field samples for PAHs were qualified as estimated (UJ) for a low surrogate recovery. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

3.4.1.5.8 Surrogate Recoveries for EPA Method SW8330 for Explosives

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exceptions presented in Table 3.4-4D. Non-detected results for all target compounds in one of 87 soil sample for explosives for were qualified as estimated (J/UJ) for a low surrogate recovery. No water data were qualified. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

3.4.1.5.9 Surrogate Recoveries for EPA Method SW8330M for PETN/Nitroglycerin

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

3.4.1.6 INTERNAL STANDARDS

For HRGC/MS analyses of dioxins/furans by EPA Method SW8290, labeled internal standards serve the dual purposes of internal standard for quantitation and system monitoring compound (surrogate). Acceptance criteria are presented in Table 3.2-4 of the QAPP. For GC/MS analyses by EPA Methods SW8260B and SW8270C, internal standard area counts were monitored to ensure that GC/MS sensitivity and response were stable during the analysis. For EPA Methods SW8260B and SW8270C the area counts of the internal standards in the sample must fall within 50 to 200 percent of the internal standard area counts in the calibration verification standard for the 12 hour tune period. In addition, the retention times of the internal standards in the sample must be within ± 30 seconds of the retention times in the calibration standard.

If internal standards did not meet the specified criteria, the data were qualified as follows. Non-detected results associated with extremely low internal standard area counts (less than 25 percent) or internal area counts abruptly dropping off indicating severe loss of sensitivity were qualified as rejected (R). Results associated with area counts not within the 50 to 200 percent control limits were qualified as estimated (J/UJ). For EPA Method SW8290, non-detected results associated with area counts less than 10 percent of the specified percent of the internal standard area for the associated CCV were qualified as rejected (R), and detected results were qualified as estimated (J/UJ). Detected and non-detected results associated with

area counts not within the specified percent of the internal standard area for the associated CCV were qualified as estimated (J/UJ).

Approximately 0.7 percent of the SW8260B results and 4.9 percent of the SW8270C results were qualified as estimated (J/UJ) for internal standard problems. No data were qualified for SW8290 and no data were rejected. All samples with internal standard recoveries outside of control limits were reanalyzed or re-extracted and reanalyzed as specified in the QAPP. Sample IDs for such reanalyses have the suffix "RE" in the data validation and QCSR tables, and only the least affected set of results for any one sample was used for reporting purposes. The low recoveries are attributed to matrix effects. Overall, internal standard areas did not significantly affect the quality of the data with respect to project objectives.

A summary and tables for the qualification of data by each analytical method due to internal standard areas are presented in the following sub-sections.

3.4.1.6.1 Internal Standards for EPA Method SW8260B for VOCs

All internal standard peak areas and retention times were within QC limits, with the exceptions presented in Table 3.4-5A. Results for one internal standard outside of control limits resulted in the estimation (J/UJ) of approximately one-third of the target analytes in two of 91 soil samples, and results for two internal standards outside of control limits resulted in the estimation (J/UJ) of approximately two-thirds of the target analytes in one soil sample. No water data were qualified and no results were rejected. Estimated data are usable in decision-making for project objectives. The effect of the estimations for the small number of affected samples on the project objectives is not significant.

3.4.1.6.2 Internal Standards for EPA Method SW8270C for SVOCs

All internal standard peak areas and retention times were within QC limits, with the exceptions presented in Table 3.4-5B. Results for one internal standard outside of control limits in two of seven soil samples resulted in the estimation (J/UJ) of seven of 72 target SVOCs (six of 16 PAHs), and results for two internal standards outside of control limits in one soil sample resulted in the estimation (J/UJ) of 14 target SVOCs (nine PAHs). No results were rejected. Corrective action reanalyses were performed as required with no improvement of results. These were samples that were recollected from the remedial investigation due to significant interference in the original SW8310 analyses for PAHs. Although the internal standard areas were low for the specified samples, the surrogate recoveries were acceptable, and the interference indicated does not preclude use of the results. Estimated data are usable in decision-making for project objectives. The effect on the project objectives is not significant.

3.4.1.6.3 Internal Standards for Modified Method SW8270CWM for Chloropicrin

All internal standard peak areas and retention times were within QC limits.

3.4.1.6.4 Internal Standards for EPA Method SW8290 for Dioxins/Furans

All internal standard peak areas and retention times were within QC limits.

3.4.1.7 MATRIX SPIKE/MATRIX SPIKE DUPLICATES

Matrix-specific accuracy was evaluated using matrix spike/matrix spike duplicate (MS/MSD) recoveries. Matrix spike samples are actual environmental samples spiked with known concentrations of analytes which are processed like regular samples. The MS/MSD recoveries are indicators of interference specific to the sample matrix. Such interference includes the possibility of instrument response suppression or enhancement due to chemical or physical interference, and digestion or extraction efficiency for the sample

matrix. When MS/MSD recoveries are outside the control limits and LCS results are acceptable, matrix related interference is indicated. Acceptance criteria for MS/MSD recoveries were established for each method by matrix, and are shown in Table 3.2-2 of the QAPP.

Organic data are not generally qualified for MS/MSD results alone according to the Functional Guidelines and EPA Region IX data validation protocols. For this project, organic results were qualified in the parent QC sample for analytes with recoveries not within QC limits, as specified in the QAPP. If MS/MSD recoveries did not meet the specified criteria, the data were qualified as follows. Non-detected organic results in the QC sample were qualified as rejected (R) for MS and/or MSD percent recoveries less than 10 percent. Non-detected inorganic results associated with MS/MSD recoveries less than 30 percent were qualified as rejected (R). Non-detected results associated with MS/MSD recoveries less than the LCL but greater than 10 percent for organics or 30 percent for inorganics were qualified as estimated (UJ). Detected results associated with MS/MSD recoveries less than the LCL were qualified as estimated (J-). Detected results associated with MS/MSD recoveries greater than the UCL were qualified as estimated (J+).

Two results were rejected (R) and approximately 0.3 percent were estimated (J/UJ) due to MS/MSD results outside of QC limits. Overall, matrix spike results do not significantly affect the quality of the data.

A summary and tables for the qualification of data by each analytical method due to MS/MSD recovery criteria are presented in the following sub-sections.

3.4.1.7.1 MS and Laboratory Duplicate for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)

MS/MSDs are not required for EPA Methods 160.1 and 160.2. MS and laboratory duplicates (not MSD) are performed for EPA Methods 300.0 and 415.1/SW9060.

MS analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6A. No MS was performed for EPA Method 415.1 in the batch associated with the four water samples specified. As MS analyses were performed at a frequency of 1:5 for samples of this matrix, exceeding the minimum of 1:20 samples specified in the QAPP, the effect on the quality of the data is not expected to be significant.

MS analyses were performed for each matrix as applicable. Percent recoveries were within QC limits.

Duplicate sample analyses were performed for each matrix as applicable. Relative percent differences (RPD) were within QC limits.

3.4.1.7.2 MS/MSD for Perchlorate: Method CADHS 300.0-Mod

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

Duplicate sample analyses were performed for each matrix as applicable. RPDs were within QC limits.

3.4.1.7.3 MS/MSD for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)

MS analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception presented in Table 3.4-6B. Results for antimony in all six soil samples were estimated for potential low bias (J-/UJ) and results for chromium and vanadium were estimated for potential

high bias (J+) due to matrix spike recoveries. No metals results were rejected for MS recoveries. The approximately 2.2 percent of the metals data estimated for matrix effects due to MS recoveries is within normal parameters for these methods, and the effect on the quality of the data is not expected to be significant.

3.4.1.7.4 MS/MSD for EPA Method SW8015 for TEPH

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6C. The referenced annotated comments in Table 3.4-6C and in LDC DVRs 4812A6, 4812A8, and 4827F8 are incorrect and do not affect the technical or contractual quality of the data as MS/MSD analyses were extracted and analyzed for TEPH in the batches associated with the samples specified. MS/MSD analyses were not extracted and analyzed for TEPH in the batches associated with the samples specified in the remaining comments in Table 3.4-6C. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. One of the samples was a PE sample, which is also not of the environmental matrix. As the purpose of PE samples is to evaluate laboratory accuracy and the results for the PE sample was acceptable, there is no adverse effect on the quality of the data. For the remaining four water samples, there was no batch-specific MS/MSD. MS/MSD analyses were performed at a frequency of 1:10 water samples with only marginal outliers, exceeding the minimum of 1:20 samples specified in the QAPP. Therefore the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6D. The results for TEPH in one soil sample were estimated (J/UJ) for the 60%R MSD that was marginally below the LCL of 65%R. The MS analysis was acceptable. In addition, the results for TEPH in one soil sample were estimated (UJ) for an RPD of 45 percent, marginally exceeding the 40 RPD criterion. The MS and MSD results were both within the 65-135%R control limits. The small number of qualifications for marginally exceeded control limits does not significantly affect the project objectives.

3.4.1.7.5 MS/MSD for EPA Method SW8081A for Pesticides

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6E. The referenced annotated comments in Table 3.4-6E and in LDC DVR 4812A3A are incorrect and do not affect the technical or contractual quality of the data as MS/MSD analyses were extracted and analyzed for pesticides in the batches associated with the specified samples. MS/MSD analyses were not extracted and analyzed for pesticides in the batches associated with the samples specified in the remaining comments in Table 3.4-6E. LCS/LCSDs were performed instead. One of the samples was a PE sample, which is not of the environmental matrix. As the purpose of PE samples is to evaluate laboratory accuracy and the results for the PE sample was acceptable, there is no adverse effect on the quality of the data. For the remaining five water samples specified in the table, there was no batch-specific MS/MSD. MS/MSD analyses were performed for this matrix at a frequency of 1:10 samples, exceeding the minimum of 1:20 specified in the QAPP, and with no qualification of data for the MS/MSD analyses performed. Therefore, the effect on the quality of the data is not significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6F. The recovery of Endrin in one MSD marginally exceeded the upper control limit (UCL). Endrin was not detected in any samples and no data were qualified. There is no effect on the project objectives.

3.4.1.7.6 MS/MSD for EPA Method SW8082 for PCBs

MS/MSD analyses were performed according to method requirements. The comment in the LDC DVR 4812A3b presented in Table 3.4-6G is incorrect as MS/MSD was performed on the sample specified.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception presented in Table 3.4-6H. The recovery of Arochlor 1260 in one MSD exceeded the upper control limit (UCL). Arochlor 1260 was not detected in any samples and no data were qualified. There is no effect on the project objectives.

3.4.1.7.7 MS/MSD for EPA Method SW8260B for VOCs

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6I. MS/MSD analyses were not analyzed for VOCs in the batches associated with the samples specified. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. For the remaining seven soil samples and nine water samples, there was no batch-specific MS/MSD. The samplers were unable to provide adequate sample for more aqueous MS/MSDs because there was not enough water in the wells. There was inadequate soil sample for an MS/MSD in the specified VOC batch as the required additional Encore samplers were not collected for any sample in the batch. MS/MSD analyses were performed at a frequency of 1:11 water samples and 1:15 soil samples, exceeding the minimum of 1:20 samples specified in the QAPP with very few outliers. Therefore, the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6J. Results for 2-chloroethylvinyl ether were rejected in some MS/MSD samples. This compound is not a chemical of potential concern for this project, and was rejected in all samples for the soils matrix due to decomposition from methanol preservation according to preparation method SW5035. The results for one-to-four compounds were estimated in four QC soil samples (approximately 0.1 percent of the VOC data) for MS recoveries above the UCL or below the LCL. Note that high recoveries and high RPDs for MEK in several of the MS/MSD analyses may be due to MEK as common laboratory contaminant (refer to Section 3.4.1.4.7). No significant trends were noted. The effect of the small number of qualifications on the project objectives is not significant.

3.4.1.7.8 MS/MSD for EPA Method SW8270C for SVOCs

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6K. The results for benzoic acid in one soil sample was rejected (R) due to MS/MSD recoveries less than 10 percent, and the results for two compounds in the same soil sample was estimated (UJ) for MS/MSD recoveries below the LCL. None of the qualified compounds were chemicals of potential concern for this project and none were PAHs. The effect of the small number of qualifications of these analytes on the project objectives is not significant.

3.4.1.7.9 MS/MSD for Modified Method SW8270CWM for Chloropicrin

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6L. The results for chloropicrin in one water sample was estimated (UJ) for recoveries below the LCL in the one MS/MSD for waters. Recoveries were acceptable for the soil samples. Although not expected to be found on site, chloropicrin was added to the project as a potential indicator for chemical warfare agents as a precaution. The method is a specialized

modification of SW8270C, and historical data is not available for spike recoveries. The effect on the project objectives is that the reported detection limits for waters by this method may be biased low. However, as the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, and the method and data are still usable for waters, the project objectives are not significantly affected.

3.4.1.7.10 MS/MSD for EPA Method SW8290 for Dioxins/Furans

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception presented in Table 3.4-6M. The recovery of octachlorodibenzofuran (OCDF) in one MS/MSD exceeded the UCL. OCDF was not detected in any samples and no data were qualified. There is no effect on the project objectives.

3.4.1.7.11 MS/MSD for EPA Method SW8310 for PAHs

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6N. MS/MSDs were extracted and analyzed for PAHs in two extraction batches associated with 14 samples. However, the MS and MSD for water sample MW-9 were not spiked with the target compound spiking solution. The project chemist was contacted, and the laboratory was directed to re-spike, re-extract, and reanalyze the samples. The re-extractions and reanalyses were performed for the samples; however, the re-extraction of the MS/MSD could not be performed due to lack of sample volume. MS/MSD analyses were not extracted and analyzed for PAHs in the batches associated with the water samples specified in the remaining comments in Table 3.4-6N. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. One of the samples was a PE sample, which is not of the environmental matrix. The purpose of PE samples is to evaluate laboratory accuracy, so recoveries were evaluated for this sample. For the remaining water samples, there were no batch-specific MS/MSDs. MS/MSD analyses were performed at a frequency of 1:19 water samples (plus 2 field duplicates), with no qualification of data. The QAPP specifies a minimum of 1:20 samples per matrix. Percent recoveries and RPDs were within QC limits for the MS/MSD analysis of sample MW-4A.

Adequate aqueous samples were designated for MS/MSD by the samplers for 1:11 water samples, which would have met the minimum frequency of 1:20. However, the laboratory failure to spike one of the MS/MSDs and inadequate volume to re-extract the MS/MSD resulted in the loss of one of the two designated MS/MSDs. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. Although non-compliant, the lack of MS/MSDs for each analytical batch is not expected to significantly affect the quality of the data.

3.4.1.7.12 MS/MSD for Modified Method SW8315M for Hydrazines

MS/MSD analyses were performed for waters as applicable. No soils were analyzed. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6O. In the five MS/MSD sample analyses performed, low recoveries were reported for hydrazine in four MSs and one MSD, for monomethyl hydrazine (MMH) in one MS, and for unsymmetrical dimethylhydrazine (UDMH) in three MSs and one MSD. The 26.5 RPD for one of the MS/MSDs marginally exceeded the 25 RPD control limit. LCS recoveries were acceptable, demonstrating extraction and analytical efficiency and accuracy. Due to the reactivity of these analytes, the low MS/MSD recoveries are interpreted to indicate that these species of compounds cannot survive in the matrix. The effect on the project objectives is to confirm that these compounds are unlikely to be present in the environment at the project site.

3.4.1.7.13 MS/MSD for EPA Method SW8330 for Explosives

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6P. The annotated comments in Table 3.4-6P reference LDC DVR 4812A40, which is incorrect as MS/MSD analyses were extracted and analyzed for explosives in the batch associated with the samples specified. For the remaining comments in Table 3.4-6N, MS/MSD analyses were not extracted and analyzed for explosives in the batches associated with the water samples specified. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. For the remaining samples, MS/MSD analyses were performed at a frequency of 1:6 water samples, exceeding the minimum of 1:20 samples specified in the QAPP with only one QC outlier, therefore the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6Q. The non-detected results for 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene in one soil QC sample were rejected for low MS/MSD recoveries. The results for three compounds in another soil QC sample were estimated (J/UJ) for low MS/MSD recoveries, and a third compound was estimated for a high MSD recovery and high RPD in the MS/MSD. The recoveries indicate matrix interference from the presence of significant TNT and TNT breakdown products in the samples, and there is no adverse effect on the project objectives.

The non-detected results for two compounds in another soil QC sample were estimated (UJ) due to high bias in the MS and an RPD that marginally exceeded the control limit. The non-detected results for two compounds in a water QC samples were estimated (UJ) due to 21-23 RPDs that marginally exceeded the 20 RPD control limit. The effect of these minor qualifications on the project objectives is not expected to be significant.

3.4.1.7.14 MS/MSD for EPA Method SW8330M for PETN and Nitroglycerin

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.8 LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATES (LCS/LCSD)

Laboratory accuracy was evaluated using LCS recoveries. Laboratory control samples are reagent water or contamination-free soil or sand spiked with known concentrations of analytes which are processed like regular samples. Since LCSs are free of matrix interference, they are indicators of laboratory and method performance. Acceptance criteria for LCS recoveries were established for each method by matrix, and are shown in Table 3.2-3 of the QAPP.

When LCS/LCSD recoveries did not meet the specified criteria, the data were qualified as follows. Non-detected results associated with LCS recoveries less than 10 percent for organic analyses or less than 50 percent for metals analyses were qualified as rejected (R). Non-detected results associated with LCS recoveries less than the LCL but greater than 10 percent for organic analyses or 50 percent for metals were qualified as estimated (UJ). Detected results associated with LCS recoveries less than the LCL were qualified as estimated (J-). Detected results associated with LCS recoveries greater than the UCL were qualified as estimated (J+).

Approximately 2.3 percent of the data were qualified as estimated (J/UJ) due to LCS/LCSD results outside of QC limits. No results were rejected for LCS recoveries. Overall, LCS results do not significantly affect the quality of the data.

A summary and tables for the qualification of data by each analytical method due to LCS recovery criteria are presented in the following sub-sections.

3.4.1.8.1 *LCS/LCSDs for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)*

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits.

3.4.1.8.2 *LCS/LCSD for Perchlorate: Method CADHS 300.0-Mod*

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits.

3.4.1.8.3 *LCS/LCSD for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)*

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits

3.4.1.8.4 *LCS/LCSD for EPA Method SW8015 for TEPH*

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7A. The results for TEPH in 30 soil samples, six water samples, and four equipment blanks were estimated (J-/UJ) due to low LCS/LCSD recoveries. 126 soil samples, 20 water samples, and 20 equipment blanks were analyzed for TEPH. Approximately 24 percent of the TEPH data were estimated. No results were rejected.

The soil samples and LCSs qualified for low LCS recoveries underwent silica gel extraction cleanup (SGC). Although Table 3.2-3 of the QAPP does not specify an LCL of 30%R for LCSs undergoing SGC, Table 3.2.2 for MS/MSDs and Table 3.2-4 for surrogate recoveries specify LCLs of 30%R for all SGC-treated samples. In addition, the text in Section 3.2.4.2 of the QAPP (Laboratory Analytical Procedures) specifies in the description of SGC by EPA Method SW3630C that "all surrogate, LCS, or MS/MSD recoveries for samples undergoing silica gel cleanup will have a lower control limit of 30-percent recovery." Thus, although the data are qualified as estimated according to the guidelines in Tables 3.2-3 and 3.4-1, the QAPP recognizes that SGC will result in recoveries below the 65%R LCL for all analyses performed by this method. All of the LCS recoveries were above the 30 percent LCL specified in the QAPP as acceptable for samples having undergone SGC.

As all of the soil LCSs underwent SGC extraction and the 57-59%Rs were only marginally less than the 60%R LCL for samples without SGC, and the 54%R for the six water samples was not significantly outside the 60 percent LCL, the effect of the LCS qualifications on the project objectives is not expected to be significant.

3.4.1.8.5 *LCS/LCSD for EPA Method SW8081A for Pesticides*

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.8.6 LCS/LCSD for EPA Method SW8082 for PCBs

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.8.7 LCS/LCSD for EPA Method SW8260B for VOCs

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7B. Vinyl acetate was qualified as estimated (UJ) in 7 water samples, six trip blanks, and one equipment blank; and 2-butanone was qualified as estimated (UJ) in one water sample and two trip blanks (approximately 0.2 percent of the VOC data) due to low LCS recoveries. Vinyl acetate is not a chemical of potential concern at the project site. The small number of qualifications does not affect the project objectives.

3.4.1.8.8 LCS/LCSD for EPA Method SW8270C for SVOCs

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7C. The results for benzoic acid in eight soil samples were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. No results were rejected. Benzoic acid is not a chemical of potential concern for this project and does not affect project objectives.

3.4.1.8.9 LCS/LCSD for Modified Method SW8270CWM for Chloropicrin

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7D. The results for chloropicrin in two water samples and one equipment blank were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. No soil results were qualified and no results were rejected. As the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, and the method and data are still usable for waters, the project objectives are not significantly affected.

3.4.1.8.10 LCS/LCSD for EPA Method SW8290 for Dioxins/Furans

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.8.11 LCS/LCSD for EPA Method SW8310 for PAHs

LCS/LCSDs were performed for each matrix as applicable, with the exception presented in Table 3.4-7E. Percent recoveries and RPDs were within QC limits for all LCS analyses performed, with the exception presented in Table 3.4-7F, which was associated with a reanalysis that was not used for reporting purposes.

For the exception presented in Table 3.4-7E, the LCS (and MS/MSD) were not spiked for the extraction batch including samples MW-1, MW-1A, MW-2, MW-6, MW-7, MW-8, MW-9, MW-13, MW-14, and MW-15 (and MW-9MS/MSD). The surrogate recoveries for the LCS, MS/MSD, method blank, and all of the affected samples except sample MW-7 were within control limits, indicating acceptable overall batch extraction efficiency and also indicating that the 0 percent spike recoveries were due to spiking failure, not to extraction or analytical deficiencies. In addition, results for other LCSs analyzed in the same analytical batch were requested by the project chemist and evaluated to demonstrate usable analytical accuracy and precision. These LCSs were for batches of samples extracted the day before and the day after the samples. All of the results for one LCS with a full target compound list (TCL) and one LCS/LCSD with the

five controlling compounds reported were within specified control limits for this project. These data are presented in Attachment 6, and indicate acceptable analytical batch accuracy and precision for all target compounds.

As the batch extraction efficiency and analytical batch accuracy and precision were demonstrated to be acceptable, the continuing calibrations for the original analysis were acceptable, and the results for the reanalyses of these samples were the same as in the original analyses, the original results have been used for reporting purposes and are considered usable for decision-making purposes. The results have been qualified as estimated (J/UJ) due to the lack of the LCS analysis. No other PAH data were qualified for LCS criteria. The effect on the quality of the data is not expected to be significant.

3.4.1.8.12 LCS/LCSD for Modified Method SW8315M for Hydrazines

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.8.13 LCS/LCSD for EPA Method SW8330 for Explosives

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7G.

Approximately 2.7 percent of the explosives data were qualified as estimated, and no data were rejected. Results for one-to-four of the 14 compounds were estimated in 13 of 25 water samples and in two of 16 equipment blanks due to LCS/LCSD RPDs greater than 20 percent. All of the RPDs were within 10 percent of the 20 RPD control limit and all of the percent recoveries were within control limits, with the exception of 4-nitrotoluene in one LCS/LCSD, for which a 39 RPD was reported due to the high recovery in the LCSD. No soils data were qualified due to LCSs for this method. There were no low recoveries and all of the associated results were non-detected. The small number and types of qualifications do not significantly affect project objectives.

3.4.1.8.14 LCS/LCSD for EPA Method SW8330M for PETN and Nitroglycerin

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

3.4.1.9 LABORATORY DUPLICATE PRECISION

Laboratory precision was evaluated using the RPDs between results for the analysis of laboratory duplicate samples for inorganic analyses, and of MS/MSD results for organic analyses. In the event that MS/MSD analyses were not performed, LCS/LCSD results were evaluated. The RPDs were compared to the acceptance criteria specified for each method, analyte, and matrix in Table 3.2-2 of the QAPP for laboratory duplicate samples and MS/MSDs and Table 3.2-3 of the QAPP for LCS/LCSDs. If the RPDs did not meet the specified criteria, the data were qualified as estimated (J/UJ).

A summary and tables for the qualification of data by each analytical method due to laboratory precision criteria are presented in the following sub-sections.

3.4.1.9.1 Laboratory Duplicate Precision for Inorganic Methods

Duplicate sample analyses were performed for soil and water samples, with the exception presented in Table 3.4-8A. Although not performed for the analytical batch specified, duplicate analyses were performed at a frequency of 1:5 water samples, in excess of 1:20 samples for each method and matrix. For the

inorganic general chemistry methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters), and SW9060 (TOC - Soils), all laboratory duplicate analyses were within specified criteria. The lack of a duplicate analysis for these methods associated with four of 18 water samples (22 water samples for TOC) does not affect project objectives.

For metals by EPA Methods SW6010B, SW7470A (mercury - waters), and SW7471A (mercury - soils), results were within QC limits, with the exceptions presented in Table 3.4-8B. The results for potassium in one soil sample and its field replicate were qualified as estimated (J) due to a high RPD in the laboratory duplicate sample analysis. The field replicate results were acceptable. There is no effect on the quality of the data.

3.4.1.9.2 Laboratory Duplicate Precision for Organic Methods

For MS/MSD or LCS/LCSD RPDs outside of control limits, data qualification information is presented in Tables 3.4-6 and 3.4-7, respectively. MS/MSD RPDs exceeding the control limits were reported for one sample by TEPH, one and three compounds by SW8260B in two samples, chloropicrin in one sample, hydrazine in one sample, and TNT in one sample. The data qualifications are discussed in Section 3.4.1.7, above.

High RPDs were reported for the LCS/LCSDs for TEPH in four samples, for one-to-two VOCs in four samples and four trip blanks, and for one-to-four explosives in 13 water samples and two equipment blanks. The data qualifications are discussed in Section 3.4.1.8, above.

The RPD exceedances were intermittent and generally only marginally exceeded control limits. No distinct trends were apparent. Laboratory duplicate precision is not expected to affect project objectives.

3.4.1.10 ICP SERIAL DILUTION

For inductively coupled plasma (ICP) analyses of metals by EPA Method SW6010B, a five-fold serial dilution of a representative sample was evaluated to determine if significant matrix interferences may be affecting the quality of the data. For analyte concentrations at least 50 times the instrument detection limit (IDL) in the undiluted QC sample used for serial dilution, the diluted and undiluted results must agree within $\pm 10\%D$. For analytes that failed to meet this criterion, associated results were qualified as estimated (J/UJ). Serial dilution criteria were met, with the exception presented in Table 3.4-9.

The results for lead in all six soil samples were qualified as estimated for an 11.1%D serial dilution result that marginally exceeded the 10.0%D control limit (approximately 0.7 percent of the metals data). The qualifications due to serial dilution results do not affect the project objectives.

3.4.1.11 ICP INTERFERENCE CHECK SAMPLE

The ICP analysis of trace metals by EPA Method SW6010B requires the verification of the interelement and background correction factors by analysis of an ICP interference check sample (ICS) at the beginning and end of the analytical sequence or after every 8 hours, whichever is more frequent. Results for the analytes in the ICSA and ICSAB solutions must fall within ± 20 percent of their true values to demonstrate conformance. In addition, results for analytes not actually spiked into the ICSAB solution must be below the reporting limits (RLs). Failure to meet the ICSA and ICSAB performance criteria results in the qualification of the data as estimated (J/UJ). No results were qualified for ICP interference.

3.4.1.12 ANALYTE IDENTIFICATION

Qualitative criteria for identifying target analytes have been established to minimize the possibility of reporting false positives and false negatives. Most of the identification criteria are directed toward ensuring that a compound is positively identified, and thus toward preventing false positives.

For GC/MS EPA Methods SW8260B and SW8270C, compound identification is made based on comparison of the relative retention times (RRTs) of the chromatographic peaks for the sample and calibration standards, then on comparison of the sample mass spectra against reference mass spectra for each potential target compound. Positive identification is made when all of the following criteria are met: a) all ions present in the standard mass spectra at a relative intensity greater than 10 percent are also present in the sample mass spectra; b) the relative intensities of these ions in the standard and sample mass spectra agree to within 20 percent; c) all ions greater than 10 percent in the sample mass spectrum but not in the standard mass spectrum are accounted for; and d) the compound elutes within ± 0.06 RRT units of the RRT for that target compound in the calibration standards. Mass spectra for up to 10 peaks for SW8260B and 20 peaks for SW8270C with RRTs not matching target compounds areas and with chromatographic peaks greater than 10 percent of the nearest internal standard peak areas are quantitated and compared to a computerized library of mass spectra. No tentatively identified compounds (TICs) were reported for any sample.

Results for which compound or analyte identification is considered to be questionable were estimated and were qualified as estimated (J). Examples may include retention times for either column in GC methods not within specified limits, percent differences greater than 50 percent between primary and confirmation columns for GC, or other reasons a compound or analyte is believed to be misidentified.

The characterization of TEPH fuels by chromatographic pattern matching is a subjective process for environmental samples. Patterns may range from an excellent match with a calibration fuel to a mix of different fuels, weathered fuels, or random hydrocarbons. TEPH chromatograms for every sample were reviewed and characterized by the laboratory, LDC (the third party validators), and Earth Tech chemists in San Jose. A summary of the interpretations of the chromatographic patterns is presented in Table 3.4-10. All results reported as detections for specific TEPH fuels represent a reasonable characteristic match to the specified chromatographic fuel patterns, and may include inexact matches such as weathered fuels or additional peaks in the pattern. TEPH results that did not adequately match the fuel patterns of the standards were reported as Unknown Diesel or Motor Oil Range Hydrocarbons. These results do not represent kerosene, diesel, motor oil or other petroleum fuels as the chromatographic patterns indicate individual peaks or series of peaks not indicative of fuels.

Level III review of the summary forms and Level IV review of the raw data and summary forms for GC/MS analyses by EPA Methods SW8260B and SW8270C; HRGC/MS analyses by SW8290; and HPLC analysis by EPA Methods SW8310, SW8330, and SW8330M did not show any problems associated with correct analyte identification.

3.4.1.13 ANALYTE QUANTITATION

Data validation for Level II data also includes a review of the quantitation performed by the laboratory to ensure the accuracy of all concentrations and detection limits reported. The raw data reviewed includes instrument generated quantitation reports, instrument logs, sample preparation sheets, extraction cleanup records, and chromatograms. Calculations for the RF, RRT, %RSD, %D, RPD, r, concentrations, detection limits, percent dry weight, and percent recoveries of surrogates and spikes, are verified for approximately 10 percent of the Level II data.

Results for which compound or analyte quantitation is considered to be questionable were qualified as estimated (J), indicating that the results may be quantitatively uncertain. Examples may include unaccountable differences in results between dilutions, related results which do not add up, percent differences greater than 25 between primary and confirmation columns for GC, results quantitated and reported from above the demonstrated calibration range of an instrument, or other reasons for quantitative uncertainty. None of the data were qualified due to quantitation results.

3.4.1.14 REPORTING OF RESULTS AND DETECTION LIMITS

All analytical results and reporting limits for the samples collected in this project were adjusted for dilutions resulting from the preparation procedures required by the method or to get the result for a compound or analyte within the calibration range of the instrument. The PQLs and MDLs were raised by the dilution factor when reported for diluted analyses.

The laboratories reported analytical results that were above the MDL but below the PQL. Such results were qualified as estimated (J) due to possible quantitative or qualitative uncertainty near the limits of detection, and do not indicate analytical problems or affect project objectives.

For some analytes, the PQLs specified in Table 3.1-1 of the QAPP were not met, as presented in Table 3.4-11.

All PQLs for the inorganic methods met the requirements specified in the QAPP. All PQLs for the inorganic methods met project objectives.

All PQLs for the organic methods met the requirements specified in the QAPP, with the exceptions discussed below. For some samples, the SW8015B PQLs for diesel, kerosene, and motor oil exceeded the PQLs specified in the QAPP. In addition, the PQLs for two analytes for waters and two analytes for soils exceeded the PQLs specified in the QAPP for SW8260B.

A summary and tables for the PQLs and MDLS for each analytical method are presented in the following sub-sections.

3.4.1.14.1 PQLs for Inorganic Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)

All PQLs for the inorganic methods met the requirements specified in the QAPP. All PQLs for the inorganic methods met project objectives.

3.4.1.14.2 PQLs for Inorganic Methods: SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)

All PQLs for the metals methods met the requirements specified in the QAPP. The metals PQLs met project objectives.

3.4.1.14.3 PQLs for Inorganic Methods: CADHS Method 300.0-M (Perchlorate)

The PQLs for perchlorate met the requirements specified in the QAPP. The perchlorate PQLs met project objectives.

3.4.1.14.4 PQLs for Organic Methods: EPA Method SW8015B (TEPH)

For SW8015B for TEPH, all compounds met specified project PQLs, with the exceptions specified in Table 3.4-11A. PQLs for samples analyzed at dilution were raised by the dilution factor, and are not included in the table.

For a substantial number of water samples (9 of 20), the TEPH as diesel and TEPH as kerosene PQLs were reported at 200 µg/L, and the TEPH as motor oil PQL was reported at 1000 µg/L. For water samples, the TEPH as diesel and TEPH as kerosene reporting limits should be reported at 50 µg/L and the TEPH as motor oil PQL should be reported at 500 µg/L, per the QAPP.

For a substantial number of soil samples (53 of 126), the TEPH as diesel and TEPH as kerosene PQLs were reported at 5.0 mg/kg and the TEPH as motor oil reporting limit was reported at 25 mg/kg. For soil samples, the TEPH as diesel and TEPH as kerosene PQLs should be reported at 1.0 mg/kg and the TEPH as motor oil PQL should be reported at 10 mg/kg, per the QAPP.

The non-conformance was due to analyst error in the selection of the extraction method. The extraction method used on the specified samples was the routine extraction performed for Earth Tech projects at another site, whereas the extraction required for this project is a special extraction used to lower the detection limits to meet the PQLs required for this project. As soon as the error was discovered, the correct extraction was implemented, and all samples within holding times were re-extracted if possible. However, the holding times had already expired for the samples reported at the elevated PQLs.

The elevated PQLs for waters are four times higher than the specified PQLs for diesel and kerosene, and two times higher for motor oil. The elevated PQLs for soils are five times higher than the specified PQLs for diesel and kerosene, and 2.5 times higher for motor oil. MDLs for each fuel in each matrix are approximately one half the PQLs. No action levels were specified in the project objectives for these analytes. Although these PQLs do not meet the PQLs specified in the QAPP, the health risk assessment being used to evaluate the project site is using levels of 500 mg/kg as the action level for TEPH fuels in soils for the project objectives. Therefore, the PQLs reported for the affected samples meet the required objectives by factors of eight or more.

3.4.1.14.5 PQLs for Organic Methods: EPA Method SW8081A for Pesticides

For SW8081A for pesticides, all compounds met specified project PQLs. All PQLs for SW8081A met project objectives.

3.4.1.14.6 PQLs for Organic Methods: EPA Method SW8082 for PCBs

For SW8082 for PCBs, all compounds met specified project PQLs. All PQLs for SW8082 met project objectives.

3.4.1.14.7 PQLs for Organic Methods: EPA Method SW8260B (VOCs)

All PQLs for VOCs met the requirements specified in the QAPP, with the exceptions specified in Table 3.4-11B. For SW8260B in waters, the PQLs for vinyl acetate and 1,1,2-trichloro-1,2,2-trifluoroethane did not meet the PQLs specified in the QAPP. For SW8260B in soils, the PQLs for tert-methyl-butyl ether (MTBE) and 1,1,2-trichloro-1,2,2-trifluoroethane did not meet the PQLs specified in the QAPP.

For all water samples, the 1,1,2-trichloro-1,2,2-trifluoroethane PQL was reported at 2.0 µg/L, whereas the PQL is specified as 1.0 µg/L in the QAPP. The MDL of 1 µg/L is at the PQL. For all water samples, the vinyl acetate PQL was reported at 10 µg/L, whereas the PQL is specified as 5 µg/L in the QAPP. The MDL

of 1 µg/L is less than one half the PQL, so the laboratory could have reported results using the specified PQL. The low concentration calibration standard for both compounds was analyzed at 1 µg/L, demonstrating acceptable sensitivity and linearity at 1 µg/L. Vinyl acetate is not a chemical of potential concern at the project site. As results are reported down to the MDL, and the action levels specified in the Final Work Plan for this project (see Table 2.4-11) exceed the reported PQLs by 59,000 times for 1,1,2-trichloro-1,2,2-trifluoroethane and 80 times for vinyl acetate, there is no effect on the project objectives.

For all soil samples, the MTBE and 1,1,2-trichloro-1,2,2-trifluoroethane PQLs were reported at 0.010 mg/kg, whereas the PQLs are specified as 0.005 mg/kg in the QAPP. The MDLs of 0.006 mg/kg marginally exceed the PQLs. The low concentration calibration standard for both compounds was analyzed at 0.010 mg/kg. For MTBE, there is no action level specified for soils. As results are reported down to the MDL and the action level (see Table 2.4-11) for 1,1,2-trichloro-1,2,2-trifluoroethane for this project exceeds the reported PQL by five orders of magnitude, there is no significant effect on the project objectives.

3.4.1.14.8 PQLs for Organic Methods: EPA Method SW8270C for SVOCs

For SW8270C for SVOCs, all compounds met specified project PQLs. All PQLs for SW8270C met project objectives.

3.4.1.14.9 PQLs for Organic Methods: Modified Method SW8270CWM for Chloropicrin

For SW8270CWM for chloropicrin, all compounds met specified project PQLs. All PQLs for SW8270CWM met project objectives.

3.4.1.14.10 PQLs for Organic Methods: EPA Method SW8290 (Dioxins/Furans)

For SW8290 for dioxins/furans, the MDLs for all compounds met specified project PQLs. All PQLs for SW8290 met project objectives.

3.4.1.14.11 PQLs for Organic Methods: EPA Method SW8310 (PAHs)

For SW8315M for hydrazines, all compounds met specified project PQLs. All PQLs for SW8315M met project objectives.

3.4.1.14.12 PQLs for Inorganic Methods: EPA Method SW8315M for Hydrazines

For SW8310 for PAHs, all compounds met specified project PQLs. All PQLs for SW8310 met project objectives.

3.4.1.14.13 PQLs for Organic Methods: EPA Methods SW8330 (Explosives) and SW8330M (PETN/Nitroglycerin)

For SW8330 for explosives and SW8330M for PETN/nitroglycerin, all compounds met specified project PQLs. All PQLs for SW8310 met project objectives.

3.4.1.15 METHOD COMPLIANCE AND ANALYTICAL PERFORMANCE

In addition to the QC parameters discussed above, additional method and QC parameters were evaluated as part of the full data validation process. These parameters were used to assess the laboratories' performance and compliance with the analytical method requirements.

The laboratories met the performance criteria specified for each method, with the exceptions discussed for each QC parameter in subsections 3.4.1.1 through 3.4.1.14, above. As discussed in each subsection, data were qualified if the non-compliance adversely affected the sample results. In general, these non-compliances did not significantly affect the project objectives. The majority of the non-compliances were due to lack of MS/MSD analyses for individual preparation and analytical batches and due to TEPH soil sample data qualified as estimated for low LCS recoveries in LCSs that underwent SGC.

The non-compliances for LCS/LCSDs and MS/MSDs with respect to project environmental field samples are summarized below.

The results for TEPH by EPA Method SW8015B in 30 of 126 soil samples, six of 20 water samples, and four of 19 equipment blanks were estimated (J-/UJ) due to low LCS/LCSD recoveries. No results were rejected. Although corrective action was performed, the LCS/LCSD results for SGC-extracted LCSs remained low. The soil samples and LCSs qualified for low LCS recoveries underwent SGC. Note that the low recoveries were not actually non-compliant as all of the LCS recoveries were above the 30 percent LCL specified in the QAPP as acceptable for samples having undergone SGC. As all of the soil LCSs underwent SGC extraction, the 57-59%Rs were only marginally less than the 60%R LCL for samples without SGC and recoveries in the 30-65 percent range are expected, and the 54%R for the six water samples was not significantly outside the 60 percent LCL, the effect of the LCS qualifications on the project objectives is not expected to be significant. For further discussion of SGC control limits, refer to Section 3.4.1.8.4.

The results for PAHs by EPA Method SW8310 in 10 of 21 water samples were estimated (J-/UJ) due to an LCS that was not spiked for one extraction batch. Although corrective action was performed, the re-extractions were grossly (>2X) outside of holding times and could not be used for reporting purposes. The surrogate recoveries for the LCS, MS/MSD, method blank, and all of the affected samples except sample MW-7 were within control limits, indicating acceptable overall batch extraction efficiency and also indicating that the 0 percent spike recoveries were due to spiking failure, not to extraction or analytical deficiencies. In addition, results for other LCSs analyzed in the same analytical batch but from different extraction batches the day before and the day after the samples in question were within project control limits. As the batch extraction efficiency and analytical batch accuracy and precision were demonstrated to be acceptable, the continuing calibrations for the original analysis were acceptable, and the results for the reanalyses of these samples were the same as in the original analyses, the original results have been used for reporting purposes and are considered usable for decision-making purposes. For further discussion of SGC control limits, refer to Section 3.4.1.8.11.

No MS was performed for EPA Method 415.1 for one batch of four water samples. MS analyses were performed at a frequency of 1:4.4 for water samples with no outliers.

MS/MSD analyses were not extracted and analyzed for TEPH by EPA Method SW8015B in the batches associated with four of the 20 water samples. MS/MSD analyses were performed at a frequency of 1:10 water samples with only marginal outliers.

MS/MSD analyses were not extracted and analyzed for pesticides by EPA Method SW8081A in the batches associated with five of the 19 water samples. MS/MSD analyses were performed for waters at a frequency of 1:10 samples with no qualification of data.

MS/MSD analyses were not analyzed for VOCs by EPA Method SW8260B in the batches associated with seven of the 91 soil samples and nine of the 22 water samples. MS/MSD analyses were performed at a frequency of 1:15 soil samples and 1:11 water samples with very few outliers.

MS/MSD analyses were not extracted and analyzed for PAHs by EPA Method SW8310 in the batches associated with seven of the 21 water samples. The MS/MSD for one batch of 10 samples was lost due to a spiking failure and inadequate volume for re-extraction. MS/MSD analyses were performed at a frequency of 1:19 water samples (plus 2 field duplicates) with no qualification of data.

MS/MSD analyses were not extracted and analyzed for explosives by SW8330 in the batches associated with nine water samples. LCS/LCSDs were performed instead. MS/MSD analyses were performed at a frequency of 1:6 water samples with only one QC outlier.

With the exception of one batch of seven soil samples for VOCs out of 91 soil samples, all of the affected samples were aqueous samples. There was inadequate soil sample for an MS/MSD in the specified VOC batch as the required additional Encore samplers were not collected for any sample in this batch. MS/MSD analyses were performed for all of the other soil batches for all methods. Adequate aqueous samples were designated for MS/MSD by the samplers to meet the minimum frequency of 1:20 required in the QAPP. However, the samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. Many wells had to be sampled on multiple days just to provide enough sample for each method. Thus, the laboratory was unable to perform an MS/MSD in every extraction and analytical batch due to the small numbers and volumes of water samples received and logged daily. Due to careful planning, MS/MSDs were able to be performed at frequencies not exceeding 1:11 for any method for field water samples. Note that the analysis of MS/MSDs is a matrix-specific QC parameter. Batch extraction efficiency and laboratory accuracy and precision are measured with LCS/LCSDs, which were performed for all of the specified batches, and the sample-specific information is measured by surrogate recoveries. The numbers of MS/MSDs allowed for the adequate characterization of matrix effects, and the MS/MSD non-compliances are not expected to affect data quality or project objectives.

These deviations from specified performance criteria affect the contractual completeness calculations. Refer to Section 3.7.2 for further discussion of contractual compliance.

3.4.2 Field Quality Control

Field QC samples specified in Sections 2 and 3 of the Work Plan include equipment blanks, source water samples, and field duplicate samples. In addition, split samples to be sent for analysis through different laboratories and by different agencies were collected for this project; however, none of the split samples were analyzed by the agencies.

The field quality control samples were collected during the non-OE RI as described in the following sections of Appendix C.

Replicate and duplicate samples: see Section C.13.1

Source water sampling: see Section C.13.2

Trip blanks, equipment blanks, filter blanks, and temperature blanks: see Section C.13.3

Field-designated matrix spike & matrix spike duplicate samples: see Section C.13.4.

The following field test equipment was used to obtain field groundwater data during the non-OE RI in the following sections of Appendix C.

Beckman pH/Temperature Meter: see Sections C.18.1 and C.18.3

YSI Model 33 Conductivity Meter: see Section C.18.2

HF Scientific DRT-15C Turbidimeter: see Section C.18.4.

In addition to the field test equipment listed above, a water level meter was used to collect water level measurements as described in Section C.18.5 of Appendix C.

Field instruments were calibrated at the beginning and end of each sampling day. The calibration information was recorded in the logbooks, which accompanied each field instrument.

Decontamination procedures were implemented during drilling, well installation, and soil/sediment and water sample collection to prevent foreign contamination of samples and cross-contamination between sampling locations. Field equipment and personnel decontamination procedures implemented during the non-OE RI are discussed in Section C.19 of Appendix C.

Evaluation of the field QC samples for each parameter are presented in the following sub-sections.

3.4.2.1 FIELD DUPLICATE SAMPLE PRECISION

Field duplicate and replicate samples were collected at an approximate frequency of 10 percent. The duplicate (and split) samples for waters were true field duplicates, collected from the same bailers at the same locations at the same times whenever possible. The duplicate samples for soils are considered to be field replicate samples, as defined in the QAPP. These samples were collocated samples, taken from adjacent borings or at consecutive depths. A summary of field duplicate and replicate samples with frequency summaries is presented in Table 3.4-12.

Duplicate and replicate samples were analyzed by all methods. RPD values were calculated, where possible, and compared to established acceptance criteria specified for each method, analyte, and matrix, as presented in Tables 3.2-2 and 3.2-3 of the QAPP. The RPD value is not defined for duplicate pairs for which one or both results are below PQL. For values less than five times the PQL, RPDs were not calculated. In these cases, results within one PQL for waters, or within two PQL for soils, are considered acceptable. RPDs below 40 percent for soils and 30 percent for waters generally represent good agreement. Data were evaluated but not qualified for field duplicate results.

Field duplicate aqueous samples by all methods were generally in agreement with each other. Field replicate soils results for each method were generally acceptable, with the exceptions presented in the following sub-sections. For higher RPDs or otherwise notable disagreement between replicates, soil sample heterogeneity is generally the cause. Most of the outliers are within normal parameters for the methods, and the quality of the data is not expected to be affected with the possible exception of 2,4,6-trinitrotoluene (TNT) in soil samples with elevated levels of explosives contamination.

A summary and tables with detected results for field replicate pairs by each analytical method are presented in the following sub-sections. Results for samples for which all results were non-detected are not included in the tables as such results are within specified limits.

3.4.2.1.1 *Field Duplicates for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)*

Field duplicate and replicate results were within specified criteria, with the exceptions presented in Table 3.4-13A. Results exceeding duplicate precision criteria are highlighted in bold in the table. Results for TSS in one aqueous field duplicate pair, and for six analytes in a second aqueous duplicate pair exceeded specified criteria. All other results for these methods were non-detected or within specified criteria. The wells for these samples did not readily produce adequate water for all analyses, so field duplicate samples were collected after initial sample volumes for all analyses were collected. Concentrations of TDS, TSS, TOC, and three anions may have been affected. Field duplicate precision results are not expected to significantly affect project objectives for these methods.

3.4.2.1.2 Field Duplicates for Perchlorate: Method CADHS 300.0-Mod

Field duplicate and replicate results were within specified criteria. All results for perchlorate were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.3 Field Duplicates for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)

Precision assessment for detected field duplicate and replicate results is presented in Table 3.4-13B. Results exceeding duplicate precision criteria are highlighted in bold in the table. Field duplicate and replicate results for one-to-four elements exceeded the specified criteria in each field replicate pair. No significant trends were noted. Concentrations of metallic elements are expected to vary within soil samples due the differences in concentrations of elements in the various geological components of the soils. The results that exceeded the specified criteria were within reasonable expectations for the method, and can be attributed to lack of sample homogeneity in the soil samples. Field duplicate precision is not expected to adversely affect project objectives for these methods.

3.4.2.1.4 Field Duplicates for EPA Method SW8015 for TEPH

Precision for field duplicate and replicate detected results is presented in Table 3.4-13C. Results exceeding duplicate precision criteria are highlighted in bold in the table. Field duplicate and replicate results were within specified criteria with the exception of field replicate soils results for an unknown hydrocarbon reported in one sample but not in the other. This result can be attributed to lack of sample homogeneity in soil samples. Field duplicate precision results are not expected to significantly affect project objectives for this method.

3.4.2.1.5 Field Duplicates for EPA Method SW8081A for Pesticides

Field duplicate and replicate results were within specified criteria. All results for this method were non-detected or within specified criteria (see Table 3.4-13D). Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.6 Field Duplicates for EPA Method SW8082 for PCBs

Field duplicate and replicate results were within specified criteria. All results for this method were non-detected or within specified criteria (see Table 3.4-13E). Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.7 Field Duplicates for EPA Method SW8260B for VOCs

Field duplicate and replicate results were within specified criteria, with the exception presented in Table 3.4-13F. Chloroform was reported at a low concentration in one aqueous sample, but not in the field duplicate sample. All other field duplicate and replicate results for this method were non-detected or within specified criteria. Detected results for VOCs were all at low concentrations, and with the exception of the common laboratory contaminant acetone, most detected compounds were not confirmed in the duplicate or replicate sample. Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.8 Field Duplicates for EPA Method SW8270C for SVOCs

Eight soil samples were collected for this method, and no field replicate samples were collected for this method. Field replicate precision was not evaluated for this method.

3.4.2.1.9 Field Duplicates for Modified Method SW8270CWM for Chloropicrin

The results for chloropicrin in the field replicate soil sample pair were non-detected. No aqueous field duplicate sample could be collected for the two wells analyzed for this method due to lack of adequate water in the wells. These wells had to be sampled on multiple dates in an effort just to collect enough water for all of the planned analyses. Although not expected to be found on site, chloropicrin was added to the project as a potential indicator for chemical warfare agents as a precaution. As the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, the project objectives are not significantly affected by the lack of a duplicate sample for the two wells analyzed by this method. Field duplicate and replicate precision does not adversely affect project objectives for this method.

3.4.2.1.10 Field Duplicates for EPA Method SW8290 for Dioxins/Furans

All results for dioxins/furans in field replicate samples were non-detected. Field replicate precision does not adversely affect project objectives for this method.

3.4.2.1.11 Field Duplicates for EPA Method SW8310 for PAHs

All results for PAHs in field duplicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.12 Field Duplicates for EPA Method SW8315M for Hydrazines

All results for hydrazines in field duplicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.1.13 Field Duplicates for EPA Method SW8330 for Explosives

Precision assessment for detected field duplicate and replicate results is presented in Table 3.4-13G. Results exceeding duplicate precision criteria are highlighted in bold in the table.

Results for TNT in three out of seven replicate soil samples for which explosives were detected exceeded specified criteria. These results indicate an improvement in field replicate precision compared to those of the remedial investigation, most likely due to the implementation of sample homogenization of the complete sample sleeve at the laboratory prior to removal of the aliquot of soil for preparation and analysis. However, the data still indicate lack of sample homogeneity typical of TNT in soils. TNT is known for crystallizing into clumps in the soil. Field replicate and split sample results are in good agreement where TNT and explosives were non-detected. Where TNT is detected at elevated levels, concentrations of TNT may vary within the small distances between collocated samples. No other explosive target compounds exceeded the field precision criteria.

Results for samples with no explosives contamination present were generally confirmed in both field replicate and field duplicate analyses. Although lack of sample homogeneity affects the ability to precisely and accurately define levels of TNT contamination in the soils, the data can be used to effectively determine where detectable concentrations of explosives do and do not exist.

The project objectives were to determine the presence and extent of explosives at the project sites. In non-detected areas, field duplicate precision results meet the DQOs by confirming that explosives are not present. In areas of detected explosives, the sample homogeneity issue was addressed and the DQO process was used after each stage of sampling to ensure that an adequate number of samples were collected to allow for the cross-sectional evaluation of each site. Thus, DQOs were met by the further evaluation, planning, collection, and analysis of additional samples at and in all directions from the contaminated sites to determine the lateral and horizontal extent of contamination in spite of the lack of sample homogeneity. The data support the meaningful evaluation of the remedial requirements and project decisions for each site.

3.4.2.1.14 *Field Duplicates for EPA Method SW8330/8332 (SW8330M) for PETN and Nitroglycerin*

All results for PETN and nitroglycerin in field duplicate and replicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

3.4.2.2 TRIP AND EQUIPMENT BLANKS

Review of the results for trip and equipment blanks (including source water blanks) indicates no detections greater than the PQL, with the exceptions presented in Table 3.4-3. Most equipment blank detections were either non-detected or less than one half the PQLs. Discussion of all blank results is presented in Section 3.4.1.4 of this QCSR.

Trip, equipment, and source water samples were collected and analyzed according to the requirements specified in Sections 2 and 3 of the Work Plan. Trip, equipment, and source water blank contamination does not affect the project objectives.

3.4.2.3 QUALITY ASSURANCE SPLIT SAMPLES

Split samples to be sent for analysis through different laboratories and by different agencies were collected for this project; however, none of the split samples were analyzed by the agencies.

3.4.3 PE samples

Performance evaluation (PE) samples were provided to the analytical laboratories as specified in Section 3.3.2.3 of the QAPP. PE samples are samples of known concentrations of project target analytes provided to the laboratory to assess laboratory accuracy. PE samples are provided in a manner such that the laboratory knows the samples are for evaluation purposes but does not know the concentrations (single blind), or disguised as a project field sample so the laboratory is not aware the sample is for evaluation and does not know the concentrations (double blind). PE samples of a solid matrix were used to evaluate analyses for some methods. Such samples were submitted single blind, as soil samples cannot be readily submitted double blind. Otherwise, double blind aqueous PE samples were used to evaluate the ability of the laboratory to accurately perform analytical methods. The results for all PE samples for all phases of the project are presented in Attachment 2.

For QES/STL, solid PE samples were provided at the start of the remedial investigation sampling event for EPA Methods SW6010B, SW7471A, SW9060, and 300.0. All PE sample results for QES/STL were within specified criteria. In addition, Earth Tech provides QES/STL with double blind aqueous PE samples for many methods on a semi-annual basis. All QES/STL PE sample results were acceptable in 1999. Earth Tech provided additional PE samples to QES/STL for the data gaps investigation as this laboratory was performing additional analyses. The methods for which aqueous PE samples were provided included EPA

Methods 160.1, 160.2, SW6010B, SW7470A, SW8015 (diesel), SW8081A, SW8260B, SW8270CWM (chloropicrin), SW8310, and SW8330. Solid PE samples was provided for SW8015B (motor oil) and SW8082. All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP, with the following exceptions.

For EPA Method SW8310, an aqueous double blind PE sample was provided to the laboratory on March 30, 2000 with samples for the data gaps investigation, and an aqueous double blind PE sample and a soil PE sample were provided to the laboratory on May 30, 2000 with samples for the RAW investigation. All results were acceptable for the data gaps aqueous PE sample and for the soil PE sample. For the RAW investigation aqueous PE sample, a false negative was reported for acenaphthene. All other analytes were acceptable. As the 34 percent surrogate recovery was low for this PE sample, the PE sample was re-extracted past the extraction hold time and reanalyzed with an acceptable surrogate recovery. All results were acceptable with the exception of another false negative for acenaphthene. Acenaphthene was listed by the vendor as having been spiked slightly above the PQL. As the aqueous action level specified in the DQOs of the Work Plan for acenaphthene is 37 times the PQL and 28.5 times the spike concentration in the PE sample, the possibility of a false negative near the action limit is not implied for this compound and the PE result is not expected to have a significant impact on the project objectives. The 94 percent compliance for one PE sample and 100 percent compliance for two others for this laboratory (versus goal of 95 percent), demonstrate acceptable laboratory accuracy for this method.

For EPA Method SW8330, results for the March 30, 2000 aqueous double blind PE sample for all analytes were very good with the exception of tetryl with a 36%R. The true value for tetryl was below the PQL. A low concentration of TNT was accurately reported. Follow-up PE samples of one double blind aqueous sample and one single blind soil sample were provided to the laboratory on May 30, 2000. All results were acceptable for the soil PE sample. For the aqueous PE sample, all results were acceptable with the exception of a marginally low 61%R for 2,6-dinitrotoluene (vs 65%R LCL) for which the true value was one-fifth of the PQL. The results indicate acceptable performance by the laboratory for these analyses, especially at the PQL.

PE samples were not provided by Earth Tech to QES/STL for EPA Methods SW8270C and SW8290. Eight soil samples were analyzed for SVOCs by SW8270C. These were samples that were recollected from the remedial investigation due to significant interference in the original SW8310 analyses for PAHs, and a PE sample was not ordered as the method was not originally planned as a primary method for this project. Eight soil samples and one sediment sample were analyzed for dioxin/furans by SW8290. No vendor could be located to provide a dioxin/furan PE sample for analysis by EPA Method SW8290. QES/STL participates in the National Voluntary Laboratory Accreditation Program, and acceptable PE sample results for these methods are included in Attachment 2.

Earth Tech provides double blind aqueous PE samples to Babcock for perchlorate by CADHS Method 300.0M at a minimum of once annually. The results for the perchlorate PE samples analyzed in April 1999 and March 2000 were within specified criteria.

Earth Tech provides double blind aqueous PE samples to Truesdail for hydrazines by modified Method SW8015M at a minimum of once annually. The results for the speciated hydrazines PE samples analyzed in April 2000 were within specified criteria for hydrazine, but low recoveries were reported for MMH and UDMH. Although such results are not unexpected for these highly reactive compounds due to possible interference from low levels of organics or metals in the sample provided by the vendor, follow-up PE samples were sent to Truesdail to determine if accurate recoveries could be attained in more controlled circumstances. Therefore, a single blind PE sample in a sealed ampule was provided, and the resultant analyses were performed in duplicate with all results within specified criteria.

The PE sample results for the remedial investigation analyses indicate acceptable accuracy by the participating analytical laboratories.

3.4.4 Audits

Audits were performed as specified in Section 3.3.2.3 of the QAPP. Discussion of field and laboratory audits are presented in the following subsections.

3.4.4.1 FIELD AUDITS

A field QA audit of the sampling activities at the project site was conducted in accordance with the requirements of Section 3.3.2.3 of the Work Plan on March 30, 2000 by William Knight, P.E. Mr. Knight is an Earth Tech project manager not associated with the project team. The field auditor observed that procedures and techniques were in accordance with the Work Plan and best professional standards. Specific issues identified during the audit were discussed with the Field Team Leader (FTL) during the audit. Responses for each issue were implemented by the FTL during the same day. More details are provided in the Field QA Audit Memorandum dated March 30, 2000, included in Attachment 3.

3.4.4.2 LABORATORY AUDITS AND CERTIFICATIONS

Special analytical services for the analysis of perchlorate was performed by E.S. Babcock & Sons, Inc. (Babcock) of Riverside, California according to the proprietary modification of the California Department of Health Services (CADHS) Sanitation and Radiation Laboratories Branch (SRLB) modification of EPA Method 300.0 (CADHS 300.0M). Special analytical services for the analysis of speciated hydrazines was performed by Truesdail Analytical Laboratories (Truesdail) of Tustin, California according to the proprietary modification of EPA Method SW8315 (SW8315M). Analytical services for all other methods were provided by Quanterra Incorporated (Quanterra) in West Sacramento, CA (QES/STL). Laboratory audits of all project laboratories were performed in accordance with the requirements of Section 3.3.2.3 of the Work Plan.

3.4.4.2.1 Laboratory Audit of Quanterra Inc., West Sacramento, CA (QES/STL)

Quanterra West Sacramento (QES/STL) is CA ELAP and USACE certified for the analyses performed for this project. See Attachment 4.

Earth Tech maintains an ongoing QA program for analytical work integral to all federal and DOD programs, including an annual audit program. The Earth Tech federal program audit team based in Long Beach, California performed an in-depth audit of the Quanterra West Sacramento facility, the primary fixed-base laboratory identified for this project, in September 1999. The audit was primarily performed for an Air Force Center for Environmental Excellence (AFCEE) project, and the audit team was accompanied by an AFCEE representative. The audit includes a full report with response items and full closure of all action items, which has been filed with the U.S. EPA, and is included in Attachment 5.

As specified in Section 3.3.2.3 of the Work Plan, a follow-on project-specific cursory audit of QES/STL was performed by Debbie Masonheimer, an Earth Tech chemist and laboratory audit team member, while samples from this project were in-house. The audit focused on project-specific QC requirements, and found the laboratory to be meeting the requirements of the QAPP, with one exception. The laboratory implemented the finding, and the quality of the data is not expected to be affected. More details are provided in the Audit Report for Quanterra West Sacramento dated December 27, 1999, included in Attachment 5. The next Earth Tech audit of this facility is scheduled for September 2000.

3.4.4.2 Laboratory Audit of E.S. Babcock & Sons

Babcock is CA DTSC approved for the analyses performed for this project (see Attachment 4). Earth Tech maintains an ongoing QA program for analytical work integral to all federal and DOD programs, including an annual audit program. The Earth Tech federal program audit team based in Long Beach, California performed an audit of the Babcock facility for its perchlorate analyses in March, 2000 between the remedial and data gap sampling events. The audit includes a full report with response items and full closure of all action items, which has been filed with the EPA and is included in Attachment 5.

3.4.4.3 Laboratory Audit of Truesdail Laboratories

Truesdail is approved by EPA Region IX and California EPA (CAL EPA) for the special analyses of hydrazines by modified Method SW8315M performed for this project. Earth Tech maintains an ongoing QA program for analytical work integral to all federal and DOD programs, including an annual audit program. The Earth Tech federal program audit team based in Long Beach, California performed an audit of the Truesdail facility for its hydrazines analyses in March, 2000 between the remedial and data gap sampling events. The audit includes a full report with response items and full closure of all action items, which has been filed with the U.S. EPA and is included in Attachment 5.

3.5 ANALYTICAL PROCEDURES

All analyses for this project were performed according to the analytical procedures and methods specified in Section 3.2.4.2 of the QAPP, with exceptions specified in the evaluations for each QC parameter in Section 2.4 of this QCSR. The analytical procedures fulfill the requirements for decision-making with respect to the project objectives.

3.6 CHEMICAL DATA QUALITY ASSESSMENT

The data review and validation performed on the entire definitive-level data set, as well as the acceptable results for the PE samples, indicate the overall acceptability of the definitive-level data collected for this project. Less than 0.9 percent of the data were qualified as rejected (R), and approximately 9.7 percent of the data were qualified as estimated (J/UJ). The remaining data met the data quality assurance objectives for accuracy, precision, sensitivity, and completeness specified in the QAPP. Of the rejected data, approximately 80 percent were for 2-chloroethylvinyl ether in soils; for 2-chloroethylvinyl ether and dibromo-3-chloropropane in waters, of which most were field blanks; and for several ketones in several field blanks. These rejections have no effect on project objectives. Data qualified with the "J" qualifier solely for reported values less than the PQL but greater than the MDL are included in the completeness calculations, however these qualifiers are not related to the QC parameters, and do not affect the usability of the data.

The data review includes assessment for compliance with the data quality assurance objectives specified throughout the QAPP. This includes achievement of quality assurance objectives related to sample collection, handling, labeling, and custody; analytical methods and procedures; laboratory data reduction, validation, reporting, and management; data package and electronic deliverables verification, validation, and assessment; and documentation and reporting. The compliance with the quality assurance elements of the DQOs indicates a high level of confidence in the data, allowing the data to be used for its intended purposes within the constraints of the data qualifiers.

Data qualified as "R" are rejected and considered unusable. Data qualified with the "J" qualifier are considered estimated and usable as assessed in validation for decision-making purposes. Otherwise, the definitive-level data as presented are of acceptable quality and can be used to support the environmental decision-making and Non-OE RI project objectives.

A summary of the data quality assessment for each analytical method is provided in the following subsections.

3.6.1 Data Quality Summary for General Chemistry Methods: EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils)

Analyses were performed according to the methods and requirements specified in the QAPP. Approximately 7.6 percent of the general chemistry data were qualified as estimated (J/UJ) and 3.5 percent rejected due to QC parameters.

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1A. The result for nitrate-N in one soil sample and results for nitrite-N in all six soil samples were rejected (R), and results for nitrate-N and nitrite-N were estimated in two of 18 aqueous field samples and two equipment blanks due to holding time exceedance. For nitrate-N and nitrite-N, the potential impact of the holding time qualifications would be for nitrite-N to convert to nitrate-N, with marginal effect on the sum of the two analytes. The six soil samples were collected from the boring of monitoring well 6 (MW-6). Unqualified results for nitrate-N at 0.5' (same depth as the rejected nitrate-N result, above) and nitrite-N results at various depths for this general location are available from the samples collected during the boring of temporary well 6 (TW-6) during the remedial investigation, and confirm that nitrate-N was non-detected at 0.5', and that nitrite-N was not found at detectable concentrations at the site. The estimated results are usable for decision-making purposes. Project objectives are not significantly affected for these methods.

All initial and continuing calibrations met specified criteria, with the exception that one result for nitrite-N was qualified as estimated for a marginally low CCV recovery. The effect on the quality of the data is not significant.

Method blanks were analyzed for each matrix as applicable. No contaminant concentrations were found in the method or field blanks, with the exceptions presented in Tables 3.4-3A, 3.4-3B, and 3.4-3C. The detected result for nitrate-N in one of 18 water field samples was blank-qualified (UJ) due to equipment blank results. No field sample results were qualified due to method blank contamination. The blank-qualified nitrate-N result was reported at less than one-half the PQL. Blank contamination does not affect the project objectives for these analytical methods.

MS analyses were performed according to method requirements, with the exception that no MS was performed for EPA Method 415.1 in one batch associated with the four water samples. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. As MS analyses were performed at a frequency of 1:5 for samples of this matrix, exceeding the minimum of 1:20 samples specified in the QAPP, the effect on the quality of the data is not expected to be significant. MS analyses were otherwise performed for each matrix as applicable. Percent recoveries were within QC limits.

For the inorganic general chemistry methods 160.1 (TDS), 160.2 (TSS), 300.0 (Anions), 415.1 (TOC - Waters), and SW9060 (TOC - Soils), all laboratory duplicate analyses were within specified criteria. The lack of a duplicate analysis for these methods associated with one batch of four samples does not affect project objectives. Duplicate sample analyses were performed for each matrix as applicable. RPDs were within QC limits.

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits.

All PQLs for the inorganic methods met the requirements specified in the QAPP. All PQLs for the inorganic methods met project objectives.

Field duplicate and replicate results were within specified criteria, with the exceptions presented in Table 3.4-13A. Results for TSS in one aqueous field duplicate pair, and for six analytes in a second aqueous duplicate pair exceeded specified criteria. The wells for these samples did not readily produce adequate water for all analyses, so field duplicate samples were collected after initial sample volumes for all analyses were collected. Concentrations of TDS, TSS, TOC, and three anions may have been affected. All other results for these methods were non-detected or within specified criteria. Field duplicate precision results are not expected to significantly affect project objectives for these methods.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for the general chemistry EPA Methods 160.1 (TDS), 160.2 (TSS), 300.0 (anions), 415.1 (TOC - Waters) and SW9060 (TOC - Soils) are valid and usable for decision-making purposes, with the exception of one result for nitrate-N and six results for nitrite-N in soil samples rejected due to grossly exceeded holding time. The general chemistry data meet the requirements of the project objectives.

3.6.2 Data Quality Summary for Method CADHS 300.0M for Perchlorate

Analyses were performed according to the methods and requirements specified in the QAPP. None of the perchlorate data were qualified as estimated (J/UJ) or rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements. All correlation coefficients (r) exceeded the 0.995 criterion, and all %Rs for the ICVs and CCVs met the 90-110%R criteria.

No contaminant concentrations were found above the reporting limit in the initial, continuing, preparation, and equipment blanks for this method.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits.

Duplicate sample analyses were performed for each matrix as applicable. RPDs were within QC limits.

All PQLs for perchlorate met the requirements specified in the QAPP. The perchlorate PQLs met project objectives.

Field duplicate and replicate results were within specified criteria. All results for perchlorate were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

PE sample results for this method were acceptable.

Results for perchlorate by CADHS Method 300.0M are valid and usable for decision-making purposes. The data meet the requirements of the project objectives.

3.6.3 Data Quality Summary for EPA Methods SW6010B (Metals), SW7470A (Mercury - Waters), and SW7471A (Mercury - Soils)

Analyses were performed according to the methods and requirements specified in the QAPP. Approximately 6.9 percent of the metals data were qualified as estimated (J/UJ) due to QC parameters. No data were rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial and continuing calibrations for EPA Methods SW6010B, SW7470A for waters, and SW7471A for soils were performed according to method requirements, and met specified criteria.

No contaminant concentrations were found above the reporting limit in the initial, continuing and preparation blanks, with the exceptions presented in Table 3.4-3D. No contaminant concentrations were found in the equipment and source water blanks, with the exceptions presented in Table 3.4-3E. Approximately 3.9 percent of the metals data were blank-qualified. Small numbers of results for various metals, mostly iron and manganese, were blank-qualified in water samples and equipment blanks due to laboratory blank results. As the affected results were all below action levels for metals in water, blank contamination does not significantly affect the project objectives for metals.

MS analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception presented in Table 3.4-6B. Results for antimony in all six soil samples were estimated for potential low bias (J-/UJ) and results for chromium and vanadium were estimated for potential high bias (J+) due to matrix spike recoveries. No metals results were rejected for MS recoveries. The approximately 2.2 percent of the metals data estimated for matrix effects due to MS recoveries is within normal parameters for these methods, and the effect on the quality of the data is not expected to be significant.

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries were within QC limits

Duplicate sample analyses were within QC limits with one exception. The results for potassium in one soil sample and its field replicate were qualified as estimated (J) due to a high RPD in the laboratory duplicate sample analysis. The field replicate results were acceptable. There is no effect on the quality of the data.

The results for lead in all six soil samples were qualified as estimated for an 11.1%D serial dilution result that marginally exceeded the 10.0%D control limit (approximately 0.7 percent of the metals data). The qualifications due to serial dilution results do not affect the project objectives.

No results were qualified for ICP interference.

All PQLs for the metals methods met the requirements specified in the QAPP. The metals PQLs met project objectives.

Field duplicate and replicate results for one-to-four elements exceeded the specified criteria in each field replicate pair. No significant trends were noted, and all the results that exceeded the specified criteria were attributed to lack of sample homogeneity in the soil samples. Field duplicate precision results are not expected to affect project objectives for these methods.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for metals by EPA Method SW6010B, SW7470A, and SW7471A are valid and usable for decision-making purposes. Small numbers of results were qualified as estimated due to laboratory and field blanks, MS recoveries, laboratory duplicate analyses, and serial dilution results. The small numbers and types of qualifications for the metals data are within normal parameters for the methods and matrices involved, and do not significantly affect the project objectives for these methods.

3.6.4 Data Quality Summary for EPA Method SW8015B for TEPH

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 2.7 percent of the TEPH data were qualified as rejected and 27.1 percent were qualified as estimated (J/UJ) due to QC parameters. 126 soil samples, 20 water samples, and 20 equipment blanks were analyzed for TEPH.

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1B. Non-detected results for TEPH in three soil samples were rejected due to holding time exceedance. No other data used for reporting purposes were qualified due to holding time or preservation requirements. The effect of the small number of qualifications on the project objective is not expected to be significant.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%D$ criterion.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits with several exceptions. Non-detected results for TEPH in two soil samples were rejected (R) due to low surrogate recoveries caused by significant interference from high concentrations of TNT. The location has known contamination so there is no effect on the project objectives. Non-detected results for TEPH in four soil samples were qualified as estimated (UJ) for low surrogate recoveries. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6C. MS/MSD analyses were not extracted and analyzed for TEPH in the batches associated with the samples specified in the remaining comments in Table 3.4-6C. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. One of the samples was a PE sample, which is also not of the environmental matrix. As the purpose of PE samples is to evaluate laboratory accuracy and the results for the PE sample was acceptable, there is no adverse effect on the quality of the data. For the remaining four water samples, there was no batch-specific MS/MSD. MS/MSD analyses were performed at a frequency of 1:10 water samples with only marginal outliers, exceeding the minimum of 1:20 samples specified in the QAPP. Therefore the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6D. The results for TEPH in one soil sample were estimated (J/UJ) for the 60%R MSD that marginally exceeded the LCL of 65%R. The MS analysis was acceptable. In addition, the results for TEPH in one soil sample were estimated (UJ) for an RPD of 45 percent, marginally exceeding the 40 RPD criterion. The MS and MSD results were both within

the 65-135%R control limits. The effect of the small number of qualifications for marginally exceeding control limits on the project objectives is not significant.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7A. The results for TEPH in 30 soil samples, six water samples, and four equipment blanks were estimated (J-/UJ) due to low LCS/LCSD recoveries. No results were rejected. Approximately 24 percent of the TEPH data were estimated for LCS criteria. The soil samples and LCSs qualified for low LCS recoveries underwent SGC. Although the data are qualified as estimated according to the guidelines in the QAPP tables, the QAPP recognizes that SGC will result in recoveries below the 60%R LCL for all analyses by this method (refer to discussion in Section 2.4.1.8.4). As all of the soil LCSs underwent SGC extraction and the 57-59%R recoveries were only marginally less than the 60%R LCL for samples without SGC (and easily met the SGC LCL of 30%R), and the 54%R for the six water samples was not significantly outside the 60 percent LCL, the effect of the LCS qualifications on the project objectives is not expected to be significant.

High LCS/LCSD RPDs were reported for LCS/LCSDs for four soil samples by TEPH. MS/MSD RPDs exceeding the control limits were reported for one sample. Laboratory duplicate precision is not expected to affect project objectives.

For SW8015B for TEPH, all compounds met specified project PQLs, with the exceptions specified in Table 3.4-11A. For a substantial number of water samples (9 of 20), the TEPH as diesel and TEPH as kerosene PQLs were reported at 200 µg/L, and the TEPH as motor oil PQL was reported at 1000 µg/L. For water samples, the TEPH as diesel and TEPH as kerosene reporting limits should be reported at 50 µg/L and the TEPH as motor oil PQL should be reported at 500 µg/L, per the QAPP. For a substantial number of soil samples (53 of 126), the TEPH as diesel and TEPH as kerosene PQLs were reported at 5.0 mg/kg and the TEPH as motor oil reporting limit was reported at 25 mg/Kg. For soil samples, the TEPH as diesel and TEPH as kerosene PQLs should be reported at 1.0 mg/Kg and the TEPH as motor oil PQL should be reported at 10 mg/kg, per the QAPP. The non-conformance was due to analyst error in the selection of the extraction method. The extraction method used on the specified samples was the routine extraction performed for Earth Tech projects at another site, whereas the extraction required for this project is a special extraction used to lower the detection limits to meet the PQLs required for this project. As soon as the error was discovered, the correct extraction was implemented, and all samples within holding times were re-extracted if possible. However, the holding times had already expired for the samples reported at the elevated PQLs.

The elevated PQLs for waters are four times higher than the specified PQLs for diesel and kerosene, and two times higher for motor oil. The elevated PQLs for soils are five times higher than the specified PQLs for diesel and kerosene, and 2.5 times higher for motor oil. MDLs for each fuel in each matrix are approximately one half the PQLs. No action levels were specified in the project objectives for these analytes. Although these PQLs do not meet the PQLs specified in the QAPP, the health risk assessment being used to evaluate the project site is using levels of 500 mg/kg for TEPH fuels in soils as action levels for the project objectives. Waters are not being assessed. Therefore, the PQLs reported for the affected samples meet the required objectives by factors of eight or more.

Field duplicate and replicate results were within specified criteria with the exception of field replicate soils results for an unknown hydrocarbon reported in one sample but not in the other. This can be attributed to lack of sample homogeneity. Field duplicate precision results are not expected to significantly affect project objectives for this method.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

TEPH chromatograms were reviewed for every sample by the LDC validators and by Earth Tech chemists in San Jose, and a 2 of the chromatographic patterns is presented in Table 3.4-10. All results reported as detections for specific TEPH fuels represent a reasonable characteristic match to the specified chromatographic fuel patterns, and may include inexact matches such as weathered fuels or additional peaks in the pattern. TEPH results that did not adequately match the fuel patterns of the standards were reported as Unknown Diesel or Motor Oil Range Hydrocarbons. These results do not represent kerosene, diesel, motor oil or other petroleum fuels as the chromatographic patterns indicate individual peaks or series of peaks not indicative of fuels.

Results for TEPH by EPA Method SW8015B are valid and usable for decision-making purposes, with the exception of rejected results for TEPH in five of 126 soil samples. Results for the 24 percent of the TEPH data qualified as estimated were due to LCS recoveries less than 60 percent (57-59 percent recoveries for the soil samples without SGC which easily met the SGC LCL of 30%R and 54 percent recoveries for the water samples). These qualifications do not significantly affect the project objectives as the LCSs underwent SGC and recoveries in that range are acceptable according to the QAPP. The numbers and types of qualifications do not significantly affect the project objectives for this method.

3.6.5 Data Quality Summary for EPA Method SW8081A for Pesticides

Analyses were performed according to the method and requirements specified in the QAPP. None of the pesticide data were qualified due to QC criteria.

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1C. No data used for reporting purposes were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%D$ criterion, with one exception. No qualifications were required as all results were non-detected and the CCVs indicated the possibility of high bias. The quality of the data was not affected.

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6E. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. LCS/LCSDs were performed instead. One of the samples was a PE sample, which is not of the environmental matrix. As the purpose of PE samples is to evaluate laboratory accuracy and the results for the PE sample was acceptable, there is no adverse effect on the quality of the data. For the remaining five water samples specified in the table, there was no batch-specific MS/MSD. MS/MSD analyses were performed for this matrix at a frequency of 1:10 samples, exceeding the minimum of 1:20 specified in the QAPP, and with no qualification of data for the MS/MSD analyses performed. Therefore, the effect on the quality of the data is not significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6F. The recovery of Endrin in one MSD marginally exceeded the upper control limit (UCL). Endrin was not detected in any samples and no data were qualified. There is no effect on the project objectives.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

Laboratory duplicate precision was acceptable.

For SW8081A for pesticides, all compounds met specified project PQLs. All PQLs for SW8081A met project objectives.

Field duplicate and replicate results were within specified criteria. All results for this method were non-detected or within specified criteria. Field duplicate precision does not adversely affect project objectives for this method.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for pesticides by EPA Method SW8081A are valid and usable for decision-making purposes. No data were qualified due to QC criteria. The data meet project objectives.

3.6.6 Data Quality Summary for EPA Method SW8082 for PCBs

Analyses were performed according to the method and requirements specified in the QAPP. Results for the PCBs were rejected in approximately 2.8 percent and estimated in approximately 28.6 percent of the PCB data.

Results for the PCBs were rejected in one sample and estimated in eleven samples due to exceedance of extraction holding time criteria. PCBs are extremely stable and are not likely to dissipate due to storage prior to extraction, so the non-detected results may be considered to indicate that PCBs are not present in any of the qualified samples. The holding time qualifications do not significantly affect the project objectives.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%$ D criterion, with one exception. No qualifications were required as all results were non-detected and the CCVs indicated the possibility of high bias. The quality of the data was not affected.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

MS/MSD analyses were performed according to method requirements for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception presented in Table 3.4-6H. The recovery of Arochlor 1260 in one MSD exceeded the upper control limit (UCL). Arochlor 1260 was not detected in any samples and no data were qualified. There is no effect on the project objectives.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

Laboratory duplicate precision is acceptable.

For SW8082 for PCBs, all compounds met specified project PQLs. All PQLs for SW8082 met project objectives.

Field duplicate and replicate results were within specified criteria. All results for this method were non-detected or within specified criteria. Field duplicate precision does not adversely affect project objectives for this method.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for PCBs by EPA Method SW8082 are valid and usable for decision-making purposes with the exception of the rejected results in one sample. The only qualifications were due to holding time exceedances. PCBs are extremely stable and holding times are not expected to affect levels of PCBs in the samples. Estimated data are usable in decision-making for project objectives. The data meet project objectives.

3.6.7 Data Quality Summary for EPA Method SW8260B for VOCs

Analyses were performed according to the method and requirements specified in the QAPP. Approximately one percent of the VOC data were qualified as rejected and 6.4 percent were qualified as estimated (J/UJ) due to QC parameters.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements within validation criteria, with the exceptions noted in Table 3.4-2F. Continuing calibration was performed at the required frequencies within validation criteria, with the exceptions noted in Table 3.4-2G. All of the continuing calibration 6.6 percent values were within validation criteria, with the exceptions noted in Table 3.4-2H. Initial and continuing calibration was not reported for 2-chloroethylvinyl ether in any of the soils samples. The SW5035 methanol preservation destroys this compound. Therefore, there were no recoveries for any QC analysis of this compound. For reporting purposes, the results for 2-chloroethylvinyl ether in all of the soils samples have been qualified as rejected (R) and unusable wherever they are reported. As 2-chloroethylvinyl ether is not a concern at the project site, there is no effect on the project objectives.

Data qualification for initial calibrations resulted in the estimation (UJ) of non-detected results for acetone in all of the water samples and one soil sample, for vinyl acetate in most of the water samples, and for 2-hexanone in one soil sample for %RSDs above 30 percent. Results for 2-chloroethylvinyl ether were rejected in all of the water samples and 1,2-dibromo-3-chloropropane was rejected in four aqueous water samples and 10 field blanks due to 6.6% less than 0.5 and low sensitivity at the PQLs. Acetone and 2-butanone were estimated in all of the water samples and 2-hexanone was estimated in four aqueous water samples and 10 field blanks due to 6.6% less than 0.5 but greater than 0.01 with adequate sensitivity at the PQLs due to raised PQLs. Data qualification for continuing calibrations resulted in the rejection (R) and estimation (J/UJ) of the same compounds in the same water samples as in the initial calibrations due to low 6.6%. Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for various ketones, bromomethane, dichlorodifluoromethane, 2,2-dichloropropane, and vinyl acetate in some samples. The small number of rejected results for 2-chloroethylvinyl ether and 1,2-dibromo-3-chloropropane do not affect the project objectives as neither compound is a chemical of potential concern.

Approximately 4.2 percent of the SW8260B results were qualified as estimated and approximately one percent as rejected due to exceeded calibration criteria, which is within normal parameters for this method. Estimated data are usable in decision-making for project objectives.

Method blanks were analyzed for each matrix as applicable. Approximately 0.8 percent of the VOC data were blank-qualified as estimated and non-detected at the reported concentrations. Results for acetone in 72 soil samples and one water sample, naphthalene in four soil samples, and hexachlorobutadiene in one soil sample were blank-qualified due to laboratory blank results. Very low concentration trace results (results less than the PQL) for methylene chloride in two water samples, and for acetone in four soil

samples and a water sample were blank-qualified as common laboratory contaminants, as presented in Table 3.4-3J. No results for other VOCs were blank-qualified.

Acetone and methylene chloride are demonstrated common laboratory contaminants. Due to the prevalence of acetone in method and equipment blanks, all detected results for acetone, which were at low concentrations, were blank-qualified. Blank-qualification due to common laboratory contamination is discussed in detail in Section 3.4.1.4.7. The reported concentrations of the blank-qualified compounds for SW8260B in soils were 1,700 to 360,000 times lower than the action levels specified in the DQOs. The reported concentrations of the blank-qualified compounds for SW8260B in waters were 12 to 360 times lower than the action levels specified in the DQOs. Therefore, blank contamination does not significantly affect the project objectives for this analytical method.

In addition, MEK is generally considered to be a common laboratory contaminant according to EPA Region IX data validation guidelines. Results for MEK were not blank-qualified for common laboratory contamination by the validators for this project. However, QES/STL has determined that the glue used to bind the septum to the teflon caps to the Encore™ soils preservation vials used for SW5035 preparation may produce low levels of MEK upon heating during sample purge. This type of Encore™ preservation vial cap was used for the samples in this project. Method blanks were not generally placed in the Encore™ preservation vials, and equipment blanks and trip blanks did not undergo SW5035 preparation, so MEK detections would not be expected in these blanks, even if laboratory contamination were affecting project samples. Therefore, the unqualified low level results reported for MEK should be considered as potential laboratory artifacts. These MEK results were significantly lower (5 orders of magnitude) than the action level specified in the DQOs.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits with the following exceptions. Non-detected results for all target compounds in three soil samples for VOCs were qualified as estimated (UJ) for low surrogate recoveries. The detected result for 2-butanone in one soil sample was qualified as estimated (J+) due to a high surrogate recovery. 91 soil samples were analyzed for VOCs. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

All internal standard peak areas and retention times were within QC limits, with the exceptions presented in Table 3.4-5A. Results for one internal standard outside of control limits resulted in the estimation (J-/UJ) of approximately one-third of the target analytes in two of 91 soil samples, and results for two internal standards outside of control limits resulted in the estimation (J-/UJ) of approximately two-thirds of the target analytes in one soil sample. No water data were qualified and no results were rejected. Estimated data are usable in decision-making for project objectives. The effect of the estimations for the small number of affected samples on the project objectives is not significant.

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6I. MS/MSD analyses were not analyzed for VOCs in the batches associated with the samples specified. The samplers did not provide additional MS/MSDs due to low volumes of water in the wells. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. For the remaining seven soil samples and nine water samples, there was no batch-specific MS/MSD. MS/MSD analyses were performed at a frequency of 1:11 water samples and 1:15 soil samples, exceeding the minimum of 1:20 samples specified in the QAPP with very few outliers. Therefore, the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6J. Results for 2-chloroethylvinyl ether were rejected in some MS/MSD samples. This compound is not a chemical of potential concern for this

project, and was rejected in all samples for the soils matrix due to decomposition from methanol preservation according to preparation method SW5035. The results for one-to-four compounds were estimated in four QC soil samples (approximately 0.1 percent of the VOC data) for MS recoveries above the UCL or below the LCL. Note that high recoveries and high RPDs for MEK in several of the MS/MSD analyses may be due to MEK as common laboratory contaminant (refer to Section 3.4.1.4.7). No significant trends were noted. The effect of the small number of qualifications on the project objectives is not significant.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7B. Vinyl acetate was qualified as estimated (UJ) in 7 water samples, six trip blanks, and one equipment blank; and 2-butanone was qualified as estimated (UJ) in one water sample and two trip blanks (approximately 0.2 percent of the VOC data). Vinyl acetate is not a chemical of potential concern at the project site. The small number of qualifications does not affect the project objectives.

MS/MSD RPDs exceeding the control limits were reported for one-to-three compounds by SW8260B in two QC samples. Laboratory duplicate precision is not expected to affect project objectives.

Level III review of the summary forms and Level IV review of the raw data and summary forms for GC/MS analyses by EPA Method SW8260B did not show any problems associated with correct analyte identification.

All PQLs for VOCs met the requirements specified in the QAPP, with the exceptions specified in Table 3.4-11B. For all water samples, the 1,1,2-trichloro-1,2,2-trifluoroethane PQL was reported at 2.0 µg/L, whereas the PQL is specified as 1.0 µg/L in the QAPP. The MDL of 1 µg/L is at the PQL. For all water samples, the vinyl acetate PQL was reported at 10 µg/L, whereas the PQL is specified as 5 µg/L in the QAPP. The MDL of 1 µg/L is less than one half the PQL, so the laboratory could have reported results using the specified PQL. The low concentration calibration standard for both compounds was analyzed at 1 µg/L, demonstrating acceptable sensitivity and linearity at 1 µg/L. Vinyl acetate is not a chemical of potential concern at the project site. As results are reported down to the MDL, and the action levels specified in the Final Work Plan for this project (see Table 2.4-11) exceed the reported PQLs by 59,000 times for 1,1,2-trichloro-1,2,2-trifluoroethane and 80 times for vinyl acetate, there is no effect on the project objectives.

For all soil samples, the MTBE and 1,1,2-trichloro-1,2,2-trifluoroethane PQLs were reported at 0.010 mg/kg, whereas the PQLs are specified as 0.005 mg/kg in the QAPP. The MDLs of 0.006 mg/kg marginally exceed the PQLs. The low concentration calibration standard for both compounds was analyzed at 0.010 mg/kg. For MTBE, there is no action level specified for soils. As results are reported down to the MDL and the action level (see Table 2.4-11) for 1,1,2-trichloro-1,2,2-trifluoroethane for this project exceeds the reported PQL by five orders of magnitude, there is no significant effect on the project objectives.

Field duplicate and replicate results were within specified criteria, with the exception presented in Table 3.4-13F. Chloroform was reported at a low concentration in one aqueous sample, but not in the field duplicate sample. All other field duplicate and replicate results for this method were non-detected or within specified criteria. Detected results for VOCs were all at low concentrations, and with the exception of the common laboratory contaminant acetone, most detected compounds were not confirmed in the duplicate or replicate sample. Field duplicate precision does not adversely affect project objectives for this method.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for VOCs by EPA Method SW8260B are valid and usable for decision-making purposes, with the exception of the small number of rejected results for 2-chloroethylvinyl ether and 1,2-dibromo-3-chloropropane, which are not chemicals of potential concern for this project. Small numbers of results were qualified as estimated for each QC parameter. Minor non-conformances for PQLs do not affect the project objectives. The small numbers and types of qualifications for the VOC data do not significantly affect the project objectives for this method.

3.6.8 Data Quality Summary for EPA Method SW8270C for SVOCs

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 2.6 percent of the SVOC data were qualified as rejected and 10.9 percent were qualified as estimated (J/UJ) due to QC parameters. The SW8270C analyses were the reanalyses of re-collected samples unsuccessfully analyzed for PAHs by SW8310 during the remedial investigation sampling event, so the non-PAH compounds were not included in the DQOs for this method.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements within validation criteria, with the exceptions noted in Table 3.4-2I. Continuing calibration was performed at the required frequencies, with the exceptions noted in Table 3.4-2J. All of the continuing calibration 6.6 percent values were within validation criteria, with the exceptions noted in Table 3.4-2K. Results for benzidine were rejected in all seven soil samples for high %RSDs and for 6.6% less than 0.05 in the continuing calibrations. Non-detected results for three additional compounds in all seven soil samples were qualified as estimated (UJ) for initial and continuing calibrations, and the detected results for two additional compounds in two soil samples were qualified as estimated (J+) for continuing calibrations. None of the qualified SVOC data were for PAHs, with the exception of the detected results for indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene in two soil samples qualified for potential high bias. Therefore, the rejected results for benzidine and the other non-PAH estimated data do not affect the project objectives. The four detected PAH results may be biased slightly high, and are usable in decision-making for project objectives.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method. A low level result for bis(2-ethylhexyl) phthalate was blank-qualified as a common laboratory contaminant in one sample, as presented in Table 3.4-3K. No results for other SVOCs were blank-qualified.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

All internal standard peak areas and retention times were within QC limits, with the exceptions presented in Table 3.4-5B. Results for one internal standard outside of control limits in two of seven soil samples resulted in the estimation (J-/UJ) of seven of 72 target SVOCs (six of 16 PAHs), and results for two internal standards outside of control limits in one soil sample resulted in the estimation (J-/UJ) of 14 target SVOCs (nine PAHs). No results were rejected. Corrective action reanalyses were performed as required with no improvement of results. These were samples that were recollected from the remedial investigation due to significant interference in the original SW8310 analyses for PAHs. Although the internal standard areas were low for the specified samples, the surrogate recoveries were acceptable, and the interference indicated does not preclude use of the results. Estimated data are usable in decision-making for project objectives. The effect on the project objectives is not significant.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6K. The results for benzoic acid in one soil sample was rejected (R) due to MS/MSD recoveries less than 10 percent, and the results for two compounds in the same soil sample were estimated (UJ) for MS/MSD recoveries below the LCL. None of the qualified compounds were chemicals of potential concern for this project and none were PAHs. The effect of the small number of qualifications of these analytes on the project objectives is not significant.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7C. The results for benzoic acid in eight soil samples were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. No results were rejected. Qualification of this compound does not affect project objectives.

Laboratory duplicate precision was acceptable.

Level III review of the summary forms and Level IV review of the raw data and summary forms for GC/MS analyses by EPA Method SW8270C did not show any problems associated with correct analyte identification.

For SW8270C for SVOCs, all compounds met specified project PQLs. All PQLs for SW8270C met project objectives.

Field replicate precision was not evaluated for this method.

All of the PE sample results were within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

Results for SVOCs by EPA Method SW8270C are valid and usable for decision-making purposes, with the exception of rejected results for 2.6 percent of the SW8270C results. The small number of rejected results for benzidine and benzoic acid does not affect the project objectives as these are not chemicals of potential concern for this project. The small numbers and types of qualifications for the SVOC data were within normal parameters for the method and matrices involved, and do not significantly affect the project objectives for this method.

3.6.9 Data Quality Summary for EPA Method SW8270CWM for Chloropicrin

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 27.3 percent of the chloropicrin data were qualified as estimated (J/UJ) due to QC parameters. No results were rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for the CCVs met the $\pm 15\%D$ criterion.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

All internal standard peak areas and retention times were within QC limits.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6L. The results for chloropicrin in one water sample was estimated (UJ) for recoveries below the LCL in the one MS/MSD for waters. Recoveries were acceptable for the soil samples. Detection limits for waters by this method may be biased low.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7D. The results for chloropicrin in two water samples and one equipment blank were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. No soil results were qualified and no results were rejected. Detection limits for waters by this method may be biased low.

The MS/MSD RPD of 40 RPD marginally exceeded the 40 RPD control limit for chloropicrin in the one aqueous MS/MSD. The aqueous LCS/LCSD RPD was acceptable. Laboratory duplicate precision was acceptable for soils.

For SW8270CWM for chloropicrin, all compounds met specified project PQLs. All PQLs for SW8270CWM met project objectives.

The PE sample result was within the project accuracy control limits specified in Table 3.2-3 of the QAPP.

The results for chloropicrin in the field replicate soil sample pair were non-detected. No aqueous field duplicate sample could be collected for the two wells analyzed for this method due to lack of adequate water in the well. These wells had to be sampled on multiple dates in an effort just to collect enough water for all of the planned analyses. The project objectives are not significantly affected by the lack of a duplicate sample for the two wells analyzed by this method as the method was added to the sampling plan primarily for soils.

Results for chloropicrin by Modified Method SW8270CWM are valid and usable for decision-making purposes. All soils data were within QC limits and met project objectives. Although not expected to be found on site, chloropicrin was added to the project as a potential indicator for chemical warfare agents as a precaution. The method is a specialized modification of SW8270C, and historical data is not available for spike recoveries or RPDs. The effect of the QC outliers for this method on the project objectives is that detection limits for the non-detected results in the two water samples may be biased low; however, the aqueous PE sample recoveries indicate adequate sensitivity to detect chloropicrin at higher concentrations. As the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, and the method and data are still usable for waters, the project objectives are not significantly affected.

3.6.10 Data Quality Summary for EPA Method SW8290 for Dioxins/Furans

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 18.1 percent of the dioxins/furan data were qualified as estimated (J/UJ) due to QC parameters. No results were rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed with a five point initial calibration according to method requirements. Routine (continuing) calibration was performed at the required frequencies and met validation criteria, with the exceptions presented in Table 3.4-2L. Data qualification for continuing calibrations resulted in the

estimation (UJ) of non-detected results for six compounds in four soil samples and two field blanks and seven compounds in one sediment sample (approximately 18 percent of the SW8290 data) due to routine calibration %Ds between the initial calibration RF and the routine calibration RF internal standard greater than the specified control limit of 30%D. The non-compliant continuing calibration standard was not re-injected as required. The laboratory has been notified that re-injection of the affected standards and samples is required for this project. All of the compounds have low TEFs and are therefore of relatively low importance compared to the unqualified compounds for these samples. The effect of these qualifications on project objectives is not expected to be significant.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method, with the exceptions presented in Table 3.4-3L. Sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blank. No data were qualified, and there is no effect on the quality of the data.

All internal standard peak areas and retention times were within QC limits.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exception of a recovery of OCDF in one MS/MSD that exceeded the upper control limit (UCL). OCDF was not detected in any samples and no data were qualified. There is no effect on the project objectives.

LCS/LCSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs for all LCS/LCSD analyses performed were within QC limits.

Laboratory duplicate precision was acceptable.

Level III review of the summary forms and Level IV review of the raw data and summary forms for HRGC/MS analyses by SW8290 did not show any problems associated with correct analyte identification.

For SW8290 for dioxins/furans, the MDLs for all compounds met specified project PQLs. All PQLs for SW8290 met project objectives.

All results for dioxins/furans in field replicate samples were non-detected. Field replicate precision does not adversely affect project objectives for this method.

PE samples were not available for this method.

Results for dioxins/furans by EPA Method SW8290 are valid and usable for decision-making purposes. Small numbers of results were qualified as estimated for low internal standard recoveries. All of the estimated compounds have low TEFs and are therefore of relatively low importance compared to the unqualified compounds for these samples. Estimated data are usable in decision-making for project objectives. The effect of these qualifications on project objectives is not expected to be significant.

3.6.11 Data Quality Summary for EPA Method SW8310 for PAHs

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 40 percent of the PAH data were qualified as estimated (J/UJ) due to QC parameters. No results were rejected.

All technical holding time requirements were met, with the exceptions presented in Table 3.4-1D. No data used for reporting purposes were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements and met validation criteria. Calibration verification was performed at required frequencies. The continuing calibrations were within QC limits, with the exceptions presented in Table 3.4-2M. Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for six compounds in one water sample and two equipment blanks, and estimation (UJ, J-, and J+) of three compounds in an aqueous PE sample (approximately 4.7 percent of the PAH data). The effect of the small number of qualifications on the quality of the data is not significant.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits with one exception. Non-detected results for all target compounds in one of 21 water field samples (MW-7) for PAHs were qualified as estimated for low surrogate recovery (approximately 3.6 percent of the PAH data). The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6N. MS/MSD samples were extracted and analyzed for PAHs by EPA Method SW8310 in two extraction batches. However, the laboratory failure to spike one of the MS/MSDs and inadequate sample volume to re-extract the MS/MSD resulted in the loss of one of the two designated MS/MSDs. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. MS/MSD analyses were performed at a frequency of 1:19 water samples (plus 2 field duplicates), with no qualification of data. The QAPP specifies a minimum of 1:20 samples per matrix. Percent recoveries and RPDs were within QC limits for the MS/MSD analyzed. Although non-compliant, the lack of MS/MSDs for each analytical batch is not expected to significantly affect the quality of the data.

LCS/LCSDs were performed for each matrix as applicable, with the exception presented in Table 3.4-7E. Percent recoveries and RPDs were within QC limits for all LCS analyses performed, with the exception of one high RPD associated with a reanalysis that was not used for reporting purposes. For the exception presented in Table 3.4-7E, the LCS was not spiked for the extraction batch including samples MW-1, MW-1A, MW-2, MW-6, MW-7, MW-8, MW-9, MW-13, MW-14, and MW-15 (and MW-9MS/MSD). The surrogate recoveries for the LCS, MS/MSD, method blank, and all of the affected samples except sample MW-7 were within control limits, indicating acceptable overall batch extraction efficiency and also indicating that the 0 percent spike recoveries were due to spiking failure, not to extraction or analytical deficiencies. In addition, results for other LCSs analyzed in the same analytical batch were requested by the project chemist and evaluated to demonstrate usable analytical accuracy and precision. These LCSs were for batches of samples extracted the day before and the day after the samples. All of the results were within project control limits. These data indicate acceptable analytical batch accuracy and precision for all target compounds. Acceptable MS/MSD recoveries for QC sample MW-4A, which was analyzed with a different group of samples, indicate that matrix interference with respect to individual analytes was not a factor for the matrix as all results were within specified QC criteria. Matrix interference with respect to individual samples is measured by surrogate recoveries.

The samples were initially analyzed on 26 April 2000. When the laboratory discovered the problem, the project chemist was contacted, and the laboratory was directed to re-spike, re-extract, and reanalyze the samples. The re-extractions were performed on 1 May 2000 and reanalyses were performed with all QC within QC limits; however, the re-extractions were grossly (>2X) outside of holding times. As the batch extraction efficiency and analytical batch accuracy and precision were demonstrated to be acceptable, the continuing calibrations for the original analysis were acceptable, and the results for the reanalyses of these samples were the same as in the original analyses, the original results have been used for reporting purposes and are considered usable for decision-making purposes. The results have been qualified as

estimated (J/UJ) due to the lack of the LCS analysis. All other LCS/LCSD results were within QC criteria. The effect on the quality of the data is not expected to be significant.

Laboratory duplicate precision was acceptable.

Level III review of the summary forms and Level IV review of the raw data and summary forms for HPLC analysis by EPA Method SW8310 did not show any problems associated with correct analyte identification.

For SW8310 for PAHs, all compounds met specified project PQLs. All PQLs for SW8310 met project objectives.

All results for PAHs in field duplicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

For EPA Method SW8310, an aqueous double blind PE sample was provided to the laboratory on March 30, 2000 with samples for the data gaps investigation, and an aqueous double blind PE sample and a soil PE sample were provided to the laboratory on May 30, 2000 with samples for the RAW investigation. All results for the data gaps aqueous PE sample and the soil PE sample were within the project accuracy control limits specified in Table 3.2-3 of the QAPP. For the RAW investigation aqueous PE sample, a false negative was reported for acenaphthene. All other analytes were acceptable. Acenaphthene was spiked slightly above the PQL. As the aqueous action level specified in the DQOs of the Work Plan for acenaphthene is 37 times the PQL, the possibility of a false negative near the action limit is not implied for this compound and is not expected to have a significant impact on the project objectives. The 94 percent compliance for one PE sample and 100 percent compliance for two others for this laboratory (versus goal of 95 percent), demonstrate acceptable laboratory accuracy for this method.

Results for PAHs by EPA Method SW8310 are valid and usable for decision-making purposes. Approximately 4.7 percent of the PAH data were estimated for calibration criteria and 3.6 percent were estimated for a low surrogate recovery. Approximately 36 percent of the PAH data, including the same data qualified for the low surrogate recovery and some of the data qualified for calibration criteria, were estimated when the LCS/LCSD for samples MW-1, MW-1A, MW-2, MW-6, MW-7, MW-8, MW-9, MW-13, MW-14, and MW-15 (and MW-9MS/MSD) were not spiked. Note that for the affected samples, acceptable batch extraction efficiency and analytical batch accuracy and precision were demonstrated to be acceptable, and the continuing calibrations were acceptable for the original analyses of the affected samples. In addition, the results for the reanalyses of these samples were the same as those from the original analyses. Therefore, the original results have been used for reporting purposes and are considered usable for decision-making purposes. The results for sample MW-7 are expected to be biased low due to low surrogate recoveries in both analyses. The effect of these qualifications on project objectives is not expected to significantly affect project objectives.

3.6.12 Data Quality Summary for Modified Method SW8315M for Hydrazines

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 10.7 percent of the hydrazines data were qualified as estimated (UJ) due to QC parameters. No results were rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than or equal to 0.995 criteria, and all %Ds for

the CCVs met the $\pm 15\%D$ criterion, with the exceptions presented in Table 3.4-2M. The continuing calibrations exhibited a high bias and all results were non-detected, therefore no data were qualified.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

MS/MSD analyses were performed for waters as applicable. No soils were analyzed. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6O. In the five MS/MSD sample analyses performed, low recoveries were reported for hydrazine in four MSs and one MSD, for MMH in one MS, and for UDMH in three MSs and one MSD. The 26.5 RPD for one of the MS/MSDs marginally exceeded the 25 RPD control limit. LCS recoveries were acceptable, demonstrating extraction and analytical efficiency and accuracy. Due to the reactivity of these analytes, the low MS/MSD recoveries are interpreted to indicate that these species of compounds cannot survive in the matrix. The effect on the project objectives is to confirm that these compounds are unlikely to be present in the environment at the project site.

MS/MSD RPDs exceeding the control limits were reported for hydrazine in one sample. Laboratory duplicate precision did not significantly affect project objectives.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

For SW8315M for hydrazines, all compounds met specified project PQLs. All PQLs for SW8315M met project objectives.

All results for hydrazines in field duplicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

Earth Tech provides double blind aqueous PE samples to Truesdail for hydrazines by modified Method SW8015M at a minimum of once annually. The results for the speciated hydrazines PE samples analyzed in April 1999 were within specified criteria for hydrazine, but low recoveries were reported for MMH and UDMH. Although such results are not unexpected for these highly reactive compounds due to possible interference from low levels of organics or metals in the sample provided by the vendor, follow-up PE samples were sent to Truesdail to determine if accurate recoveries could be attained in more controlled circumstances. Therefore, a single blind PE sample in a sealed ampule was provided, and the resultant analyses were performed in duplicate with all results within specified criteria.

Results for hydrazines by Method SW8315M are valid and usable for decision-making purposes. Approximately 10.7 percent of the hydrazine data were estimated for low MS/MSD recoveries. LCS/LCSD recoveries were acceptable. Due to the reactivity of these analytes, the low MS/MSD recoveries are interpreted to indicate that these species of compounds cannot survive in the matrix. Hydrazines are extremely reactive reducing agents, and will react with many hydrocarbons, many states of metals commonly found in the environment, especially iron, or other easily reduced chemical compounds. Due to the differing concentrations of such common chemical species in the environmental matrices for each sampling location, differing amounts of the hydrazines decompose in the brief amount of time required to spike the sample and commence the derivitization extraction process. The effect of the low MS/MSD recoveries on the project objectives is to confirm that these compounds are unlikely to be present in the environment at the project site.

3.6.13 Data Quality Summary for EPA Method SW8330 for Explosives

Analyses were performed according to the method and requirements specified in the QAPP. Approximately 3.4 percent of the explosives data were qualified as estimated (UJ) due to QC parameters. Two results were rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed for the primary (quantitation) column and confirmation column according to method requirements and met validation criteria. Calibration verification was performed at the required frequencies and were within the 85-115 percent QC limits.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method, with the exceptions presented in Table 3.4-3M. Sample concentrations were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blank. No data were qualified, and there is no effect on the quality of the data.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exceptions presented in Table 3.4-4D. Non-detected results for all target compounds in one of 87 soil sample were qualified as estimated for low surrogate recovery. No water data were qualified. The small number of qualifications for surrogate recoveries does not significantly affect the project objectives.

MS/MSD analyses were performed according to method requirements, with the exceptions presented in Table 3.4-6P. MS/MSD analyses were not extracted and analyzed for explosives in the batches associated with the samples specified. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. LCS/LCSDs were performed instead. For the equipment blanks, MS/MSD analyses are not required as they do not represent the environmental matrix. For the remaining samples, MS/MSD analyses were performed at a frequency of 1:6 water samples, exceeding the minimum of 1:20 samples specified in the QAPP with only one outlier, therefore the effect on the quality of the data is not expected to be significant.

MS/MSD analyses were otherwise performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-6Q. The non-detected results for 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene in one soil QC sample were rejected for low MS/MSD recoveries. The results for three compounds in another soil QC sample were estimated (J/UJ) for low MS/MSD recoveries, and a third compound was estimated for a high MSD recovery and high RPD in the MS/MSD. The recoveries indicate matrix interference from the presence of significant TNT and TNT breakdown products in the samples, and there is no adverse effect on the project objectives. The non-detected results for two compounds in another soil QC sample were estimated (UJ) due to high bias in the MS and an RPD that marginally exceeded the control limit. The non-detected results for two compounds in a water QC samples were estimated (UJ) due to RPDs that ranged from 21 to 23, marginally exceeding the 20 RPD control limit. The effect of these minor qualifications on the project objectives is not expected to be significant.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits, with the exceptions presented in Table 3.4-7G. Approximately 2.7 percent of the explosives data were qualified as estimated, and no data were rejected. Results for one-to-four of the 14 compounds were estimated in 13 of 25 water samples and in two of 16 equipment blanks due to LCS/LCSD RPDs greater than 20 percent. All of the RPDs were within 10 percent of the 20 RPD control limit and all of the %Rs were within control limits with the exception of 4-nitrotoluene in one LCS/LCSD, for which a 39 RPD was reported

due to the high recovery in the LCSD. No soils data were qualified due to LCSs for this method. There were no low recoveries and all of the associated results were non-detected. The small number and types of qualifications do not significantly affect project objectives.

MS/MSD and LCS/LCSD RPD exceedances were intermittent and generally marginally exceeded control limits. No distinct trends were apparent. Laboratory duplicate precision is not expected to affect project objectives.

Level III review of the summary forms and Level IV review of the raw data and summary forms for HPLC analysis by EPA Method SW8330 did not show any problems associated with correct analyte identification.

For SW8330 for explosives and SW8330M for PETN/nitroglycerin, all compounds met specified project PQLs. All PQLs for SW8310 met project objectives.

Precision for field duplicate and replicate detected results are presented in Table 3.4-13G. Results exceeding duplicate precision criteria are highlighted in bold in the table.

Results for TNT in three of the seven replicate soil samples for which explosives were detected exceeded specified field precision criteria. These results indicate an improvement in field replicate precision since the remedial investigation, most likely due to the implementation of the homogenization protocol specified in the addendum to the QAPP, by which the complete sample sleeve is homogenized by the laboratory prior to removal of the aliquot of soil for preparation and analysis. However, the data still indicate lack of sample homogeneity that is typical of TNT in soils. TNT is known for crystallizing into clumps in the soil. Field replicate and split sample results are in good agreement where TNT and explosives were non-detected. Where TNT is detected at elevated levels, concentrations of TNT may vary within the small distances between collocated samples. No other explosive target compounds exceeded the field precision criteria.

Results for samples with no explosives contamination present were generally confirmed in both field replicate and field duplicate analyses. Although lack of sample homogeneity affects the ability to precisely and accurately define levels of TNT contamination in the soils, the data can be used to effectively determine where detectable concentrations of explosives do and do not exist.

For EPA Method SW8330, PE sample results for all analytes were very good with the exception of tetryl with a 36%R. The true value for tetryl was below the PQL. A low level of TNT was accurately reported. Follow-up PE samples of one double blind aqueous and one single blind soil samples were provided to the laboratory. All results were acceptable for the soil PE sample. For the aqueous PE sample, all results were acceptable with the exception of a marginally low 61%R for 2,6-dinitrotoluene (vs 65%R LCL) for which the true value was one-fifth of the PQL. The results indicate acceptable performance by the laboratory for these analyses, especially at the PQL.

Results for explosives by EPA Method SW8330 are valid and usable for decision-making purposes, with the exception of two results that were rejected in one soil sample. Approximately 3.4 percent of the explosives data were estimated for various QC parameters, mostly for low LCS and surrogate recoveries. Estimated data are usable in decision-making for project objectives. The effect of these qualifications on project objectives is not expected to be significant.

3.6.14 Data Quality Summary for EPA Method SW8330M for PETN and Nitroglycerin

Analyses were performed according to the method and requirements specified in the QAPP. None of the PETN/nitroglycerin data were qualified as estimated or rejected.

All technical holding time requirements were met. No data were qualified due to holding time or preservation requirements.

Initial calibrations were performed according to method requirements. All %RSDs for the RFs met the less than or equal to 20%RSD or correlation coefficient greater than 0.995 criteria, and all %Ds for the CCVs met the less than or equal to 15%D criterion.

No contaminant concentrations were found above the reporting limit in the laboratory preparation and equipment blanks for this method.

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits.

MS/MSD analyses were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

LCS/LCSDs were performed for each matrix as applicable. Percent recoveries and RPDs were within QC limits.

Laboratory precision was acceptable.

For SW8330 for explosives and SW8330M for PETN/nitroglycerin, all compounds met specified project PQLs. All PQLs for SW8310 met project objectives.

All results for PETN and nitroglycerin in field duplicate and replicate samples were non-detected. Field duplicate precision does not adversely affect project objectives for this method.

Results for PETN and nitroglycerin by EPA Method SW8330M are valid and usable for decision-making purposes. None of the PETN/nitroglycerin data were qualified as estimated or rejected.

3.7 COMPLETENESS SUMMARY

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct, normal conditions. The overall assessment of completeness is the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. Completeness is generally defined as the valid data percentage of the total tests requested.

Valid analyses are defined as those where the sample arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed COC form. Furthermore, the sample must be analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria are met to the degree that the result is usable for decision-making purposes.

Completeness for the entire project also involves completeness of field and laboratory documentation, whether all samples and analyses specified in the FSP have been processed, and whether they were processed according to the procedures specified in the Final Work Plan and laboratory standard operating procedures (SOPs). Therefore, completeness is evaluated in terms of four goals which are discussed with regard to project goals in this section: field sampling completeness, contractual completeness, analytical completeness, and technical completeness. Field completeness is calculated for each method using the information presented in Table 3.3-1. The remaining completeness results are presented in Table 3.7-1.

The completeness goals are evaluated qualitatively as well as quantitatively. The quantitative evaluation of completeness is determined according to the foregoing definitions. The qualitative evaluation of completeness evaluates the impacts of each of the completeness goals on the DQOs for the project, including all events contributing to the sampling event and the effects of incomplete data.

A summary of completeness assessment for each analytical method is provided in the following subsections.

3.7.1 Field Sampling Completeness

Field sampling completeness is defined as the ratio of collected samples to the total number of samples planned. The goal for field completeness is 100 percent.

Results for samples planned, sampled, collected, and analyzed are presented in Table 3.3-1. All samples included in the Final Work Plan are presented, and all field samples are marked with a "1" in the column for each method analyzed. Equipment blanks are marked with an "X." Samples placed on hold and not analyzed per the sample plan, are marked with an "H." Samples not successfully collected and analyzed are marked with a bold "M." In some cases, samples marked with an "M" were not required or were analyzed under another sample name, as discussed below.

Field completeness was 100 percent for all methods, with the following exceptions.

For soil sample AR-3R/0.5, analyses for SW8015B for TEPH and SW8082 for PCBs were not collected and analyzed. The field completeness for these methods is 99.4 percent and 97.1 percent, respectively. These analyses were performed at adjacent locations to determine if a correlation between low concentrations of TEPH and PCBs could be established. Adequate data were collected at the adjacent locations to determine that PCBs were not associated with detected results for TEPH. The effect on the project objectives is not significant.

For EPA Method SW8290, one planned sample was missed for soil sample TNT-1P/0.5. The field completeness for this method is 92.8 percent. Samples were analyzed for this method at other locations with similar high concentrations of explosives at the TNT sites, and the effect on the project objectives is not expected to be significant.

For EPA Method SW8330M for nitroglycerin and PETN, two planned samples were missed for seep samples NV-S1 and SV-S1. The field completeness for this method is 97.0 percent. The effect on the project objectives is not expected to be significant as PETN was not found for any sample for this Non-OE RI, and nitroglycerin was only found in trace amounts at the most contaminated TNT sites. PETN and nitroglycerin were not found in any groundwater samples. Additional samples marked with the "M" in Table 3.3-1 include one field duplicate for SW8330M in sample NV-S2. A sample for SW8330M was collected for location NV-S2 (designated as field duplicate sample NV-S2A), so the project field completion calculations are not affected by this sample.

For water sample MW-5, planned analyses SW6010B and SW7470A for metals, SW8081A for pesticides, SW8310 for PAHs, and the general chemistry methods could not be performed as the well did not produce adequate water for analysis. The small amount of water able to be collected was used for analyses considered most relevant to the investigation. As the sample plan allows for well samples not to be collected in the event water flow is inadequate, the field completeness objectives are considered not to be affected.

Additional samples marked with the "M" in Table 3.3-1 include a field duplicate for metals from well MW-4 and two samples for chloropicrin from wells MW-3 and MW-4. A sample for metals was collected for sample MW-4, so this does not affect the project field completion calculation. The samples for chloropicrin were collected at a later date and are identified as samples MW-3R and MW-4R, so the field completion calculation is also 100 percent for this method.

Field completeness for this sampling event is acceptable for all methods. No further sampling is required to meet the project objectives for this stage of the investigation.

3.7.2 Contractual Completeness

Contractual completeness is defined as the ratio of contractually compliant sample analyses to the total number of tests requested of the laboratories. The goal for contractual completeness is 100 percent. In addition, the goal for sample analyses within maximum holding time is 100 percent. All samples identified as critical to project decision-making objectives must meet 100-percent completeness.

Contractual completeness is presented in column four of Table 3.7-1. Contractual non-compliances, noted in the LDC DVR tables with a "P" qualifier, are discussed below.

Contractual completeness for EPA Methods 160.1, 160.2, 300.0M (perchlorate), 415.1, SW9060, SW6010B, SW7470A, SW7471A, SW8081A, SW8315M (hydrazines), and SW8330M (nitroglycerin/PETN) were 100 percent. No samples were identified as critical with less than 100 percent contractual completeness.

Contractual completeness for EPA Method 300.0 was calculated to be 91.4 percent by LDC. The following contractual non-compliances were noted. One result for nitrate-N and six results for nitrite-N were rejected (R) in soil samples, and results for nitrate-N and nitrite-N were estimated in two aqueous field samples and two equipment blanks due to holding time exceedance. The holding time for these analytes is 48 hours, and in some cases it is not possible to get samples into the laboratory and analyzed within the specified time frame. For the estimated results for nitrate-N and nitrite-N, the potential impact of the holding time qualifications would be for nitrite-N to convert to nitrate-N, with marginal effect on the sum of the two analytes. The six soil samples with rejected data were collected from the boring of monitoring well 6 (MW-6). Unqualified results for the impacted locations are available from the samples collected during the boring of temporary well 6 (TW-6) during the remedial investigation, and confirm that nitrate-N was non-detected at 0.5', and that nitrite-N was not found at detectable concentrations at the site. The estimated results are usable for decision-making purposes. The effect on project objectives is minimal, and corrective action was not required.

Contractual completeness for EPA Method SW8015B for TEPH was calculated to be 95.9 percent. The following contractual non-compliances were noted. All technical holding time requirements were met, with the exceptions presented in Table 3.4-1B. Results for TEPH in three soil samples were rejected due to holding time exceedance. Non-detected results for TEPH in two soil samples were rejected (R) and non-detected results for TEPH in four soil samples were qualified as estimated (UJ) for low surrogate recoveries. Reanalyses were performed when surrogate recoveries were not within specified criteria, so these analyses were contractually compliant. MS/MSD analyses were not extracted and analyzed for TEPH by EPA Method SW8015B in the batches associated with four water samples. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. LCS/LCSDs were performed instead. MS/MSD analyses were performed at a frequency of 1:10 water samples with only marginal outliers, exceeding the minimum of 1:20 samples specified in the QAPP. Therefore the effect on the quality of the data is not expected to be significant. The results for TEPH in 30 soil samples, six water samples, and four equipment blanks (approximately 24 percent of the TEPH data) were estimated (J-/UJ) due to low LCS/LCSD recoveries. No results were rejected. The soil samples and LCSs qualified for low

LCS recoveries underwent SGC. The low recoveries for these samples were not actually non-compliant as SGC was performed on the LCSs per the QAPP, and the 30%R LCL for SGC-extracted samples was met. As all of the soil LCSs underwent SGC extraction and the 57-59%Rs were only marginally less than the 60%R LCL for samples without SGC, and the 54%R for the six water samples was not significantly outside the 60 percent LCL, the effect of the LCS qualifications on the project objectives is not expected to be significant. Contractual completeness for TEPH does not significantly affect project objectives.

Contractual completeness for EPA Method SW8082 for PCBs was calculated to be 65.7 percent by LDC. The following contractual non-compliances were noted. Results for one sample were rejected and 11 samples were estimated due to holding time exceedances. PCBs are extremely stable and holding times are not expected to affect levels of PCBs in the samples. Estimated data are usable in decision-making for project objectives. Contractual completeness for PCBs does not affect project objectives.

Contractual completeness for EPA Method SW8260B for VOCs was calculated to be 98.6 percent. The following contractual non-compliances were noted. Initial and continuing calibration was not performed for 2-chloroethylvinyl ether in any of the soils samples. The SW5035 methanol preservation destroys this compound, 2-chloroethylvinyl ether is not a concern at the project site, and there is no effect on the project objectives. Data qualified for calibration criteria were within normal parameters and were within contractual requirements. Reanalyses were performed when surrogate recoveries were not within specified criteria, so these analyses were contractually compliant. MS/MSD analyses were not analyzed for VOCs by EPA Method SW8260B in the batches associated with seven soil samples and nine water samples. The samplers were unable to provide adequate sample for more aqueous MS/MSDs because there was not enough water in the wells. There was inadequate soil sample for an MS/MSD in the specified VOC batch as the required additional Encore samplers were not collected for any sample in the batch. LCS/LCSDs were performed instead. MS/MSD analyses were performed at a frequency of 1:11 water samples and 1:15 soil samples, exceeding the minimum of 1:20 samples specified in the QAPP with very few outliers. Therefore the effect on the quality of the data is not expected to be significant. Vinyl acetate and 2-butanone were qualified as estimated in a small number of samples (approximately 0.2 percent of the VOC data) for low LCS recoveries. These compounds are not listed as controlling compounds, therefore the analyses were contractually compliant. VOC contractual completeness does not affect project objectives.

Contractual completeness for EPA Method SW8270C for SVOCs was calculated to be 98.3 percent. The following contractual non-compliances were noted. The results for benzoic acid in eight soil samples were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. The compounds are not listed as controlling compounds, therefore the analyses were contractually compliant. SVOC contractual completeness does not affect project objectives.

Contractual completeness for EPA Method SW8270CWM for chloropicrin was calculated to be 72.7 percent. The following contractual non-compliance was noted. The results for chloropicrin in two water samples and one equipment blank were estimated (UJ) due to LCS/LCSD recoveries less than the LCL. The effect on the project objectives is that the reported detection limits for waters by this method may be biased low. However, as the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, and the method and data are still usable for waters, the project objectives are not significantly affected.

Contractual completeness for EPA Method SW8290 for dioxins/furans was calculated to be 81.9 percent. The following contractual non-compliances were noted. Data qualification for continuing calibrations resulted in the estimation (UJ) of non-detected results for six compounds in four soil samples and two field blanks and seven compounds in one sediment sample (approximately 18 percent of the SW8290 data) due to routine (continuing) calibrations. The non-compliant continuing calibration standard was not re-injected as required. The laboratory has been notified that re-injection of the affected standards and samples is

required for this project. All of the compounds have low TEFs and are therefore of relatively low importance compared to the unqualified compounds for these samples. The effect of these qualifications and of project completeness on project objectives is not expected to be significant.

Contractual completeness for EPA Method SW8310 for PAHs was calculated to be 74.4 percent. The following contractual non-compliances were noted. Data qualified for calibration criteria were within normal parameters and were within contractual requirements. The LCS and MS/MSD were not spiked for an extraction batch of 10 samples and one MS/MSD. This laboratory failure to spike the MS/MSDs and inadequate sample volume to re-extract the MS/MSD resulted in the loss of one of the two designated MS/MSDs. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. MS/MSD analyses were performed at a frequency of 1:19 water samples (plus 2 field duplicates), with no qualification of data. The QAPP specifies a minimum of 1:20 samples per matrix. Percent recoveries and RPDs were within QC limits for the MS/MSD analyzed. Although non-compliant, the lack of MS/MSDs for each analytical batch is not expected to significantly affect the quality of the data. The surrogate recoveries for the LCS, MS/MSD, method blank, and all of the affected samples except sample MW-7 were within control limits, indicating acceptable overall batch extraction efficiency and also indicating that the 0 percent spike recoveries were due to spiking failure, not to extraction or analytical deficiencies. In addition, results for other LCSs analyzed in the same analytical batch but from different extraction batches the day before and the day after the samples in question were within project control limits. As the batch extraction efficiency and analytical batch accuracy and precision were demonstrated to be acceptable, the continuing calibrations for the original analysis were acceptable, and the results for the reanalyses of these samples were the same as in the original analyses, the original results have been used for reporting purposes and are considered usable for decision-making purposes. The results have been qualified as estimated (J/UJ) due to the lack of the LCS analysis. No other PAH data were qualified for LCS criteria.

Contractual completeness for EPA Method SW8330 for explosives was calculated to be 96.2 percent. The following contractual non-compliances were noted. MS/MSD analyses were not extracted and analyzed for explosives in the batches associated with the samples specified in Table 3.4-6P. The samplers were unable to provide adequate sample for more MS/MSDs because there was not enough water in the wells. LCS/LCSDs were performed instead. MS/MSD analyses are not required for equipment blanks. For the remaining samples, MS/MSD analyses were performed at a frequency of 1:6 water samples, exceeding the minimum of 1:20 samples specified in the QAPP with only one outlier, therefore the effect on the quality of the data is not expected to be significant. Approximately 2.7 percent of the explosives data were qualified as estimated due to LCSs.

Overall, contractual completeness is considered to be acceptable for this phase of the investigation. When assessing contractual completeness for methods that did not meet the 100 percent goal, the nature of the non-compliances, the resultant qualifications (if applicable), and the impact on the ability of the data to meet the requirements for decision-making with respect to the project objectives must be considered. In general, contractual non-compliances were limited to problems such as holding time exceedances, CCV results, low surrogate results, lack of MS/MSDs for every preparation and analytical batch, and some low LCS recoveries. Many of these contractual non-compliances calculated into the contractual completeness percentages are not non-compliant with the contractual requirements of the QAPP. Examples include CCVs outside of control limits for multiple analyte methods and low surrogate recoveries when re-extraction and/or reanalyses were performed as required.

In other cases, the non-compliance does not meet the specific requirements of the QAPP, but data quality and usability for decision-making purposes are not affected. Examples include lack of MS/MSDs for every batch when MS/MSDs were performed at a frequency well in excess of 1:20 samples per matrix. Lack of MS/MSDs was an issue especially for the water samples. Wells were not prolific with water, and the emphasis was on collecting enough water to analyze for each method, so the triple volumes necessary to

perform MS/MSD were not possible to collect. Often small numbers of samples were collected daily, so performing an MS/MSD on every daily batch was not possible. MS/MSD analysis is a matrix-specific QC parameter. Batch extraction/analysis efficiency is measured by LCSs with LCSDs for precision (and by surrogate recoveries). As long as MS/MSDs were performed often enough to adequately characterize the potential for matrix interference, and LCS and surrogate recoveries were acceptable, the quality of the data is not diminished by lack of MS/MSDs in every batch.

In addition, the large percentages of data for TEPH by SW8015B and PAHs by SW8310 that were calculated as non-compliant due to LCS recoveries below the LCL but greater than the 30 percent LCL for SGC-extracted LCSs are technically non-compliant according to the QAPP tables, but compliant according to the text in the QAPP. These LCS recoveries are consistent with the recoveries of surrogates and MS/MSDs for these analytes in SGC-extracted samples, so the quality of the data is no more diminished by the low LCS recoveries than by the surrogate and MS/MSD recoveries for which data were not qualified. In many cases, the recoveries were marginally out of specified control limits. The effects of the individual non-compliances have been assessed in detail in the sections for QC assessment of each analytical QC parameter, and unless otherwise specified, the effects are considered not to be significant.

Thus, although the contractual completeness was not 100 percent for some methods, the data are usable as assessed in validation for decision-making purposes. No samples with severely impacted (rejected) data were found to be critical to the project objectives. The effects of the contractual completeness issues did not significantly affect the ability of the data set to meet the requirements for decision-making with respect to the project objectives.

3.7.3 Analytical Completeness

Analytical completeness is defined as the ratio of unqualified sample results to all sample results. Qualified results include both rejected and estimated results. The goal for analytical completeness is 90 percent. Analytical completeness is presented in column seven of Table 3.7-1 and is discussed below.

Analytical completeness of 90 percent or greater was achieved for EPA Methods 160.1, 160.2, 300.0M (perchlorate), 415.1, SW9060, SW6010B, SW7470A, SW7471A, SW8081A, SW8260B, SW8330, and SW8330M (nitroglycerin/PETN).

Analytical completeness for EPA Method 300.0 for anions was calculated to be 78.8 percent. One result for nitrate-N and six results for nitrite-N were rejected (R) in soil samples, and results for nitrate-N and nitrite-N were estimated in two aqueous field samples and two equipment blanks due to holding time exceedance. One result for nitrite-N was qualified as estimated for a marginally low CCV recovery. One detected result for nitrate-N was blank-qualified(UJ) due to equipment blank results. The numbers and types of qualifications do not significantly affect the project objectives for this method.

Analytical completeness for EPA Method SW8015B for TEPH was calculated to be 70.1 percent. Results were qualified as estimated mostly due to LCS recoveries which were not actually non-compliant as SGC was performed on the LCSs per the QAPP, and which were only marginally less than the 60%R LCL (and easily met the SGC LCL of 30%R). Additional qualifications were made for holding times, low surrogate, and MS/MSD results. The numbers and types of qualifications do not significantly affect the project objectives for this method.

Analytical completeness for EPA Method SW8082 for PCBs was calculated to be 65.7 percent. Results for one sample were rejected and 11 samples were estimated due to holding time exceedances. PCBs are extremely stable and holding times are not expected to affect levels of PCBs in the samples. Estimated

data are usable in decision-making for project objectives. Analytical completeness for PCBs does not affect project objectives.

Analytical completeness for EPA Method SW8270C for SVOCs was calculated to be 87.7 percent. Seven soils sample results were qualified as rejected for benzidine due to calibration criteria and a low MS/MSD recovery for benzoic acid. Data were estimated for calibration criteria, internal standards, MS/MSDs, and LCSs outside of control limits. The numbers and types of qualifications do not significantly affect the project objectives for this method.

Analytical completeness for EPA Method SW8270CWM for chloropicrin was calculated to be 72.7 percent. All three aqueous results for chloropicrin were qualified as estimated for MS/MSD and LCS results below control limits. No soil data were qualified. The effect of the QC outliers for this method on the project objectives is that the reported detection limits for waters by this method may be biased low. However, as the method was added primarily for soil samples as an indicator for release of buried chemical warfare agents, and the method and data are still usable for waters, the project objectives are not significantly affected.

Analytical completeness for EPA Method SW8290 for dioxins/furans was calculated to be 81.9 percent. The qualified data were estimated due to routine (continuing) calibration %Ds not within the specified control limit. All of the qualified compounds have low toxicity equivalence factors (TEFs) and are therefore of relatively low importance compared to the unqualified compounds for these samples. The effect of these qualifications on project objectives is not expected to be significant.

Analytical completeness for EPA Method SW8310 for PAHs was calculated to be 60 percent. The LCS, MS, and MSD for samples MW-1, MW-1A, MW-2, MW-6, MW-7, MW-8, MW-9, MW-13, MW-14, and MW-15 (and MW-9MS/MSD) were not spiked with an appropriate spiking solution. Reanalyses were performed; however, the reanalyses were grossly (>2X) outside of holding times. The results from the original analysis were used, but were qualified as estimated due to the lack of the LCS analysis. Small numbers of additional results were qualified for continuing calibrations and a low surrogate recovery. The numbers and types of qualifications do not significantly affect the project objectives for this method.

Analytical completeness for SW8315M (hydrazines) was calculated to be 89.3 percent. The results for hydrazine and UDMH in the majority of the water samples were estimated for low MS/MSD recoveries. LCS recoveries were acceptable. Due to the reactivity of these analytes, the low recoveries are interpreted to indicate that these species of compounds cannot survive in the matrix. The effect on the project objectives is to confirm that these compounds are unlikely to be present in the environment at the project site.

Overall, analytical completeness is considered to be acceptable for this phase of the investigation. When assessing analytical completeness for methods that did not meet the 90 percent goal, the nature of the qualifications and the impact on the ability of the data set to meet the requirements for decision-making with respect to the project objectives must be considered. In general, data qualifications were not severe, and the resultant data are usable for decision-making purposes unless rejected. No samples with severely impacted (rejected) data were found to be critical to the project objectives. The effects of the analytical completeness issues did not significantly affect the project objectives.

3.7.4 Technical Completeness

Technical completeness is defined as the ratio of usable sample results to all sample results. The goal for technical completeness is 95 percent. Usable results are results that are not rejected. Results qualified as estimated are considered usable unless the qualification compromises the ability of the result to be used for decision-making purposes.

Technical completeness is presented in column seven of Table 3.7-1. Technical completeness of 95 percent or greater was achieved for all methods except EPA Method 300.0 for anions. All rejected results are summarized in Table 3.7-2.

Analytical completeness for EPA Method 300.0 for anions was calculated to be 93.3 percent. One result for nitrate-N and six results for nitrite-N were rejected (R) in soil samples due to holding time exceedance. The rejection of this data is not expected to significantly affect project objectives, and further action is not required.

Technical completeness for this phase of the project is acceptable.

3.8 CONCLUSIONS AND RECOMMENDATIONS

Approximately 1.1 percent of the definitive-level data were qualified as rejected and 9.7 percent of the definitive-level data were qualified as estimated for exceeding data quality criteria which include accuracy, precision, completeness, representativeness, comparability, and sensitivity. None of the rejected data points were critical to the project objectives. The remaining definitive-level data met the data quality criteria.

Data qualified as "R" are rejected and considered unusable. Data qualified with the "J" qualifier are considered estimated and usable as assessed in validation for decision-making purposes. "J+" indicates the possibility that the result may be biased high, and that the actual chemical level may be lower than the reported result. "J-" indicates the possibility that the result may be biased low, and that the actual chemical level may be higher than the reported result or detection limit reported for a non-detected result. The "U" qualifier indicates that the result is non-detected at or above the detection limit specified, and is applied to all non-detected results.

The results of this data assessment indicate the definitive-level data collected for this project meet project objectives except where specified. When project objectives were determined not to have been met for specific results, the data were assessed and determined not to require resampling as the analytes were not deemed critical, adequate data were collected, or resampling would not be expected to produce better results.

The following recommendations should be considered for future sampling events.

The LCL for LCS/LCSD recoveries of sample extracts that have undergone SGC extraction prior to analysis by EPA Methods SW8015B for TEPH or SW8310 for PAHs should be changed to 30%R to be consistent with the LCLs specified in the QAPP for MS/MSDs and surrogates (refer to Footnote 6 of Table 3.2-2 and Footnote 2 of Table 3.2-4 of the QAPP). Table 3.2-3 of the QAPP does not have the footnote allowing recoveries between 30%R and the lower control limit (LCL) for samples and extracts not cleaned up by SGC. Therefore, all SW8015B and SW8310 data with LCS recoveries between 30 percent and 65 percent were qualified as estimated, strictly according to the tables in the QAPP. Section 3.2.4.2 [Laboratory Analytical Procedures] of the QAPP, subsection for the method description for EPA Method SW3630C - Silica Gel Cleanup, specifies "All surrogate, LCS, or MS/MSD recoveries for samples undergoing silica gel cleanup will have a lower control limit of 30-percent recovery." Thus, the QAPP recognizes that analytically there is no difference between an extract for an LCS, a sample, or an MS/MSD that would indicate an expectation of greater recovery for an LCS, since the extraction is the same for all samples. The QAPP should be modified to add LCS/LCSDs to MS/MSDs and surrogates in all references specifying that samples undergoing SGC will have an LCL of 30%R.

The requirement that an MS/MSD be included in every preparation and analytical batch for this project was requested to be added to the QAPP by the reviewer for the USACE Sacramento district. The standard

requirement for MS/MSD frequency is generally considered to be 1:20 samples to adequately characterize the potential for matrix interference for RI/FS projects. Although the more stringent requirement of one MS/MSD per batch is ideal, achievement of this frequency is not always possible, especially for water samples for this project due to limited availability of sample volume.

To perform MS/MSD analyses, triple volume of sample must be available to the samplers as well as to the laboratory. For soils collected in sample sleeves, this was generally not a problem, as there was adequate sample in the sample sleeve, or an additional sleeve was provided. With the exception of VOCs by SW8260B, the MS/MSD requirement for MS/MSDs was generally met project-wide for soils. For soils by SW8260B, a minimum of five Encore samplers must be collected for MS/MSD analyses to be performed. When small numbers of samples are collected daily, sometimes the additional Encore samplers were not collected. For water samples, a minimum of four sample containers must be collected for MS/MSDs to be performed for each analytical method, and five to nine containers is better so re-extractions and reanalyses can be performed if required. With as many as nine analyses requiring one liter of aqueous sample, plus additional methods requiring smaller volumes, between 27 and 36 liters may be required from a sample location to provide adequate volume to perform an MS/MSD. Due to low productivity of the wells for this project, many wells had to be sampled on multiple days just to provide enough sample for each method. Thus, the laboratory was unable to perform an MS/MSD in every extraction and analytical batch due to the small numbers and volumes of water samples received and logged daily.

Note that the analysis of MS/MSDs is a matrix-specific QC parameter. Batch extraction efficiency and laboratory accuracy and precision are measured with LCS/LCSDs, and sample-specific matrix information is measured by surrogate recoveries. With careful planning, MS/MSDs can be performed at frequencies better than 1:20 for any method even when limited sample volumes prevent MS/MSDs from being analyzed with every batch, thus adequately characterizing the matrix. Therefore, it is recommended that the one MS/MSD per preparation and analytical batch be made a goal, with a minimum requirement of 1:20 as a requirement.

Whenever possible, PQLs reported by the laboratory should meet the PQLs specified in the QAPP. In some cases, the laboratories reported results with PQLs that did not meet the QAPP, but did meet project objectives. Due to the rapid pace of this project, variances were not requested for the affected analytes. It is recommended that for future sampling events, variances be requested for such PQLs, or for other modifications to requirements, instead of providing technical assessments and justifications after the data are reported.

3.9 REFERENCES

Environmental Data Quality Management Program Specifications, United States Army Corps of Engineers (USACE) - Sacramento District, Draft Version 1.08 (1999)

Methods for Chemical Analysis of Water and Wastes, U.S. EPA Manual 600/4-79-020 (U.S. EPA, 1983 with additions)

Physical/Chemical Methods, SW-846 3rd edition (U.S. EPA, 1986a), and Updates I, II, IIA, and III

US EPA Contract Laboratory Program National Functional Guidelines For Organic Data Review (EPA-540/R-94/012, February 1994)

National Functional Guidelines For Inorganic Data Review (EPA-540/R-94-013, February 1994).

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
E160.1	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
E160.1	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
E160.1	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
E160.1	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
E160.1	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
E160.1	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
E160.1	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
E160.1	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
E160.1	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
E160.1	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
E160.1	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
E160.1	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
E160.1	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
E160.1	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
E160.1	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
E160.1	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
E160.1	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
E160.1	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
E160.1	EV-1	Water QC Matrix	31-Mar-00	QESS	G0D010147
E160.1	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E160.1	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E160.2	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
E160.2	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
E160.2	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
E160.2	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
E160.2	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
E160.2	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
E160.2	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
E160.2	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
E160.2	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
E160.2	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
E160.2	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
E160.2	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
E160.2	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
E160.2	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
E160.2	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
E160.2	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
E160.2	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
E160.2	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
E160.2	EV-1	Water QC Matrix	31-Mar-00	QESS	G0D010147
E160.2	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E160.2	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-15	Groundwater	12-Apr-00	QESS	G0D130323

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	EV-1	Water QC Matrix	31-Mar-00	QESS	G0D010147
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
E300 (Cl, NO ₃ -N, NO ₂ -N, SO ₄)	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
E300 (NO ₃ -N, NO ₂ -N)	MW-6/0.5	Soil	05-Apr-00	QESS	G0D060121
E300 (NO ₃ -N, NO ₂ -N)	MW-6/1	Soil	05-Apr-00	QESS	G0D060121
E300 (NO ₃ -N, NO ₂ -N)	MW-6/10	Soil	05-Apr-00	QESS	G0D060121
E300 (NO ₃ -N, NO ₂ -N)	MW-6/15	Soil	05-Apr-00	QESS	G0D060121
E300 (NO ₃ -N, NO ₂ -N)	MW-6/20	Soil	05-Apr-00	QESS	G0D060121
E300 (NO ₃ -N, NO ₂ -N)	MW-6/4	Soil	05-Apr-00	QESS	G0D060121
E300-PCATE	MW-1	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-10	Groundwater	20-Apr-00	BABK	L68699
E300-PCATE	MW-11	Groundwater	20-Apr-00	BABK	L68699
E300-PCATE	MW-13	Groundwater	12-Apr-00	BABK	L68187
E300-PCATE	MW-14	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-15	Groundwater	12-Apr-00	BABK	L68187
E300-PCATE	MW-1A	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-2	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-3	Groundwater	18-Apr-00	BABK	L68699
E300-PCATE	MW-3B	Groundwater	24-Apr-00	BABK	L68699
E300-PCATE	MW-4	Groundwater	18-Apr-00	BABK	L68699
E300-PCATE	MW-4A	Groundwater	18-Apr-00	BABK	L68699
E300-PCATE	MW-6	Groundwater	12-Apr-00	BABK	L68187
E300-PCATE	MW-7	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-8	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	MW-9	Groundwater	11-Apr-00	BABK	L68187
E300-PCATE	NV-S1	Groundwater	29-Mar-00	BABK	L67877
E300-PCATE	NV-S2	Groundwater	29-Mar-00	BABK	L67877
E300-PCATE	NV-S2A	Groundwater	29-Mar-00	BABK	L67877
E300-PCATE	NV-S3	Groundwater	18-Apr-00	BABK	L68699
E300-PCATE	SV-S1	Groundwater	29-Mar-00	BABK	L67877
E300-PCATE	MW-10/K	Water QC Matrix	21-Apr-00	BABK	L68699
E300-PCATE	MW-12/K	Water QC Matrix	21-Apr-00	BABK	L68699
E300-PCATE	WAT-3	Water QC Matrix	06-Apr-00	BABK	L67876
E300-PCATE	WAT-4	Water QC Matrix	06-Apr-00	BABK	L67876
E415.1	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
E415.1	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
E415.1	MW-10	Groundwater	20-Apr-00	QESS	G0D220129

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
E415.1	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
E415.1	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
E415.1	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
E415.1	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
E415.1	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
E415.1	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
E415.1	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
E415.1	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
E415.1	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
E415.1	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
E415.1	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
E415.1	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
E415.1	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
E415.1	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
E415.1	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
E415.1	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
E415.1	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
E415.1	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
E415.1	SV-S1	Groundwater	29-Mar-00	QESS	G0C300256
E415.1	EV-1	Water QC Matrix	31-Mar-00	QESS	G0D010147
E415.1	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E415.1	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
E415.1	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
E415.1	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
M8015DB	AR-10/0.5	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-10/10	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-10/15	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-10/17	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-10/4	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-11/0.5	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-11/10	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-11/15	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-11/17	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-11/4	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-12/0.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-12/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-12/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-12/4.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-12R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-1R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-2R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-4R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-5/0.5	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-5/1	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-5/10	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-5/15	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-5/4	Soil	14-Apr-00	QESS	G0D140298
M8015DB	AR-6/1	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-6/10	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-6/15	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-6/4	Soil	31-Mar-00	QESS	G0D010147

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
M8015DB	AR-7/0.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-7/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-7/15	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-7/20	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-7/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-7R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-8/0.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-8/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-8/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-8/4.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	AR-8R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	AR-9/1	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-9/10	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-9/10.5	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-9/15	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-9/4	Soil	31-Mar-00	QESS	G0D010147
M8015DB	AR-9R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	HF-2R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	HF-3R/0.5	Soil	06-Apr-00	QESS	G0D070177
M8015DB	HF-3R/10	Soil	06-Apr-00	QESS	G0D070177
M8015DB	HF-3R/4	Soil	06-Apr-00	QESS	G0D070177
M8015DB	HF-3R1/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	MW-1/17.5	Soil	23-Feb-00	QESS	G0B250230
M8015DB	MW-1/21	Soil	23-Feb-00	QESS	G0B250230
M8015DB	MW-1/24	Soil	23-Feb-00	QESS	G0B250230
M8015DB	MW-13/0.5	Soil	29-Mar-00	QESS	G0C300256
M8015DB	MW-13/10	Soil	29-Mar-00	QESS	G0C300256
M8015DB	MW-13/15	Soil	29-Mar-00	QESS	G0C300256
M8015DB	MW-13/4	Soil	29-Mar-00	QESS	G0C300256
M8015DB	MW-13/4.5	Soil	29-Mar-00	QESS	G0C300256
M8015DB	MW-14/0.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-14/1	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-14/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-14/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/0.5	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/1	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/15	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/20	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-15/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	MW-2/0	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-2/10	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-2/15	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-2/20	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-2/4	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-2/4.5	Soil	22-Feb-00	QESS	G0B240168
M8015DB	MW-3A/0.5	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-3A/10	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-3A/15	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-3A/20	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-3A/3.5	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-3A/5	Soil	03-Apr-00	QESS	G0D040260

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
M8015DB	MW-3A/5.5	Soil	03-Apr-00	QESS	G0D040260
M8015DB	MW-7/0	Soil	24-Feb-00	QESS	G0B260131
M8015DB	MW-7/0.5	Soil	24-Feb-00	QESS	G0B260131
M8015DB	MW-7/4	Soil	25-Feb-00	QESS	G0B260131
M8015DB	MW-7/9	Soil	25-Feb-00	QESS	G0B260131
M8015DB	MW-8/0	Soil	24-Feb-00	QESS	G0B250230
M8015DB	MW-8/0.5	Soil	24-Feb-00	QESS	G0B250230
M8015DB	MW-8/10	Soil	24-Feb-00	QESS	G0B250230
M8015DB	MW-8/15	Soil	24-Feb-00	QESS	G0B250230
M8015DB	MW-8/4	Soil	24-Feb-00	QESS	G0B250230
M8015DB	MW-9/0	Soil	25-Feb-00	QESS	G0B260131
M8015DB	MW-9/10	Soil	25-Feb-00	QESS	G0D110256
M8015DB	MW-9/15	Soil	25-Feb-00	QESS	G0D110256
M8015DB	MW-9/4	Soil	25-Feb-00	QESS	G0D110256
M8015DB	SP1-R1	Soil	20-Apr-00	QESS	G0D220129
M8015DB	SP1-R2	Soil	20-Apr-00	QESS	G0D220129
M8015DB	SP2-R1	Soil	20-Apr-00	QESS	G0D220129
M8015DB	SP2-R2	Soil	20-Apr-00	QESS	G0D220129
M8015DB	SP3-R1/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	SP3-R2/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	SP3-R3/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	SP3-R4/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	TNT-1P/0	Soil	27-Mar-00	QESS	G0C300256
M8015DB	TNT-1P/0.5	Soil	27-Mar-00	QESS	G0C300256
M8015DB	TNT-1P/1	Soil	27-Mar-00	QESS	G0C300256
M8015DB	TNT-1P/10	Soil	02-Apr-00	QESS	G0D040260
M8015DB	TNT-1P/2	Soil	27-Mar-00	QESS	G0C300256
M8015DB	TNT-1P/4	Soil	02-Apr-00	QESS	G0D040260
M8015DB	TNT-1P/4.5	Soil	02-Apr-00	QESS	G0D040260
M8015DB	TNT-1P/6	Soil	02-Apr-00	QESS	G0D040260
M8015DB	TNT-1P/8	Soil	02-Apr-00	QESS	G0D040260
M8015DB	TNT-1Q/0	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-1Q/1	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-1Q/10	Soil	04-Apr-00	QESS	G0D060121
M8015DB	TNT-1Q/2	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-1Q/4	Soil	04-Apr-00	QESS	G0D060121
M8015DB	TNT-1Q/6	Soil	04-Apr-00	QESS	G0D060121
M8015DB	TNT-1Q/8	Soil	04-Apr-00	QESS	G0D060121
M8015DB	TNT-2F/0	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-2F/1	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-2F/10	Soil	30-Mar-00	QESS	G0C310244
M8015DB	TNT-2F/2	Soil	28-Mar-00	QESS	G0C300256
M8015DB	TNT-2F/4	Soil	30-Mar-00	QESS	G0C310244
M8015DB	TNT-2F/6	Soil	30-Mar-00	QESS	G0C310244
M8015DB	TNT-2F/8	Soil	30-Mar-00	QESS	G0C310244
M8015DB	TW-7R/0.5	Soil	21-Apr-00	QESS	G0D220130
M8015DB	PE-MO	Soil QC Matrix	31-Mar-00	QESS	G0D010147
M8015DB	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
M8015DB	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
M8015DB	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
M8015DB	MW-14	Groundwater	11-Apr-00	QESS	G0D120283

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
M8015DB	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
M8015DB	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
M8015DB	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
M8015DB	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
M8015DB	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
M8015DB	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
M8015DB	MW-5	Groundwater	19-Apr-00	QESS	G0D200312
M8015DB	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
M8015DB	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
M8015DB	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
M8015DB	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
M8015DB	NV-S1	Groundwater	29-Mar-00	QESS	G0C310244
M8015DB	NV-S2	Groundwater	29-Mar-00	QESS	G0C310244
M8015DB	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
M8015DB	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
M8015DB	SV-S1	Groundwater	07-Apr-00	QESS	G0D080146
M8015DB	AR-12/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
M8015DB	HF-9/K	Water QC Matrix	31-Mar-00	QESS	G0D010147
M8015DB	MW-1/K	Water QC Matrix	22-Feb-00	QESS	G0B240168
M8015DB	MW-1/K	Water QC Matrix	23-Feb-00	QESS	G0B250230
M8015DB	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
M8015DB	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
M8015DB	MW-13/K	Water QC Matrix	29-Mar-00	QESS	G0C300256
M8015DB	MW-15/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
M8015DB	MW-3A/K	Water QC Matrix	03-Apr-00	QESS	G0D040260
M8015DB	MW-7/K	Water QC Matrix	24-Feb-00	QESS	G0B260131
M8015DB	MW-9/K	Water QC Matrix	25-Feb-00	QESS	G0B260131
M8015DB	SP2-R1A/K	Water QC Matrix	20-Apr-00	QESS	G0D220129
M8015DB	SP3-R4C/K	Water QC Matrix	21-Apr-00	QESS	G0D220130
M8015DB	SRC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
M8015DB	TNT-1P/K	Water QC Matrix	27-Mar-00	QESS	G0C300256
M8015DB	TNT-1P/K	Water QC Matrix	02-Apr-00	QESS	G0D040260
M8015DB	TNT-2F/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
M8015DB	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
M8015DB	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
M8015DB	WV-S2	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW6010B	MW-6/0.5	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-6/1	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-6/10	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-6/15	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-6/20	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-6/4	Soil	05-Apr-00	QESS	G0D060121
SW6010B	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW6010B	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW6010B	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW6010B	MW-9/K	Water QC Matrix	11-Apr-00	QESS	G0D110255
SW6010B	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW6010B	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW6010B	WV-S1	Water QC Matrix	30-Mar-00	QESS	G0C310244

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW6010B-F	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW6010B-F	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW6010B-F	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW6010B-F	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW6010B-F	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW6010B-F	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW6010B-F	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW6010B-F	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW6010B-F	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW6010B-F	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW6010B-F	MW-4	Groundwater	18-Apr-00	QESS	G0D200159
SW6010B-F	MW-4A	Groundwater	18-Apr-00	QESS	G0D200159
SW6010B-F	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW6010B-F	MW-7	Groundwater	13-Apr-00	QESS	G0D130323
SW6010B-F	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW6010B-F	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW6010B-F	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW6010B-F	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
SW6010B-F	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW6010B-F	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW6010B-F	SV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW6010B-F	MW-4/L	Water QC Matrix	18-Apr-00	QESS	G0D200159
SW7470A	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW7470A	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW7470A	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW7470A	MW-9/K	Water QC Matrix	11-Apr-00	QESS	G0D110255
SW7470A	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW7470A	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW7470A	WV-S1	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW7470A-F	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW7470A-F	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW7470A-F	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW7470A-F	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW7470A-F	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW7470A-F	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW7470A-F	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW7470A-F	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW7470A-F	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW7470A-F	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW7470A-F	MW-4	Groundwater	18-Apr-00	QESS	G0D200159
SW7470A-F	MW-4A	Groundwater	18-Apr-00	QESS	G0D200159
SW7470A-F	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW7470A-F	MW-7	Groundwater	13-Apr-00	QESS	G0D130323
SW7470A-F	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW7470A-F	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW7470A-F	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW7470A-F	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
SW7470A-F	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW7470A-F	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW7470A-F	SV-S1	Groundwater	29-Mar-00	QESS	G0C300256

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW7470A-F	MW-4/L	Water QC Matrix	18-Apr-00	QESS	G0D200159
SW7471A	MW-6/0.5	Soil	05-Apr-00	QESS	G0D060121
SW7471A	MW-6/1	Soil	05-Apr-00	QESS	G0D060121
SW7471A	MW-6/10	Soil	05-Apr-00	QESS	G0D060121
SW7471A	MW-6/15	Soil	05-Apr-00	QESS	G0D060121
SW7471A	MW-6/20	Soil	05-Apr-00	QESS	G0D060121
SW7471A	MW-6/4	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/0.5	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/10	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/15	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/15.5	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/20	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/25	Soil	05-Apr-00	QESS	G0D060121
SW8081A	HF-8/4	Soil	05-Apr-00	QESS	G0D060121
SW8081A	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW8081A	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW8081A	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW8081A	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW8081A	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW8081A	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW8081A	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8081A	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW8081A	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
SW8081A	MW-4	Groundwater	20-Apr-00	QESS	G0D200312
SW8081A	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW8081A	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW8081A	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
SW8081A	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW8081A	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW8081A	NV-S1	Groundwater	29-Mar-00	QESS	G0C310244
SW8081A	NV-S2	Groundwater	29-Mar-00	QESS	G0C310244
SW8081A	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW8081A	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW8081A	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8081A	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8081A	SFC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8081A	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8081A	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8081A	WV-S1	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8082	AR-10/0.5	Soil	31-Mar-00	QESS	G0D210225
SW8082	AR-12/0.5	Soil	30-Mar-00	QESS	G0D210225
SW8082	AR-12R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-1R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-2R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-4R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-7/0.5	Soil	30-Mar-00	QESS	G0D210225
SW8082	AR-7/10	Soil	30-Mar-00	QESS	G0D210225
SW8082	AR-7/15	Soil	30-Mar-00	QESS	G0D210225

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8082	AR-7/20	Soil	30-Mar-00	QESS	G0D210225
SW8082	AR-7/4	Soil	30-Mar-00	QESS	G0D210225
SW8082	AR-7R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-8R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	AR-9R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	HF-2R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	HF-3R1/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	MW-14/0.5	Soil	30-Mar-00	QESS	G0D210225
SW8082	MW-14/1	Soil	30-Mar-00	QESS	G0D210225
SW8082	MW-15/0.5	Soil	30-Mar-00	QESS	G0D210225
SW8082	MW-15/1	Soil	30-Mar-00	QESS	G0D210225
SW8082	MW-7/0	Soil	24-Feb-00	QESS	G0B260131
SW8082	MW-7/0.5	Soil	24-Feb-00	QESS	G0B260131
SW8082	TNT-1P/0	Soil	27-Mar-00	QESS	G0D210210
SW8082	TW-7R/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8082	PE-PCB	Soil QC Matrix	31-Mar-00	QESS	G0D010147
SW8082	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8082	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
SW8082	MW-4	Groundwater	20-Apr-00	QESS	G0D200312
SW8082	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
SW8082	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8082	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8082	MW-7/K	Water QC Matrix	24-Feb-00	QESS	G0B260131
SW8082	SRC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8082	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8082	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8260B	AR-10/10	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-10/15	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-10/17	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-10/4	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-11/10	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-11/15	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-11/17	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-11/4	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-12/10	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-12/4	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-12/4.5	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-5/10	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-5/15	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-5/4	Soil	14-Apr-00	QESS	G0D140298
SW8260B	AR-6/10	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-6/15	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-6/4	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-7/10	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-7/15	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-7/20	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-7/4	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-8/10	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-8/4	Soil	30-Mar-00	QESS	G0C310244
SW8260B	AR-8/4.5	Soil	30-Mar-00	QESS	G0C310244

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8260B	AR-9/10	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-9/10.5	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-9/15	Soil	31-Mar-00	QESS	G0D010147
SW8260B	AR-9/4	Soil	31-Mar-00	QESS	G0D010147
SW8260B	HF-5/0.5	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/1	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/10	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/15	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/20	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/25	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-5/4	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-6/0.5	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/10	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/15	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/20	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/24.5	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/4	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-6/4.5	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-7/0.5	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-7/1	Soil	06-Apr-00	QESS	G0D070177
SW8260B	HF-7/10	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-7/15	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-7/20	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-7/4	Soil	07-Apr-00	QESS	G0D080146
SW8260B	HF-8/0.5	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/10	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/15	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/15.5	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/20	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/25	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-8/4	Soil	05-Apr-00	QESS	G0D060121
SW8260B	HF-9/0.5	Soil	31-Mar-00	QESS	G0D010147
SW8260B	HF-9/10	Soil	31-Mar-00	QESS	G0D010147
SW8260B	HF-9/15	Soil	31-Mar-00	QESS	G0D010147
SW8260B	HF-9/20	Soil	31-Mar-00	QESS	G0D010147
SW8260B	HF-9/4	Soil	31-Mar-00	QESS	G0D010147
SW8260B	MW-1/17.5	Soil	23-Feb-00	QESS	G0B250230
SW8260B	MW-1/21	Soil	23-Feb-00	QESS	G0B250230
SW8260B	MW-1/24	Soil	23-Feb-00	QESS	G0B250230
SW8260B	MW-13/10	Soil	29-Mar-00	QESS	G0C300256
SW8260B	MW-13/15	Soil	29-Mar-00	QESS	G0C300256
SW8260B	MW-13/4	Soil	29-Mar-00	QESS	G0C300256
SW8260B	MW-13/4.5	Soil	29-Mar-00	QESS	G0C300256
SW8260B	MW-14/10	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-14/4	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-15/10	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-15/15	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-15/20	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-15/4	Soil	30-Mar-00	QESS	G0C310244
SW8260B	MW-2/10	Soil	22-Feb-00	QESS	G0B240168
SW8260B	MW-2/15	Soil	22-Feb-00	QESS	G0B240168
SW8260B	MW-2/20	Soil	22-Feb-00	QESS	G0B240168

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8260B	MW-2/4	Soil	22-Feb-00	QESS	G0B240168
SW8260B	MW-2/4.5	Soil	22-Feb-00	QESS	G0B240168
SW8260B	MW-3A/10	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-3A/15	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-3A/20	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-3A/3.5	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-3A/5	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-3A/5.5	Soil	03-Apr-00	QESS	G0D040260
SW8260B	MW-8/0.5	Soil	24-Feb-00	QESS	G0B250230
SW8260B	MW-8/10	Soil	24-Feb-00	QESS	G0B250230
SW8260B	MW-8/15	Soil	24-Feb-00	QESS	G0B250230
SW8260B	MW-8/4	Soil	24-Feb-00	QESS	G0B250230
SW8260B	MW-9/10	Soil	25-Feb-00	QESS	G0B260131
SW8260B	MW-9/15	Soil	25-Feb-00	QESS	G0B260131
SW8260B	MW-9/4	Soil	25-Feb-00	QESS	G0B260131
SW8260B	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW8260B	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW8260B	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW8260B	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW8260B	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW8260B	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW8260B	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW8260B	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW8260B	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8260B	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW8260B	MW-4	Groundwater	20-Apr-00	QESS	G0D200312
SW8260B	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW8260B	MW-5	Groundwater	19-Apr-00	QESS	G0D200312
SW8260B	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW8260B	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
SW8260B	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW8260B	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW8260B	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW8260B	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
SW8260B	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW8260B	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW8260B	SV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW8260B	AR-12/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8260B	HF-6/K	Water QC Matrix	07-Apr-00	QESS	G0D080146
SW8260B	HF-9/K	Water QC Matrix	31-Mar-00	QESS	G0D010147
SW8260B	MW-1/K	Water QC Matrix	22-Feb-00	QESS	G0B240168
SW8260B	MW-1/K	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8260B	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8260B	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8260B	MW-13/K	Water QC Matrix	29-Mar-00	QESS	G0C300256
SW8260B	MW-15/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8260B	MW-3A/K	Water QC Matrix	03-Apr-00	QESS	G0D040260
SW8260B	MW-7/K	Water QC Matrix	24-Feb-00	QESS	G0B260131
SW8260B	MW-9/K	Water QC Matrix	25-Feb-00	QESS	G0B260131
SW8260B	SRC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8260B	TB-04-18-00	Water QC Matrix	18-Apr-00	QESS	G0D200159

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8260B	TB-04-18-00A	Water QC Matrix	18-Apr-00	QESS	G0D200159
SW8260B	TB-04-20-00	Water QC Matrix	20-Apr-00	QESS	G0D200312
SW8260B	TB-04-24-00	Water QC Matrix	24-Apr-00	QESS	G0D250199
SW8260B	TB032900	Water QC Matrix	29-Mar-00	QESS	G0C300256
SW8260B	TB032900B	Water QC Matrix	29-Mar-00	QESS	G0C300256
SW8260B	TB033000B	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8260B	TB033000C	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8260B	TB033100A	Water QC Matrix	31-Mar-00	QESS	G0D010147
SW8260B	TB033100B	Water QC Matrix	31-Mar-00	QESS	G0D010147
SW8260B	TB04-14-00	Water QC Matrix	14-Apr-00	QESS	G0D140298
SW8260B	TB04-18-00	Water QC Matrix	18-Apr-00	QESS	G0D180262
SW8260B	TB04-20-00	Water QC Matrix	20-Apr-00	QESS	G0D220129
SW8260B	TB040300A	Water QC Matrix	03-Apr-00	QESS	G0D040260
SW8260B	TB040500A	Water QC Matrix	05-Apr-00	QESS	G0D060121
SW8260B	TB040600A	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8260B	TB040600B	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8260B	TB040600C	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8260B	TB4-11-00	Water QC Matrix	11-Apr-00	QESS	G0D110255
SW8260B	TB4-11-00	Water QC Matrix	11-Apr-00	QESS	G0D120283
SW8260B	TB4-12-00	Water QC Matrix	12-Apr-00	QESS	G0D130323
SW8260B	TB4-13-00	Water QC Matrix	13-Apr-00	QESS	G0D130323
SW8260B	TRIP BLANK	Water QC Matrix	07-Apr-00	QESS	G0D080146
SW8260B	TRIP BLANK 2-22-00	Water QC Matrix	22-Feb-00	QESS	G0B240168
SW8260B	TRIP BLANK 2-23-00	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8260B	TRIP BLANK 2-24-00	Water QC Matrix	24-Feb-00	QESS	G0B250230
SW8260B	TRIP BLANK 2-25-00	Water QC Matrix	25-Feb-00	QESS	G0B260131
SW8260B	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8260B	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8270	HF-8/0.5	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/10	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/15	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/15.5	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/20	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/25	Soil	05-Apr-00	QESS	G0D060121
SW8270	HF-8/4	Soil	05-Apr-00	QESS	G0D060121
SW8270	MW-3R	Groundwater	03-May-00	QESS	G0E040279
SW8270	MW-4R	Groundwater	03-May-00	QESS	G0E040279
SW8270	MW-3R/K	Water QC Matrix	03-May-00	QESS	G0E040279
SW8270	WV-S4	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8270C	SP1-R1	Soil	20-Apr-00	QESS	G0D220129
SW8270C	SP1-R2	Soil	20-Apr-00	QESS	G0D220129
SW8270C	SP2-R1	Soil	20-Apr-00	QESS	G0D220129
SW8270C	SP2-R2	Soil	20-Apr-00	QESS	G0D220129
SW8270C	SP3-R1/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8270C	SP3-R2/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8270C	SP3-R3/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8270C	SP3-R4/0.5	Soil	21-Apr-00	QESS	G0D220130
SW8290	WET-2R	WS)	29-Mar-00	QESS	G0C300256

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8290	AR-7/1	Soil	30-Mar-00	QESS	G0C310244
SW8290	MW-1/17.5	Soil	23-Feb-00	QESS	G0B250230
SW8290	MW-1/21	Soil	23-Feb-00	QESS	G0B250230
SW8290	MW-5/10.5	Soil	24-Feb-00	QESS	G0B250230
SW8290	MW-5/11	Soil	24-Feb-00	QESS	G0B250230
SW8290	TNT-1P/4	Soil	02-Apr-00	QESS	G0D040260
SW8290	TNT-1P/4.5	Soil	02-Apr-00	QESS	G0D040260
SW8290	TNT-2F/1	Soil	28-Mar-00	QESS	G0C300256
SW8290	MW-1/K	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8290	SRC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8290	TNT-1P/K	Water QC Matrix	02-Apr-00	QESS	G0D040260
SW8290	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8290	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8310	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW8310	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW8310	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW8310	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW8310	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW8310	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW8310	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW8310	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW8310	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8310	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW8310	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
SW8310	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW8310	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW8310	MW-7	Groundwater	11-Apr-00	QESS	G0D130323
SW8310	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW8310	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW8310	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW8310	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
SW8310	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW8310	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW8310	SV-S1	Groundwater	07-Apr-00	QESS	G0D080146
SW8310	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8310	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8310	SP2-R1A/K	Water QC Matrix	20-Apr-00	QESS	G0D220129
SW8310	SP3-R4C/K	Water QC Matrix	21-Apr-00	QESS	G0D220130
SW8310	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8310	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8310	WV-S2A	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8315	MW-1	Groundwater	11-Apr-00	TRUD	602498
SW8315	MW-10	Groundwater	20-Apr-00	TRUD	602509
SW8315	MW-11	Groundwater	20-Apr-00	TRUD	602509
SW8315	MW-12	Groundwater	20-Apr-00	TRUD	602509
SW8315	MW-13	Groundwater	12-Apr-00	TRUD	602499
SW8315	MW-14	Groundwater	11-Apr-00	TRUD	602498
SW8315	MW-15	Groundwater	12-Apr-00	TRUD	602499
SW8315	MW-1A	Groundwater	11-Apr-00	TRUD	602498

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8315	MW-2	Groundwater	11-Apr-00	TRUD	602498
SW8315	MW-3	Groundwater	18-Apr-00	TRUD	602505
SW8315	MW-3B	Groundwater	24-Apr-00	TRUD	602517
SW8315	MW-4	Groundwater	18-Apr-00	TRUD	602505
SW8315	MW-4A	Groundwater	18-Apr-00	TRUD	602505
SW8315	MW-6	Groundwater	12-Apr-00	TRUD	602499
SW8315	MW-7	Groundwater	11-Apr-00	TRUD	602498
SW8315	MW-8	Groundwater	11-Apr-00	TRUD	602498
SW8315	MW-9	Groundwater	11-Apr-00	TRUD	602498
SW8315	NV-S1	Groundwater	29-Mar-00	TRUD	602492
SW8315	NV-S2	Groundwater	29-Mar-00	TRUD	602492
SW8315	NV-S2A	Groundwater	29-Mar-00	TRUD	602492
SW8315	NV-S3	Groundwater	18-Apr-00	TRUD	602505
SW8315	RW-1	Groundwater	12-Apr-00	TRUD	602499
SW8315	SV-S1	Groundwater	29-Mar-00	TRUD	602492
SW8315	ERA BLANK	Water QC Matrix	20-Apr-00	TRUD	602514
SW8315	MW-12/K	Water QC Matrix	24-Apr-00	TRUD	602517
SW8315	MW-3B/K	Water QC Matrix	24-Apr-00	TRUD	602517
SW8315	PE	Water QC Matrix	20-Apr-00	TRUD	602514
SW8330	HF-5/10	Soil	06-Apr-00	QESS	G0D070177
SW8330	HF-5/25	Soil	06-Apr-00	QESS	G0D070177
SW8330	HF-6/0.5	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/10	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/15	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/20	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/24.5	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/4	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-6/4.5	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-7/0.5	Soil	06-Apr-00	QESS	G0D080146
SW8330	HF-7/1	Soil	06-Apr-00	QESS	G0D080146
SW8330	HF-7/10	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-7/15	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-7/20	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-7/22.5	Soil	07-Apr-00	QESS	G0D080146
SW8330	HF-7/4	Soil	07-Apr-00	QESS	G0D080146
SW8330	MW-13/0.5	Soil	29-Mar-00	QESS	G0C300256
SW8330	MW-13/10	Soil	29-Mar-00	QESS	G0C300256
SW8330	MW-13/15	Soil	29-Mar-00	QESS	G0C300256
SW8330	MW-13/4	Soil	29-Mar-00	QESS	G0C300256
SW8330	MW-13/4.5	Soil	29-Mar-00	QESS	G0C300256
SW8330	MW-14/0.5	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-14/1	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-14/10	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-14/4	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/0.5	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/1	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/10	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/15	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/20	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-15/4	Soil	30-Mar-00	QESS	G0C310244
SW8330	MW-2/0	Soil	22-Feb-00	QESS	G0B240168

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8330	MW-2/10	Soil	22-Feb-00	QESS	G0B240168
SW8330	MW-2/15	Soil	22-Feb-00	QESS	G0B240168
SW8330	MW-2/20	Soil	22-Feb-00	QESS	G0B240168
SW8330	MW-2/4	Soil	22-Feb-00	QESS	G0B240168
SW8330	MW-2/4.5	Soil	22-Feb-00	QESS	G0B240168
SW8330	MW-3A/0.5	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/10	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/15	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/20	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/3.5	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/5	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-3A/5.5	Soil	03-Apr-00	QESS	G0D040260
SW8330	MW-6/0.5	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-6/1	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-6/10	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-6/15	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-6/20	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-6/4	Soil	05-Apr-00	QESS	G0D060121
SW8330	MW-8/0	Soil	24-Feb-00	QESS	G0B250230
SW8330	MW-8/0.5	Soil	24-Feb-00	QESS	G0B250230
SW8330	MW-8/10	Soil	24-Feb-00	QESS	G0B250230
SW8330	MW-8/15	Soil	24-Feb-00	QESS	G0B250230
SW8330	MW-8/4	Soil	24-Feb-00	QESS	G0B250230
SW8330	MW-9/0	Soil	25-Feb-00	QESS	G0B260131
SW8330	MW-9/10	Soil	25-Feb-00	QESS	G0B260131
SW8330	MW-9/15	Soil	25-Feb-00	QESS	G0B260131
SW8330	MW-9/4	Soil	25-Feb-00	QESS	G0B260131
SW8330	TNT-1P/0	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-1P/0.5	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-1P/1	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-1P/10	Soil	02-Apr-00	QESS	G0D040260
SW8330	TNT-1P/2	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-1P/4	Soil	02-Apr-00	QESS	G0D040260
SW8330	TNT-1P/4.5	Soil	02-Apr-00	QESS	G0D040260
SW8330	TNT-1P/6	Soil	02-Apr-00	QESS	G0D040260
SW8330	TNT-1P/8	Soil	02-Apr-00	QESS	G0D040260
SW8330	TNT-1Q/0	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-1Q/1	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-1Q/10	Soil	04-Apr-00	QESS	G0D060121
SW8330	TNT-1Q/2	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-1Q/4	Soil	04-Apr-00	QESS	G0D060121
SW8330	TNT-1Q/6	Soil	04-Apr-00	QESS	G0D060121
SW8330	TNT-1Q/8	Soil	04-Apr-00	QESS	G0D060121
SW8330	TNT-2F/0	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-2F/1	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-2F/10	Soil	30-Mar-00	QESS	G0C310244
SW8330	TNT-2F/2	Soil	28-Mar-00	QESS	G0C300256
SW8330	TNT-2F/4	Soil	30-Mar-00	QESS	G0C310244
SW8330	TNT-2F/6	Soil	30-Mar-00	QESS	G0C310244
SW8330	TNT-2F/8	Soil	30-Mar-00	QESS	G0C310244
SW8330	TNT-R1	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-R2	Soil	27-Mar-00	QESS	G0C300256

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8330	TNT-R3	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-R4	Soil	27-Mar-00	QESS	G0C300256
SW8330	TNT-R5	Soil	27-Mar-00	QESS	G0C300256
SW8330	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW8330	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW8330	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW8330	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW8330	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
SW8330	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW8330	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW8330	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW8330	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW8330	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8330	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW8330	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
SW8330	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW8330	MW-5	Groundwater	19-Apr-00	QESS	G0D200312
SW8330	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW8330	MW-7	Groundwater	13-Apr-00	QESS	G0D130323
SW8330	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW8330	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW8330	NV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW8330	NV-S2	Groundwater	29-Mar-00	QESS	G0C300256
SW8330	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW8330	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW8330	SV-S1	Groundwater	29-Mar-00	QESS	G0C300256
SW8330	SW-1R	Surface Water	29-Mar-00	QESS	G0C300256
SW8330	SW-2R	Surface Water	29-Mar-00	QESS	G0C300256
SW8330	HF-6/K	Water QC Matrix	07-Apr-00	QESS	G0D080146
SW8330	HF-9/K	Water QC Matrix	31-Mar-00	QESS	G0D010147
SW8330	MW-1/K	Water QC Matrix	22-Feb-00	QESS	G0B240168
SW8330	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8330	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8330	MW-13/K	Water QC Matrix	29-Mar-00	QESS	G0C300256
SW8330	MW-15/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8330	MW-3A/K	Water QC Matrix	03-Apr-00	QESS	G0D040260
SW8330	MW-9/K	Water QC Matrix	25-Feb-00	QESS	G0B260131
SW8330	SRC-3	Water QC Matrix	23-Feb-00	QESS	G0B250230
SW8330	TNT-1P/K	Water QC Matrix	27-Mar-00	QESS	G0C300256
SW8330	TNT-1P/K	Water QC Matrix	02-Apr-00	QESS	G0D040260
SW8330	TNT-1Q/K	Water QC Matrix	28-Mar-00	QESS	G0C300256
SW8330	TNT-2F/K	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8330	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8330	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8330	WV-S3	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8330	WV-S3A	Water QC Matrix	30-Mar-00	QESS	G0C310244
SW8330M	MW-9/0	Soil	25-Feb-00	QESS	G0B260131
SW8330M	MW-9/10	Soil	25-Feb-00	QESS	G0B260131
SW8330M	MW-9/15	Soil	25-Feb-00	QESS	G0B260131
SW8330M	MW-9/4	Soil	25-Feb-00	QESS	G0B260131

Table 3.1-1. Remedial Investigation: Samples and Analyses Performed
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EPA Method	Sample ID	Matrix	Sampling Date	Lab Code	SDG
SW8330M	MW-1	Groundwater	11-Apr-00	QESS	G0D120283
SW8330M	MW-1/A	Groundwater	11-Apr-00	QESS	G0D120283
SW8330M	MW-10	Groundwater	20-Apr-00	QESS	G0D220129
SW8330M	MW-11	Groundwater	20-Apr-00	QESS	G0D200312
SW8330M	MW-12	Groundwater	20-Apr-00	QESS	G0D200312
SW8330M	MW-13	Groundwater	12-Apr-00	QESS	G0D130323
SW8330M	MW-14	Groundwater	11-Apr-00	QESS	G0D120283
SW8330M	MW-15	Groundwater	12-Apr-00	QESS	G0D130323
SW8330M	MW-2	Groundwater	11-Apr-00	QESS	G0D120283
SW8330M	MW-3	Groundwater	18-Apr-00	QESS	G0D200159
SW8330M	MW-3B	Groundwater	24-Apr-00	QESS	G0D250199
SW8330M	MW-4	Groundwater	18-Apr-00	QESS	G0D180262
SW8330M	MW-4A	Groundwater	18-Apr-00	QESS	G0D180262
SW8330M	MW-6	Groundwater	12-Apr-00	QESS	G0D130323
SW8330M	MW-7	Groundwater	13-Apr-00	QESS	G0D130323
SW8330M	MW-8	Groundwater	11-Apr-00	QESS	G0D110255
SW8330M	MW-9	Groundwater	11-Apr-00	QESS	G0D110255
SW8330M	NV-S2A	Groundwater	29-Mar-00	QESS	G0C310244
SW8330M	NV-S3	Groundwater	18-Apr-00	QESS	G0D200159
SW8330M	SW-1R	Surface Water	29-Mar-00	QESS	G0C300256
SW8330M	SW-2R	Surface Water	29-Mar-00	QESS	G0C300256
SW8330M	MW-10/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8330M	MW-12/K	Water QC Matrix	21-Apr-00	QESS	G0D220129
SW8330M	MW-9/K	Water QC Matrix	25-Feb-00	QESS	G0B260131
SW8330M	TNT-1P/K	Water QC Matrix	27-Mar-00	QESS	G0C300256
SW8330M	WAT-3	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8330M	WAT-4	Water QC Matrix	06-Apr-00	QESS	G0D070177
SW8330M	WV-S3A	Water QC Matrix	30-Mar-00	QESS	G0C310244

QESS = Quanterra Environmental Services, West Sacramento Facility, acquired by Severn Trent Laboratories (STL) in February, 2000.

TRUD = Truesdail Laboratories

BABK = E. S. Babcock and sons

Table 3.4-1. Technical Holding Time Tables
Summary of QC Outliers (Page 1 of 3)

Table 3.4-1A. Technical Holding Times for General Chemistry Methods

Sample	EPA Method 300.0 Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
MW-6/0.5 MW-6/1 MW-6/4 MW-6/10 MW-6/15 MW-6/20 LDC Report# 4778B6	Nitrate as N Nitrite as N	48 hours	12 days	J (all detects) R (all non-detects: <i>MW-6/0.5 only</i>) R (all non-detects)	A
MW-7 LDC Report# 4812A6	Nitrate as N Nitrite as N	74.5 hours	48	J- (all detects) UJ (all non-detects)	P
MW-10 MW-10/K MW-12/K LDC Report# 4864A6	Nitrate as N Nitrite as N	3 days	48 hours	J- (all detects) UJ (all non-detects)	P

Note: Bold highlight indicates that associated sample results were qualified for this analyte.

Table 3.4-1B. Technical Holding Times for SW8015B - TEPH

Sample	TEPH: EPA Method SW8015B Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
MW-9RE (<i>NOT USED</i>) MW-8RE (<i>NOT USED</i>) LDC Report# 4858A8	TPH as extractables	22	7	J- (all detects) R (all non-detects)	A
MW-1RE MW-2RE MW-14RE MW-1ARE (<i>NOT USED</i>) LDC Report# 4827A8	TPH as extractables	22	7	J- (all detects) R (all non-detects)	A
MW-9/4 MW-9/10 MW-9/15 LDC Report# 4941A8	TPH as extractables	49 55	14 14	R (all non-detects) R (all non-detects)	P

Note: Bold highlight indicates that associated sample results were qualified for this analyte.

Table 3.4-1. Technical Holding Time Tables
Summary of QC Outliers (Page 2 of 3)

Table 3.4-1C. Technical Holding Times for SW8081 - Pesticides

Sample	Pesticides: EPA Method SW8081 Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
MW-10/KRE (NOT USED) MW-12/KRE (NOT USED) LDC Report# 4864A3a	All TCL compounds	17	7	J- (all detects) R (all non-detects)	A
MW-3RE (NOT USED) NV-S3RE (NOT USED) LDC Report# 4827B3a	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A
MW-4ARE (NOT USED) LDC Report# 4837A3a	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A

Note: No reported data were qualified.

Table 3.4-1D. Technical Holding Times for SW8082 - PCBs

Sample	PCBs: EPA Method SW8082 Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
TNT-1P/0 LDC Report# 4827D3b	All TCL compounds	30	14	R (all non-detects)	P
AR-10/0.5 LDC Report# 4827E3b	All TCL compounds	26	14	UJ (all non-detects)	P
AR-7/4 AR-7/10 AR-7/15 AR-7-20 MW-14/0.5 MW-14/1 MW-15/0.5 MW-15/1 AR-7/0.5 AR-12/0.5 LDC Report# 4827E3b	All TCL compounds	27	14	UJ (all non-detects)	P

Note:

Bold highlight indicates that associated sample results were qualified for this analyte.

Table 3.4-1. Technical Holding Time Tables
Summary of QC Outliers (Page 3 of 3)

Table 3.4-1D. Technical Holding Times for SW8310 - PAHs

Sample	PAHs: EPA Method SW8310 Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
MW-15RE (NOT USED) MW-6RE (NOT USED) MW-13RE (NOT USED)	All TCL compounds	19	7	J- (all detects) R (all non-detects)	A
MW-7RE (NOT USED) LDC Report# 4812A9	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A
MW-9RE (NOT USED) MW-8RE (NOT USED) LDC Report# 4858A9	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A
MW-1RE (NOT USED) MW-2RE (NOT USED) MW-14RE (NOT USED) MW-1ARE (NOT USED) LDC Report# 4827A9	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A
MW-4ARE (NOT USED) LDC Report# 4837A9	All TCL compounds	22	7	J- (all detects) R (all non-detects)	A

Note: No reported data were qualified.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 1 of 15)

Table 3.4-2A Continuing Calibration for EPA Method 300.0

Date	Lab. Reference/ID	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/41 5.1/SW9060 Analyte	%R (Limits)	Associated Samples	Flag	A or P
4/12/00	CCV	Nitrite as N	85 (90-110)	MW-8 LDC Report# 4858A6	J- (all detects)	P

Note:
Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2B Continuing Calibration for CADHS 300.0M - Perchlorate

Sample	PERCHLORATE CADOHS 300.0M Analyte	Finding	Criteria	Flag	A or P
All samples in SDG L67876/L67877: WAT-4 WAT-3 SV-S1 NV-S1 NV-S2 NV-S2/A LDC Report# 4733A6 and All samples in SDG L68699: MW-4A MW-4 NV-S3 MW-3 MW-11 MW-10 MW-10/K MW-12/K MW-3B LDC Report# 4783A6	Perchlorate	A blank was not used to establish the calibration curve.	A blank must be used to establish the calibration curve.	None	P

Note:
 The calibrations were compliant with USEPA Method 314.0 and there is no effect on the quality of the data.

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 2 of 15)

Table 3.4-2C Continuing Calibration for SW8081A - Pesticides

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
4/25/00	INDA 4x	DB 608	alpha-BHC gamma-BHC Heptachlor Dieldrin Endrin 4,4'-DDD Methoxychlor	23 22 21 18 20 20 18	WAT-4 WAT-3 LDC Report# 4754A3a	NA (J+ all detects) No samples qualified, all ND	P
4/28/00 (12:08)	INDA 4x	DB 1701	Methoxychlor	17	MW-10/K MW-12/K LDC Report# 4864A3a	NA (J+ all detects) No samples qualified, all ND	A
4/28/00 (21:28)	INDA 4x	DB 1701	Dieldrin 4,4'-DDD	16 16	MW-3 NV-S3 LDC Report# 4827B3a	NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A
5/15/00	INDA 4x	DB 608	alpha-BHC gamma-BHC Endrin 4,4'-DDD Methoxychlor	20 17 18 17 19	All samples in SDG G0D250199 MW-3B LDC Report# 4827F3a	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A

Note:
No reported data were qualified.

Table 3.4-2D Continuing Calibration for SW8082 - PCB'S

Date	Standard	Column	Compound	%D	Affected Compound	Associated Samples	Flag	A or P
3/10/00 LDC Report# 4678A3b	1660-200	DB 1701	Aroclor-1016	17	Aroclor-1016 Aroclor-1221 Aroclor-1232	All samples in SDG G0B250230: SRC3	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	P
3/10/00 LDC Report# 4678B3b	1660-200	DB-608	Aroclor-1016	17	Aroclor-1016 Aroclor-1221 Aroclor-1232	All water samples in SDG G0B260131: MW7/K	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	P

Note: No reported data were qualified.

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 3 of 15)

Table 3.4-2E Initial Calibration for SW8260B - VOCs

Date	Compound	%RSD or r ²	Associated Samples	Flag	A or P
2/3/00	Acetone	37.778	All water samples in SDG G0B250230: SRC3 MW1/K TRIP BLANK (2/23) TRIP BLANK (2/24) LDC Report# 4678A1	UJ (all non-detects)	P
4/17/00	Acetone Vinyl acetate	38.811 30.323	All water samples in SDG G0D060121: TB040500A LDC Report# 4778B1 and All water samples in SDG G0D080146: HF-6/K TRIP BLANK LDC Report# 4761A1 and All samples in SDG G0D130323: MW-7 MW-6 MW-13 MW-15 TB4-12-00 TB4-13-00 LDC Report# 4812A1 and All water samples in SDG G0D140298: TB04-14-00 LDC Report# 4855A1 and All samples in SDG G0D200159 MW-3 NV-S3 TB-04-18-00A TB-04-18-00 and All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K TB04-20-00 LDC Report# 4864A1 and All samples in SDG G0D250199 MW-3B TB-04-24-00 LDC Report# 4827F1	J (all detects) UJ (all non-detects) UJ (all non-detects)	A

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 4 of 15)

Table 3.4-2E Initial Calibration for SW8260B - VOCs

Date	Compound	%RSD or r ²	Associated Samples	Flag	A or P
02/27/00	Acetone 2-Butanone	40.598 34.703	MW1/17.5 LDC Report# 4678A1	J (all detects) UJ (all non-detects)	P

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2F Initial Calibration RRFs for SW8260B - VOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
2/3/00	2-Chloroethylvinyl ether Acetone 2-Butanone	0.03484 (≥0.05) 0.02360 (≥0.05) 0.03041 (≥0.05)	All water samples in SDG G0B240168: SRC3 MW1/K TRIP BLANK (2/23) TRIP BLANK (2/24) LDC Report# 4678A1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/3/00	2-Chloroethylvinyl ether 1,2-Dibromo-3- chloropropane Acetone 2-Butanone 2-Hexanone	0.03103 (≥0.05) 0.04428 (≥0.05) 0.02355 (≥0.05) 0.03209 (≥0.05) 0.04591 (≥0.05)	All water samples in SDG G0D040260: MW-3A/K TB040300A LDC Report# 4733D1 and All water samples in SDG G0D010147 TB033100A HF-9/K TB033100B LDC Report# 4743A1 and All water samples in SDG G0C310244 MW-15/K TB033000B AR-12/K TB033000C NV-S2/A LDC Report# 4769A1 and All water samples in SDG G0C300256: SV-S1 NV-S1 NV-S2 MW-13/K TB032900B TB032900 LDC Report# 4868A1	R (all non-detects) R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 5 of 15)

Table 3.4-2F Initial Calibration RRFs for SW8260B - VOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
4/17/00	2-Chloroethylvinyl ether Acetone 2-Butanone	0.03080 (≥ 0.05) 0.02944 (≥ 0.05) 0.03993 (≥ 0.05)	All water samples in SDG GOD060121: TB040500A LDC Report# 4778B1 and All water samples in SDG GOD080146: HF-6/K TRIP BLANK LDC Report# 4761A1 and All water samples in SDG GOD130323: MW-15 (4/12/00,14:30) MW-7 (4/11/00,12:00) MW-6 (4/12/00,13:30) MW-13 (4/12/00,13:30) TB4-12-00 TB4-13-00 LDC Report# 4812A1 and All water samples in SDG GOD140298: TB04-14-00 LDC Report# 4855A1 and All samples in SDG All samples in SDG GOD200159 MW-3 NV-S3 TB-04-18-00A TB-04-18-00 LDC Report# 4827B1 and GOD220129: MW-10 MW-10/K MW-12/K TB04-20-00 LDC Report# 4864A1 and All samples in SDG GOD250199 MW-3B TB-04-24-00 LDC Report# 4827F1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A

Note:
Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 6 of 15)

Table 3.4-2G Continuing Calibrations for SW8260B - VOCs

Date	Compound	%D	Associated Samples	Flag	A or P
3/2/00	Bromomethane	26.0	All water samples in SDG G0B250230: MW1/K SRC3 TRIP BLANK (2/23) TRIP BLANK (2/24) LDC Report# 4678A1 and All water samples in SDG G0B260131: MW9/K MW7/K TRIP BLANK 2-25-00 LDC Report# 4678B1 and All water samples in SDG G0B240168: MW1/K TRIP BLANK 2-22-00 LDC Report# 4678C1	UJ (all non-detects)	A
4/10/00	Vinyl acetate	309.5	All water samples in SDG G0C300256: SV-S1 NV-S1 NV-S2 MW-13/K TB032900B TB032900 LDC Report# 4868A1	NA (J+ all detects) <i>No samples qualified, all ND</i>	A
4/13/00	Dichlorodifluoromethane	29.9	All water samples in SDG G0D010147	UJ (all non-detects)	A
	2-Hexanone	27.0	HF-9/K TB033100A TB033100B LDC Report# 4743A1 and	UJ (all non-detects)	
	Vinyl acetate	284.2	All water samples in SDG G0D040260: MW-3A/K TB040300A LDC Report# 4743A1 and All water samples in SDG G0D040260 MW-3A/K TB040300A	NA (J+ all detects) <i>No samples qualified, all ND</i>	

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 7 of 15)

Table 3.4-2G Continuing Calibrations for SW8260B - VOCs

Date	Compound	%D	Associated Samples	Flag	A or P
4/17/00	Acetone Vinyl acetate	38.811 30.323	All water samples in SDG G0D070177 WAT-4 WAT-3 TB040600A TB040600B TB040600C LDC Report# 4754A6 and All samples in SDG G0D110255: MW-8 MW-9 TB4-11-00 LDC Report# 4858A1	UJ (all non-detects) UJ (all non-detects)	A
4/18/00	Acetone 2-Butanone	29.0 28.2	WAT-4 LDC Report# 4754A6 and All water samples in SDG G0D080146: HF-6/K TRIP BLANK LDC Report# 4761A1 and All water samples in SDG G0D060121: TB040500A LDC Report# 4778B1	UJ (all non-detects) UJ (all non-detects)	A
4/21/00	2-Hexanone	25.8	MW-6 MW-7 MW-13 TB4-12-00 TB4-13-00 LDC Report# 4812A1	UJ (all non-detects)	A
4/24/00	2-Butanone 2,2-Dichloropropane	29.3 26.2	MW-15 TB4-12-00 LDC Report# 4812A1 and All water samples in SDG G0D140298: TB04-14-00 LDC Report# 4855A1	UJ (all non-detects) <i>NA (J+ all detects)</i> <i>No samples qualified,</i> <i>all ND</i>	A
5/1/00	Bromomethane	49.7	All samples in SDG G0D200159: MW-3 NV-S3 TB-04-18-00A TB-04-18-00	UJ (all non-detects)	A

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 8 of 15)

Table 3.4-2G Continuing Calibrations for SW8260B - VOCs

Date	Compound	%D	Associated Samples	Flag	A or P
5/3/00 LDC Report# 4827B1	Bromomethane Acetone	30.1 27.9	All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K TB04-20-00 LDC Report# 4864A1 and All samples in SDG G0D250199 MW-3B TB-04-24-00 LDC Report# 4827F1	UJ (all non-detects) UJ (all non-detects)	A
2/24/00	Dichlorodifluoromethane Bromomethane	45.5 26.8	All soil samples in SDG G0B240168: MW2/4 MW2/4.5 MW2/10 MW2/15 MW2/20 LDC Report# 4678C1	NA (J+ all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	A
2/25/00	Vinyl acetate Dichlorodifluoromethane	27.4 38.1	MW1/21 MW1/24 MW8/0.5 MW8/4 MW8/10 MW8/15 LDC Report# 4678A1	UJ (all non-detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	A
4/7/00	1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Vinyl acetate	26.3 49.5 36.8	MW-15/4 AR-7/4 LDC Report# 4769A1 and All soil samples in SDG G0D040260: MW-3A/3.5 MW-3A/5 MW-3A/5.5 MW-3A/10 MW-3A/15 MW-3A/20 LDC Report# 4743A1 and HF-8/4 HF-8/10 HF-8/15 LDC Report# 4778B1	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A
4/10/00	1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Vinyl acetate	38.2 59.6 27.0	HF-5/1.0 HF-5/4.0 HF-5/10.0 HF-5/20 HF-7/0.5 LDC Report# 4754A1 and HF-8/0.5 HF-8/15.5 LDC Report# 4778B1	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) <i>No samples qualified, all ND</i>	A

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 9 of 15)

Table 3.4-2G Continuing Calibrations for SW8260B - VOCs

Date	Compound	%D	Associated Samples	Flag	A or P
4/11/00	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Vinyl acetate Carbon tetrachloride	27.9 35.3 50.5 30.1 28.2	HF-5/0.5 HF-5/15.0 HF-5/25 HF-7/1.0 HF-5/15.0MS HF-5/15.0MSD 0109213-BLK LDC Report# 4754A1 and HF-8/20 HF-8/25 0109213-BLK LDC Report# 4778B1	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A
4/11/00	Chloroform 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Carbon tetrachloride Vinyl acetate	27.9 35.3 50.5 28.2 30.1	HF-7/10 HF-7/15 HF-7/20 0109213-BLK LDC Report# 4761A1	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A
4/17/00	2-Hexanone 2-Butanone Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Vinyl acetate Carbon tetrachloride	25.5 29.5 30.2 42.1 62.0 34.1 28.4	HF-6/0.5 HF-6/4 HF-6/4.5 HF-6/10 HF-6/15 HF-6/20 HF-6/24.5 HF-7/4 LDC Report# 4761A1 and AR-11/4 AR-11/10 AR-11/15 LDC Report# 4855A1	UJ (all non-detects) J+ (all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A
4/18/00	Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon disulfide Vinyl acetate Carbon tetrachloride	29.0 45.5 55.8 35.7 33.1	AR-11/17 AR-5/4 AR-5/10 AR-5/15 LDC Report# 4855A1	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	A

Note:

Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 10 of 15)

Table 3.4-2H Continuing Calibration RRFs for SW8260B - VOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
3/2/00	2-Chloroethylvinyl ether Acetone 2-Butanone 2-Hexanone	0.034 (≥ 0.05) 0.018 (≥ 0.05) 0.028 (≥ 0.05) 0.043 (≥ 0.05)	All water samples in SDG G0B260131 MW9/K MW7/K TRIP BLANK 2-25-00 LDC Report# 4678B1 and All water samples in SDG G0B240168: MW1/K TRIP BLANK 2-22-00 LDC Report# 4678C1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/10/00	2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	0.030 (≥ 0.05) 0.044 (≥ 0.05) 0.019 (≥ 0.05) 0.032 (≥ 0.05) 0.044 (≥ 0.05) 0.041 (≥ 0.05)	All water samples in SDG G0C300256: SV-S1 NV-S1 NV-S2 MW-13/K TB032900B TB032900 LDC Report# 4868A1	R (all non-detects) R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/12/00	2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	0.028 (≥ 0.05) 0.036 (≥ 0.05) 0.019 (≥ 0.05) 0.026 (≥ 0.05) 0.039 (≥ 0.05) 0.038 (≥ 0.05)	All water samples in SDG G0C310244: AR-12/K MW-15/K NV-S2/A TB033000B TB033000C LDC Report# 4769A1	R (all non-detects) R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/13/00	2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	0.027 (≥ 0.05) 0.040 (≥ 0.05) 0.020 (≥ 0.05) 0.028 (≥ 0.05) 0.044 (≥ 0.05) 0.034 (≥ 0.05)	All water samples in SDG G0D04026: MW-3A/K TB040300A LDC Report# 4733D1 and All water samples in SDG G0D01014: TB033100A HF-9/K TB033100B LDC Report# 4743A1	R (all non-detects) R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 11 of 15)

Table 3.4-2H Continuing Calibration RRFs for SW8260B - VOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
4/17/00	2-Chloroethylvinyl ether Acetone 2-Butanone	0.03080 (≥ 0.05) 0.02944 (≥ 0.05) 0.03993 (≥ 0.05)	All water samples in SDG G0D070177 WAT-4 WAT-3 TB040600A TB040600B TB040600C LDC Report# 4754A1 and All samples in SDG G0D110255: MW-8 MW-9 TB4-11-00 LDC Report# 4858A1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/18/00	2-Chloroethylvinyl ether Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	0.028 (≥ 0.05) 0.021 (≥ 0.05) 0.029 (≥ 0.05) 0.049 (≥ 0.05) 0.041 (≥ 0.05)	WAT-4 LDC Report# 4754A6 and All water samples in SDG G0D080146: HF-6/K TRIP BLANK LDC Report# 4761A1 and All water samples in SDG G0D060121: TB040500A LDC Report# 4778B1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/20/00	2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane Acetone 2-Butanone 2-Hexanone	0.030 (≥ 0.05) 0.049 (≥ 0.05) 0.024 (≥ 0.05) 0.028 (≥ 0.05) 0.043 (≥ 0.05)	All samples in SDG G0D110255: MW-8 MW-9 TB4-11-00 LDC Report# 4858A1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
4/21/00	2-Chloroethylvinyl ether Acetone 2-Butanone 2-Hexanone	0.029 (≥ 0.05) 0.023 (≥ 0.05) 0.030 (≥ 0.05) 0.038 (≥ 0.05)	MW-6 MW-13 TB4-12-00 TB4-13-00 LDC Report# 4812A1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A

Table 3.4-2. Calibration Tables
Summary of QC Outliers (Page 12 of 15)

Table 3.4-2H Continuing Calibration RRFs for SW8260B - VOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
4/24/00	2-Chloroethylvinyl ether Acetone 2-Butanone 2-Hexanone	0.027 (≥ 0.05) 0.022 (≥ 0.05) 0.028 (≥ 0.05) 0.045 (≥ 0.05)	MW-15 TB4-12-00 LDC Report# 4812A1 and All water samples in SDG G0D140298: TB04-14-00 LDC Report# 4855A1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
5/1/00	2-Chloroethylvinyl ether Acetone 2-Butanone 2-Hexanone	0.027 (≥ 0.05) 0.023 (≥ 0.05) 0.032 (≥ 0.05) 0.046 (≥ 0.05)	All samples in SDG G0D200159 MW-3 NV-S3 TB-04-18-00A TB-04-18-00 LDC Report# 4827B1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A
5/3/00	2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	0.040 (≥ 0.05) 0.049 (≥ 0.05) 0.021 (≥ 0.05) 0.035 (≥ 0.05) 0.024 (≥ 0.05) 0.049 (≥ 0.05)	All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K TB04-20-00 LDC Report# 4864A1 and All samples in SDG G0D250199 MW-3B TB-04-24-00 LDC Report# 4827F1	R (all non-detects) J (all detects) UJ (all non-detects) Change: R (all non-detects) To: UJ (all non-detects) For Ketones*	A

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2I Initial Calibration for SW8270C - SVOCs

Date	Compound	%RSD	Associated Samples	Flag	A or P
4/26/00	3-Nitroaniline Carbazole Benzidine	40.202 41.802 65.846	SP1-R1 SP2-R1 SP2-R2 LDC Report# 4864A2 and SP3-R1 SP3-R2 SP3-R3 SP3-R4 LDC Report# 4864B2	J (all detects) UJ (all non-detects)	A
5/6/00	Benzidine	59.063	SP1-R2 LDC Report# 4864A2	UJ (all non-detects)	A

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 13 of 15)

Table 3.4-2I Initial Calibration for SW8270C - SVOCs

Date	Compound	%RSD	Associated Samples	Flag	A or P
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Note: **Bold highlight** indicates that associated sample results were qualified for this compound.

Table 3.4-2J Continuing Calibrations for SW8270C - SVOCs

Date	Compound	%D	Associated Samples	Flag	A or P
5/4/00	Benzidine	74.1	SP1-R1 SP2-R1	R (all non-detects)	A
	3,3'-Dichlorobenzidine	38.2	SP2-R2	UJ (all non-detects)	
	Indeno(1,2,3-cd)pyrene	31.5	LDC Report# 4864A2	J+ (all detects)	
	Benzo(g,h,i)perylene	29.0	and SP3-R1 (SP3-R1/0.5)	J+ (all detects: SP1-R1 and SP3-R1/0.5 only)	
	Carbazole	56.9	SP3-R2 (SP3-R2/0.5)	NA (J+ all detects)	
	Dibenz(a,h)anthracene	39.2	SP3-R3 (SP3-R3/0.5) SP3-R4 (SP3-R4/0.5) LDC Report# 4864B2	NA (J+ all detects) No samples qualified, all ND	

Note: **Bold highlight** indicates that associated sample results were qualified for this compound.

Table 3.4-2K Continuing Calibration RRFs for SW8270C - SVOCs

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
5/4/00	Benzidine	0.016 (≥ 0.05)	SP1-R1 SP2-R1 SP2-R2 LDC Report# 4864A2 and SP3-R1 SP3-R2 SP3-R3 SP3-R4 LDC Report# 4864B2	R (all non-detects)	A

Note: **Bold highlight** indicates that associated sample results were qualified for this compound.

Table 3.4-2L Routine (Continuing) Calibration for SW8290 - Dioxin/Furans

Date	Compound	%D (Limits)	Associated Samples	Associated Compounds	Flag	A or P
3/4/00	1,2,3,7,8-PeCDD OCDF OCDD	22.1 (≤ 20) 61.0 (≤ 20) 23.3 (≤ 20)	MW1/17.5 MW1/21 MW5/11 MW5/10.5 MW1/K SRC3	1,2,3,7,8-PeCDD OCDF OCDD	NA (J+ all detects) NA (J+ all detects) NA (J+ all detects) No samples qualified, all ND	P

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 14 of 15)

Table 3.4-2L Routine (Continuing) Calibration for SW8290 - Dioxin/Furans

Date	Compound	%D (Limits)	Associated Samples	Associated Compounds	Flag	A or P
3/4/00	¹³ C-1,2,3,4,7,8-HxCDF	34.8 (≤30)	MW1/17.5 MW1/21 MW5/11 MW5/10.5 MW1/K SRC3	1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF	UJ (all non-detects)	P
	¹³ C-1,2,3,4,6,7,8-HpCDF	40.0 (≤30)	LDC Report# 4678A21	1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	UJ (all non-detects)	
4/14/00	¹³ C-1,2,3,4,7,8-HxCDF	64.5 (≤30)	WET-2R	1,2,3,4,7,8-HxCDF	UJ (all non-detects)	P
	¹³ C-1,2,3,6,7,8-HxCDD	35.6 (≤30)	LDC Report# 4868A21	1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF		
	1,2,3,4,6,7,8-HpCDF	33.0 (≤20)		1,2,3,4,6,7,8-HpCDF		

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2. Calibration Tables
 Summary of QC Outliers (Page 15 of 15)

Table 3.4-2M Continuing Calibrations for SW8310 - PAHs

Date	Detector	Compound	%D	Associated Samples	Flag	A or P
4/25/00 (8:12)	VAR5500 FL	Naphthalene Fluorene Anthracene Pyrene Chrysene Benzo(g,h,i)perylene	28 18 20 29 24 20	All samples in SDG G0D070177: WAT-4 WAT-3 LDC Report# 4754A9 and NV-S2/A LDC Report# 4769A9	UJ (all non-detects)	A
4/26/00	VAR5500 FL	Naphthalene Anthracene Benzo(b)fluoranthene	23 19 16	WV-S2A LDC Report# 4769A9	UJ (all non-detects) J- (all detects) J+ (all detects)	A

Note: Bold highlight indicates that associated sample results were qualified for this compound.

Table 3.4-2N Continuing Calibrations for SW8315M - Hydrazines

Date	Detector	Compound	%D	Associated Samples	Flag	A or P
4/22/00	UV#1 365 nm UV#2 322 nm	Hydrazine MMH	21 21	All samples in SDG 602509 MW-10 MW-11 MW-12	<i>NA (J+ all detects)</i> <i>NA (J+ all detects)</i> No samples qualified, all ND	A

Note: Bold highlight indicates that associated sample results were qualified for this compound.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 1 of 20)

Table 3.4-3A Laboratory Blanks for General Chemistry Methods

Method Blank ID	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/415.1/SW9060 Analyte	Concentration	Associated Samples
MB	Total organic carbon	0.11 mg/L	All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K LDC Report# 4864A6
MB	Total organic carbon	0.11 mg/L	All samples in SDG G0D250199 MW-3B LDC Report# 4827F6
MB	Total organic carbon	0.11 mg/L	All samples in SDG G0D200159 MW-3 NV-S3 LDC Report# 4827B6
MB	Total organic carbon	0.11 mg/L	All samples in SDG G0D200312 MW-11 MW-12 LDC Report# 4827C6

Note: Bold highlight indicates that associated non-blank field sample results were blank qualified for this element. No results were qualified due to method blank contamination.

Table 3.4-3B Field Blanks for General Chemistry Methods

Equipment Blank ID	Sampling Date	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/415.1/SW9060 Analyte	Concentration	Associated Samples
MW-10/K	4/21/00	Nitrate as N Total dissolved solids Total organic carbon	0.048 mg/L 18.0 mg/L 0.17 mg/L	MW-10
MW-12/K LDC Report# 4864A6	4/21/00	Nitrate as N Total organic carbon	0.047 mg/L 0.16 mg/L	MW-10

Note: Bold highlight indicates that associated non-blank field sample results were blank qualified for this element.

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 2 of 20)

Table 3.4-3C Blank Qualifications for General Chemistry Methods

Sample	GENERAL CHEMISTRY: EPA Methods 160.1/160.2/300.0/415.1/SW9060 Analyte	Reported Concentration	Modified Final Concentration
MW-10	Nitrate as N <i>** Qualified due to EB not MB</i>	0.042 mg/L	0.042J mg/L
MW-10/K*	Total organic carbon	0.17 mg/L	0.17UJ mg/L
MW-12/K*	Total organic carbon	0.16 mg/L	0.16UJ mg/L
LDC Report# 4864A6	<i>* Samples MW-10/K, and MW-12/K were identified as equipment blanks and should not be blank-qualified.</i>		

Notes:

Bold highlight indicates that non-blank field sample results were qualified for this analyte.

* Equipment blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and USEPA Region IX validation protocols, field, equipment and trip blanks cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

** Field sample results for nitrate-N less than 5 times the blank qualification but present at levels above 20 mg/Kg have been qualified as estimated (J) instead of non-detected and estimated (UJ) using professional judgement at the request of the project chemist. Such results were not qualifiable due to levels of nitrate in the method blanks. The consistent levels of nitrate-N in the equipment blanks were also present in the source water, and are thus not representative of contamination from the sampling equipment. The levels of nitrate-N in the associated field samples are expected to be due to environmental nitrate, but are qualified as estimated (J) due to the levels of nitrate-N reported in the equipment blanks.

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 3 of 20)

Table 3.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Iron Magnesium	0.0492 mg/L 0.0180 mg/L 0.0412 mg/L	All samples in SDG G0D070177: WAT-4 WAT-3
ICB/CCB	Cadmium Manganese Nickel Selenium Molybdenum	0.0036 mg/L 0.0031 mg/L 0.028 mg/L 0.0033 mg/L 0.011 mg/L	WAT-4 WAT-3 LDC Report# 4754A4
ICB/CCB	Cadmium	0.0032 mg/L	All samples in SDG G0C310244: WV-S1** NV-S2/A LDC Report# 4769A4
PB (prep blank)	Barium Calcium Iron Magnesium Nickel Sodium	0.15 mg/Kg 5.3 mg/Kg 1.1 mg/Kg 2.3 mg/Kg 0.11 mg/Kg 7.5 mg/Kg	All samples in SDG G0D060121: MW-6/0.5 MW-6/1 MW-6/4 MW-6/10 MW-6/15 MW-6/20
ICB/CCB	Manganese Selenium	2.7 ug/L 3.1 ug/L	MW-6/0.5 MW-6/1 MW-6/4 MW-6/10 MW-6/15 MW-6/20 LDC Report# 4778B4
PB1 (prep blank)	Calcium Iron Sodium Zinc	0.10 mg/L 0.015 mg/L 0.16 mg/L 0.0034 mg/L	MW-6 MW-13
ICB/CCB1	Barium Cadmium Chromium Manganese Selenium Thallium	0.0057 mg/L 0.0053 mg/L 0.0058 mg/L 0.0053 mg/L 0.0027 mg/L 0.006 mg/L	MW-15

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 4 of 20)

Table 3.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
ICB/CCB2	Molybdenum	0.014 mg/L	All samples in SDG G0D130323: MW-15 MW-6 MW-13 MW-7 LDC Report# 4812A14
ICB/CCB	Barium Chromium Manganese Selenium Thallium	0.0057 mg/L 0.00582 mg/L 0.0053 mg/L 0.00266 mg/L 0.00601 mg/L	All samples in SDG G0D120283: MW-2 MW-14 LDC Report# 4827A14
PB1 (prep blank)	Iron Sodium	0.0075 mg/L 0.0907 mg/L	MW-1
ICB/CCB1	Selenium Thallium	0.00331 mg/L 0.0060 mg/L	MW-1
PB2 (prep blank)	Iron Sodium	0.0075 mg/L 0.0907 mg/L	MW-1A
ICB/CCB2	Cadmium Cobalt Manganese Selenium Thallium Molybdenum	0.004 mg/L 0.0113 mg/L 0.004 mg/L 0.00331 mg/L 0.0060 mg/L 0.0111 mg/L	MW-1A LDC Report# 4827A4
PB (prep blank)	Calcium Iron Magnesium	0.049 mg/L 0.018 mg/L 0.041 mg/L	All samples in SDG G0D110255: MW-8 MW-9 MW-9/K
ICB/CCB	Cobalt Selenium Thallium	0.00625 mg/L 0.00275 mg/L 0.00608 mg/L	MW-8 MW-9 MW-9/K LDC Report# 4858A4
ICB/CCB	Aluminum Cobalt	0.11839 mg/L 0.01014 mg/L	All samples in SDG G0C300256: SV-S1 NV-S1 NV-S2 LDC Report# 4868A4

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 5 of 20)

Table 3.4-3D Laboratory Blanks for Metals

Method Blank ID	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Iron Magnesium	0.039 ug/L 0.024 ug/L 0.041 ug/L	All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K LDC Report# 4864A14
ICB/CCB	Thallium	0.00933 mg/L	All samples in SDG G0D250199: MW-3B LDC Report# 4827F14
PB (prep blank)	Calcium Iron Magnesium	0.039 mg/L 0.024 mg/L 0.041 mg/L	All samples in SDG G0D200312: MW-11
ICB/CCB	Cadmium Cobalt	0.00329 mg/L 0.00721 mg/L	MW-11 LDC Report# 4827C14
PB (prep blank)	Calcium Iron Magnesium	0.039 ug/L 0.024 ug/L 0.041 ug/L	All samples in SDG G0D200159: MW-4A MW-4 MW-4/L MW-3 NV-S3
ICB/CCB	Cadmium Cobalt	0.00329 ug/L 0.00721 ug/L	MW-4A MW-4 MW-4/L MW-3 NV-S3 LDC Report# 4827B14
PB (prep blank)	Iron	0.0069 mg/L	All samples in SDG G0D180262: MW-4
ICB/CCB	Cobalt	0.00557 mg/L	MW-4 LDC Report# 4837A4

Note:
Bold highlight indicates that associated non-blank field sample results were blank qualified for this element.

Table 3.4-3. Field and Laboratory Blank Tables
Summary of QC Outliers (Page 6 of 20)

Table 3.4-3E Field Blanks for Metals

Equipment Blank ID	Sampling Date	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Concentration	Associated Samples
MW-9/K LDC Report# 4858A4	4/11/00	Calcium Iron Magnesium Manganese Sodium Zinc	0.092 mg/L 0.014 mg/L 0.078 mg/L 0.0044 mg/L 0.15 mg/L 0.038 mg/L	MW-9 MW-8
MW-10/K	4/2/00	Iron Magnesium Sodium Zinc Calcium Copper Manganese	0.0061 mg/L 0.074 mg/L 0.14 mg/L 0.0022 mg/L 0.14 mg/L 0.0036 mg/L 0.0092 mg/L	MW-10
MW-12/K LDC Report# 4864A14	4/2/00	Iron Magnesium Sodium Calcium Copper Manganese	0.0047 mg/L 0.029 mg/L 0.079 mg/L 0.12 mg/L 0.0029 mg/L 0.0023 mg/L	MW-10

Note:

Bold highlight indicates that associated non-blank field sample results were blank qualified for this element.

Table 3.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
WAT-4*	Iron Manganese Nickel	0.030 mg/L 0.0036 mg/L 0.0028 mg/L	0.030U mg/L 0.0036U mg/L 0.0028U mg/L
WAT-3* LDC Report# 4754A4	Calcium Iron Magnesium <i>* Samples identified as field blanks should not be blank-qualified.</i>	0.0343 mg/L 0.0151 mg/L 0.0391 mg/L	0.0343U mg/L 0.0151U mg/L 0.0391U mg/L
MW-15	Manganese	0.014 mg/L	0.014UJ mg/L
MW-13 LDC Report# 4812A14	Iron	0.020 mg/L	0.020UJ mg/L

Table 3.4-3. Field and Laboratory Blank Tables

Summary of QC Outliers (Page 7 of 20)

Table 3.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
MW-2	Manganese Thallium	0.0050 mg/L 0.0036 mg/L	0.0050UJ mg/L 0.0036UJ mg/L
MW-14 LDC Report# 4827A14	Manganese Thallium	0.0060 mg/L 0.0052 mg/L	0.0060UJ mg/L 0.0052UJ mg/L
MW-1	Thallium	0.0038 mg/L	0.0038UJ mg/L
MW-1A LDC Report# 4827A4	Manganese	0.0144 mg/L	0.0144UJ mg/L
MW-9	Iron Manganese (Due to EB only) Zinc (Due to EB only)	0.059 mg/L 0.0030 mg/L 0.042 mg/L	0.059UJ mg/L 0.0030UJ mg/L 0.042UJ mg/L
MW-8	Iron Selenium Manganese (Due to EB only) Zinc (Due to EB only)	0.012 mg/L 0.0040 mg/L 0.0076 mg/L 0.038 mg/L	0.012UJ mg/L 0.0040UJ mg/L 0.0076UJ mg/L 0.038UJ mg/L
MW-9/K* LDC Report# 4858A4	Calcium Iron Magnesium <i>* Samples identified as field blanks should not be blank-qualified.</i>	0.092 mg/L 0.014 mg/L 0.078 mg/L	0.092UJ mg/L 0.014UJ mg/L 0.078UJ mg/L
NV-S2 LDC Report# 4868A4	Aluminum Cobalt	0.075 mg/L 0.0089 mg/L	0.075U mg/L 0.0089U mg/L
MW-10	Iron Zinc (Due to EB only) Copper (Due to EB only)	0.038 mg/L 0.0079 mg/L 0.0036 mg/L	0.038UJ mg/L 0.0079UJ mg/L 0.0036UJ mg/L
MW-10/K*	Calcium Iron Magnesium	0.14 mg/L 0.0061 mg/L 0.074 mg/L	0.14UJ mg/L 0.0061UJ mg/L 0.074UJ mg/L
MW-12/K* LDC Report# 4864A14	Calcium Iron Magnesium <i>* Samples identified as field blanks should not be blank-qualified.</i>	0.14 mg/L 0.0047 mg/L 0.029 mg/L	0.14UJ mg/L 0.0047UJ mg/L 0.029UJ mg/L

Table 3.4-3. Field and Laboratory Blank Tables
Summary of QC Outliers (Page 8 of 20)

Table 3.4-3F Blank Qualifications for Metals

Sample	Metals: EPA Methods SW6010B/SW7470ASW/7471A Analyte	Reported Concentration	Modified Final Concentration
MW-4A	Iron	0.061 ug/L	0.061UJ ug/L
MW-4	Iron	0.0058 ug/L	0.0058UJ ug/L
MW-4/L	Calcium Iron Magnesium	0.074 ug/L 0.0043 ug/L 0.053 ug/L	0.074UJ ug/L 0.0043UJ ug/L 0.053UJ ug/L
MW-3	Iron	0.013 ug/L	0.013UJ ug/L
NV-S3	Cobalt Iron	0.0076 ug/L 0.054 ug/L	0.0076UJ ug/L 0.054UJ ug/L
LDC Report# 4827B14			

Notes:

Bold highlight indicates that non-blank field sample results were qualified for this analyte.

* Equipment blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and USEPA Region IX validation protocols, field, equipment and trip blanks cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

Table 3.4-3. Field and Laboratory Blank Tables

Summary of QC Outliers (Page 9 of 20)

Table 3.4-3G Laboratory Blanks for SW8260B - VOCs

Method Blank ID	Analysis Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
0059303MB	2/25/00	Naphthalene	0.0024 mg/Kg	MW1/21 MW1/24 MW8/0.5 MW8/4 MW8/10 MW8/15
0060467MB	2/26/00	Acetone	0.0055 mg/Kg	MW1/17.5
0059303MB		Hexachlorobutadiene	0.0011 mg/Kg	LDC Report# 4678A1
0060467MB	2/26/00	Acetone Hexachlorobutadiene	0.0055 mg/Kg 0.0011 mg/Kg	All soil samples in SDG G0B260131: MW9/4 MW9/10 MW9/15 MW9/K MW7/K TRIP BLANK 2-25-00 LDC Report# 4678B1
0057165MB	2/24/00	Naphthalene	0.0026 mg/Kg	All soil samples in SDG G0B240168: MW2/4 MW2/4.5 MW2/10 MW2/15 MW2/20 MW1/K TRIP BLANK 2-22-00 LDC Report# 4678C1
0108367-BLK	4/7/00	Acetone	0.0059 mg/Kg	All soil samples in SDG G0D040260: MW-3A/3.5 MW-3A/5 MW-3A/5.5 MW-3A/10 MW-3A/15 MW-3A/20 MW-3A/K TB040300A LDC Report# 4733D1
0108418-BLK	4/4/00	Acetone	0.0092 mg/Kg	AR-6/4 AR-6/10 AR-6/15 AR-9/4.0 AR-9/10 AR-9/10.5 AR-9/15 LDC Report# 4743A1

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 10 of 20)

Table 3.4-3G Laboratory Blanks for SW8260B - VOCs

Method Blank ID	Analysis Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
0108419-BLK	4/5/00	Acetone	0.077 mg/Kg	AR-10/4 AR-10/10 AR-10/15 AR-10/17 HF-9/0.5 HF-9/4 HF-9/10 HF-9/15 HF-9/20 LDC Report# 4743A1
0109206-BLK	4/10/00	Acetone	0.0080 mg/Kg	HF-5/1.0 HF-5/4.0 HF-5/10.0 HF-5/20 HF-7/0.5 LCD Report# 4754A1
0115264-BLK	4/17/00	Acetone	0.012 mg/Kg	HF-7/4 HF-6/24.5 HF-6/0.5 HF-6/4 HF-6/4.5 HF-6/10 HF-6/15 HF-6/20 LDC Report# 4761A1
0105394-BLK	4/3/00	Acetone 1,3-Dichlorobenzene 1,2,4-Trichlorobenzene	0.0081 mg/Kg 0.00078 mg/Kg 0.00081 mg/Kg	MW-14/4 MW-14/10 MW-15/10 MW-15/15 MW-15/20 AR-7/10 AR-7/15 AR-7/20 AR-8/10
0108267-BLK	4/4/00	Acetone	0.0092 mg/Kg	AR-8/4 AR-8/4.5 AR-12/4 AR-12/4.5 AR-12/10
0108367-BLK	4/7/00	Acetone	0.0059 mg/Kg	MW-15/4 AR-7/4 LDC Report# 4769A1
0108367-BLK	4/7/00	Acetone	0.0059 mg/Kg	HF-8/4 HF-8/10 HF-8/15
0109206-BLK	4/10/00	Acetone	0.0080 mg/Kg	HF-8/0.5 HF-8/15.5 LDC Report# 4778B1

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 11 of 20)

Table 3.4-3G Laboratory Blanks for SW8260B - VOCs

Method Blank ID	Analysis Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
0115264-BLK	4/14/00	Acetone	0.012 mg/Kg	AR-11/4 AR-11/10 AR-11/15
0115469-BLK	4/18/00	Acetone	0.0080 mg/Kg	AR-11/17 AR-5/4 AR-5/10 AR-5/15 LDC Report# 4855A1
0123252-BLK	5/1/00	Acetone	1.2 ug/L	All samples in SDG G0D200159: MW-3 NV-S3 TB-04-24-00 LDC Report# 4827B1
0125328-BLK	5/3/00	Acetone (none qualified)	1.3 ug/L	All samples in SDG G0D220129: MW-10 MW-10/K MW-12/K TB04-20-00 LDC Report# 4864A1
0105394-BLK	4/3/00	Acetone 1,3-Dichlorobenzene 1,2,4-Trichlorobenzene	0.0081 mg/Kg 0.00078 mg/Kg 0.00081 mg/Kg	All soil samples in SDG G0C300256: MW-13/4 MW-13/4.5 MW-13/10 MW-13/15 LDC Report# 4868A1
0125328-BLK	5/3/00	Acetones	1.3 ug/L	All samples in SDG G0D250199: MW-3B TB-04-24-00 LDC Report# 4827F1
0108367-BLK	4/7/00	Acetone	0.0059 mg/Kg	All soil samples in SDG G0D040260: MW-3A/3.5 MW-3A/5 MW-3A/5.5 MW-3A/10 MW-3A/15 MW-3A/20 LDC Report# 4733D1

Note:

Bold highlight indicates that associated non-blank field sample results were blank qualified for this analyte.

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 12 of 20)

Table 3.4-3H Field Blanks for SW8260B - VOCs

Blank ID	Sampling Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
Trip Blank				
TRIP BLANK (2/23) LDC Report# 4678A1	2/23/00	Chloroform Bromodichloromethane Dibromochloromethane	18 ug/L 6.3 ug/L 1.6 ug/L	MW1/17.5 MW1/21 MW1/24 SRC3 MW1/K
TRIP BLANK 2-25-00 LDC Report# 4678B1	2/25/00	Chloroform Bromodichloromethane Dibromochloromethane	16 ug/L 5.7 ug/L 1.5 ug/L	MW9/4 MW9/10 MW9/15 MW9/K MW7/K
TRIP BLANK 2-22-00 LDC Report# 4678C1	2/22/00	Chloroform Bromodichloromethane Dibromochloromethane	17 ug/L 5.8 ug/L 1.6 ug/L	MW2/4 MW2/4.5 MW2/10 MW2/15 MW1/K MW2/20
Equipment Blank ID				
MW7/K LDC Report# 4678B8	2/24/00	Chloroform Bromodichloromethane Dibromochloromethane	16 ug/L 5.5 ug/L 1.5 ug/L	MW7/4 MW7/9 MW9/0 MW7/0 MW7/0.5
MW1/K LDC Report# 4678C1	2/22/00	Chloroform Bromodichloromethane Dibromochloromethane	16 ug/L 5.5 ug/L 1.5 ug/L	MW2/4 MW2/4.5 MW2/10 MW2/15 MW2/20
HF-9/K LDC Report# 4743A1	3/31/00	Acetone	3.3 ug/L	AR-6/4 AR-6/10 AR-6/15 AR-9/4.0 AR-9/10 AR-9/10.5 AR-9/15 AR-10/4 AR-10/10 AR-10/15 AR-10/17 HF-9/0.5 HF-9/4 HF-9/10 HF-9/15 HF-9/20

Table 3.4-3. Field and Laboratory Blank Tables

Summary of QC Outliers (Page 13 of 20)

Table 3.4-3H Field Blanks for SW8260B - VOCs

Blank ID	Sampling Date	VOCs: EPA Method SW8260B Compound	Concentration	Associated Samples
HF-6/K LDC Report# 4761A1	4/7/00	Acetone	1.9 ug/L	HF-7/4 HF-7/10 HF-7/15 HF-7/20 HF-6/24.5 HF-6/0.5 HF-6/4 HF-6/4.5 HF-6/10 HF-6/15 HF-6/20
Source Blank ID				
WAT-3 LDC Report# 4754A1	4/6/00	Chloroform Dibromochloromethane Bromodichloromethane	55 ug/L 4.1 ug/L 16 ug/L	HF-5/0.5 HF-5/1.0 HF-5/4.0 HF-5/10.0 HF-5/15.0 HF-5/20 HF-5/25 HF-7/0.5 HF-7/1.0

Note:

Bold highlight indicates that associated non-blank field sample results were blank qualified for this analyte.

Table 3.4-3. Field and Laboratory Blank Tables
Summary of QC Outliers (Page 14 of 20)

Table 3.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
MW1/21	Naphthalene	0.00094 mg/Kg	0.00094UJ mg/Kg
MW8/0.5	Naphthalene	0.0013 mg/Kg	0.0013UJ mg/Kg
MW1/17.5 LDC Report# 4678A1	Acetone	0.011 mg/Kg	0.011UJ mg/Kg
MW9/4	Acetone Hexachlorobutadiene	0.024 mg/Kg 0.0015 mg/Kg	0.024UJ mg/Kg 0.0015UJ mg/Kg
MW9/10	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
MW9/15	Acetone	0.0085 mg/Kg	0.0085UJ mg/Kg
MW7/K * LDC Report# 4678B1	Chloroform Bromodichloromethane Dibromochloromethane <i>* Samples identified as trip blanks should not be blank-qualified.</i>	16 ug/L 5.5 ug/L 1.5 ug/L	16UJ ug/L 5.5UJ ug/L 1.5UJ ug/L
MW2/4	Naphthalene	0.0018 mg/Kg	0.0018UJ mg/Kg
MW2/4.5	Naphthalene	0.0013 mg/Kg	0.0013UJ mg/Kg
MW1/K* LDC Report# 4678C1	Chloroform Bromodichloromethane Dibromochloromethane <i>* Samples identified as trip blanks should not be blank-qualified.</i>	16 ug/L 5.5 ug/L 1.5 ug/L	16UJ ug/L 5.5UJ ug/L 1.5UJ ug/L
MW-3A/3.5	Acetone	0.041 mg/Kg	0.041UJ mg/Kg
MW-3A/5	Acetone	0.033 mg/Kg	0.033UJ mg/Kg
MW-3A/5.5	Acetone	0.040 mg/Kg	0.040UJ mg/Kg
MW-3A/10	Acetone	0.033 mg/Kg	0.033UJ mg/Kg
MW-3A/15	Acetone	0.037 mg/Kg	0.037UJ mg/Kg
MW-3A/20 LCD Report# 4733D1	Acetone	0.011 mg/Kg	0.011UJ mg/Kg

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 15 of 20)

Table 3.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
AR-6/4	Acetone	0.073 mg/Kg	0.073UJ mg/Kg
AR-6/10	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
AR-6/15	Acetone	0.018 mg/Kg	0.018UJ mg/Kg
AR-9/4.0	Acetone	0.019 mg/Kg	0.019UJ mg/Kg
AR-9/10	Acetone	0.044 mg/Kg	0.044UJ mg/Kg
AR-9/10.5	Acetone	0.025 mg/Kg	0.025UJ mg/Kg
AR-9/15	Acetone	0.031 mg/Kg	0.031UJ mg/Kg
AR-10/4	Acetone	0.047 mg/Kg	0.047UJ mg/Kg
AR-10/10	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
AR-10/15	Acetone	0.025 mg/Kg	0.025UJ mg/Kg
AR-10/17	Acetone	0.0090 mg/Kg	0.0090UJ mg/Kg
HF-9/0.5	Acetone	0.039 mg/Kg	0.039UJ mg/Kg
HF-9/4	Acetone	0.030 mg/Kg	0.030UJ mg/Kg
HF-9/10	Acetone	0.021 mg/Kg	0.021UJ mg/Kg
HF-9/15	Acetone	0.019 mg/Kg	0.019UJ mg/Kg
HF-9/20	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
LDC Report# 4743A1			
HF-5/1.0	Acetone	0.021 mg/Kg	0.021UJ mg/Kg
HF-5/4.0	Acetone	0.040 mg/Kg	0.040UJ mg/Kg
HF-5/10.0	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
HF-5/20	Acetone	0.022 mg/Kg	0.022UJ mg/Kg
LDC Report# 4754A1			

Table 3.4-3. Field and Laboratory Blank Tables
 Summary of QC Outliers (Page 16 of 20)

Table 3.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
HF-7/4	Acetone	0.12 mg/Kg	0.12UJ mg/Kg
HF-6/24.5	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
HF-6/0.5	Acetone	0.028 mg/Kg	0.028UJ mg/Kg
HF-6/4.5	Acetone	0.054 mg/Kg	0.054UJ mg/Kg
HF-6/10	Acetone	0.022 mg/Kg	0.022UJ mg/Kg
HF-6/15	Acetone	0.018 mg/Kg	0.018UJ mg/Kg
HF-6/20	Acetone	0.044 mg/Kg	0.044UJ mg/Kg
HF-6/24.5	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
LDC Report# 4761A1			
MW-14/4	Acetone	0.018 mg/Kg	0.018UJ mg/Kg
MW-14/10	Acetone	0.013 mg/Kg	0.013UJ mg/Kg
MW-15/10	Acetone	0.084 mg/Kg	0.084UJ mg/Kg
MW-15/15	Acetone	0.039 mg/Kg	0.039UJ mg/Kg
MW-15/20	Acetone	0.012 mg/Kg	0.012UJ mg/Kg
AR-7/4	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
AR-7/10	Acetone	0.041 mg/Kg	0.041UJ mg/Kg
AR-7/20	Acetone	0.017 mg/Kg	0.017UJ mg/Kg
AR-8/10	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
AR-8/4	Acetone	0.074 mg/Kg	0.074UJ mg/Kg
AR-8/4.5	Acetone	0.047 mg/Kg	0.047UJ mg/Kg
AR-12/4	Acetone	0.058 mg/Kg	0.058UJ mg/Kg
AR-12/4.5	Acetone	0.055 mg/Kg	0.055UJ mg/Kg
AR-12/10	Acetone	0.013 mg/Kg	0.013UJ mg/Kg
MW-15/4	Acetone	0.021 mg/Kg	0.021UJ mg/Kg
LDC Report# 4769A1			

Table 3.4-3. Field and Laboratory Blank Tables

Summary of QC Outliers (Page 17 of 20)

Table 3.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
HF-8/4	Acetone	0.035 mg/Kg	0.035UJ mg/Kg
HF-8/10	Acetone	0.021 mg/Kg	0.021UJ mg/Kg
HF-8/15	Acetone	0.019 mg/Kg	0.019UJ mg/Kg
HF-8/0.5	Acetone	0.032 mg/Kg	0.032UJ mg/Kg
HF-8/15.5	Acetone	0.020 mg/Kg	0.020UJ mg/Kg
LDC Report# 4778B1			
AR-11/4	Acetone	0.019 mg/Kg	0.019UJ mg/Kg
AR-11/10	Acetone	0.022 mg/Kg	0.022UJ mg/Kg
AR-11/15	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
AR-11/17	Acetone	0.012 mg/Kg	0.012UJ mg/Kg
AR-5/4	Acetone	0.070 mg/Kg	0.070UJ mg/Kg
AR-5/10	Acetone	0.034 mg/Kg	0.034UJ mg/Kg
LDC Report# 4855A1			
MW-13/4	Acetone	0.021 mg/Kg	0.021UJ mg/Kg
MW-13/4.5	Acetone	0.014 mg/Kg	0.014UJ mg/Kg
MW-13/10	Acetone	0.017 mg/Kg	0.017UJ mg/Kg
MW-13/15	Acetone	0.016 mg/Kg	0.016UJ mg/Kg
LDC Report# 4868A1			
NV-S3	Acetone	1.7 ug/L	1.7UJ ug/L
LDC Report# 4827B1			
MW-3A/3.5	Acetone	0.041 mg/Kg	0.041UJ mg/Kg
LDC Report# 4733D1			

Table 3.4-3. Field and Laboratory Blank Tables
Summary of QC Outliers (Page 18 of 20)

Table 3.4-3I Blank Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound	Reported Concentration	Modified Final Concentration
MW-3A/5	Acetone	0.033 mg/Kg	0.033UJ mg/Kg
MW-3A/5.5	Acetone	0.040 mg/Kg	0.040UJ mg/Kg
MW-3A/10	Acetone	0.033 mg/Kg	0.033UJ mg/Kg
MW-3A/15	Acetone	0.037 mg/Kg	0.037UJ mg/Kg
MW-3A/20 LDC Report# 4733D1	Acetone	0.011 mg/Kg	0.011UJ mg/Kg

Note:

Bold highlight indicates that non-blank field sample results were qualified for this analyte.

* Equipment blanks were qualified by the validation sub-contractor, LDC, as non-detected and estimated (UJ) according to validation protocols followed by LDC. However, according to the Functional Guidelines and USEPA Region IX validation protocols, field, equipment and trip blanks cannot be blank-qualified according to the blank qualification rules as these samples are blanks, not environmental field samples. The results for all field blanks should be considered as detected at the reported concentrations for the purpose of evaluating potential field contamination.

Table 3.4-3J Common Laboratory Contaminant Qualifications for SW8260B - VOCs

Sample	VOCs: EPA Method SW8260B Compound Compound	Reported Concentration	Modified Final Concentration
MW-1/21	Acetone	0.0045 mg/kg	0.0045 UJ mg/kg
MW-2/10	Acetone	0.0087 mg/kg	0.0087 UJ mg/kg
MW-2/15	Acetone	0.01 mg/kg	0.01 UJ mg/kg
MW-2/20	Acetone	0.0081 mg/kg	0.0081 UJ mg/kg
AR-6/15	Methylene chloride	0.0047 mg/kg	0.0047 UJ mg/kg
MW-4A <i>Project Chemist Discretion*</i>	Methylene chloride	0.36 ug/L	0.36 UJ ug/L
NV-S2 LDC Report# 4868A1	Acetone	2.1 ug/L	2.1UJ ug/L

Note: * The project chemist qualified the results listed above according to the requirements specified in the Functional Guidelines and US EPA Region IX data validation protocols. Trace levels of acetone and methylene chloride are considered to be common laboratory contaminants for this analytical method and are known, demonstrated system contaminants at QES/STL.

Table 3.4-3. Field and Laboratory Blank Tables

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Table 3.4-3K Common Laboratory Contaminant Qualifications for SW8270C - SVOCs

Sample	SVOCs: EPA Method SW8270C Compound	Reported Concentration	Modified Final Concentration
SP2-R2 Not in LDC Report# 4864A2: Project Chemist Discretion*	bis(2-ethylhexyl) phthalate	0.072 mg/kg	0.072 UJ Mg/kg

Note: * The project chemist qualified the results listed above according to the requirements specified in the Functional Guidelines and US EPA Region IX data validation protocols. Trace levels of acetone and methylene chloride are considered to be common laboratory contaminants for this analytical method.

Table 3.4-3L Field Blanks for SW8290 - Dioxins/Furans

Method Blank ID	Extraction Date	Dioxins/Furans: EPA Method SW8290 Compound	Concentration	Associated Samples
0061101MB LDC Report# 4678A21	2/29/00	1,2,3,4,6,7,8-HpCDD OCDD OCDF	12 pg/G 160 pg/G 43 pg/G	All soil samples in SDG G0B250230 MW1/17.5 MW1/21 SRC3 MW1/K MW5/11 MW5/10.5

Note: Sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blank. No data were qualified, and there is no effect on the quality of the data.

Table 3.4-3. Field and Laboratory Blank Tables
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Table 3.4-3M Field Blanks for SW8330 - Explosives

Equipment Blank ID	Sampling Date	Explosives: EPA Method SW8330 Compound	Concentration	Associated Samples
TNT-1P/K	3/27/00	2,4,6-Trinitrotoluene	0.76 ug/L	TNT-R5 TNT-R1 TNT-R2 TNT-R3 TNT-R4 TNT-1P/0 TNT-1P/0.5 TNT-1P/1 TNT-1P/2
TNT-1Q/K LDC Report# 4868A40	3/28/00	2,4,6-Trinitrotoluene	18 ug/L	TNT-2F/0 TNT-2F/1 TNT-2F/2 TNT-1Q/0 TNT-1Q/1 TNT-1Q/2

Note: **Bold highlight** indicates that associated non-blank field sample results were blank qualified for this analyte. No field sample results were qualified due to equipment blank contamination.

These tables were reproduced from the tables in the Laboratory Data Consultants (LDC) data validation reports (DVRs) to present the findings of the third party data validation. Only QC outliers were included. Notes and highlights were added by Earth Tech. Any changes to the LDC DVR tables determined by the Earth Tech project chemist were highlighted in italics. Bold highlight specifies sample results qualified due to validation. The "A" and "P" designations are LDC DVR designations that indicate the LDC validator determined that the finding was based upon technical validation criteria (A) or that the validation finding was related to a protocol/contractual deviation (P).

Table 3.4-4. Surrogate Recovery Tables
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Table 3.4-4A Surrogate Recoveries for SW8015B - TEPH

Sample	Surrogate	%R (Limits)	TEPH: EPA Method SW8015B Compound	Flag	A or P
MW8/0.5	o-Terphenyl	46 (60-120)	TPH as extractables	UJ (all non-detects)	P
MW8/10 LDC Report# 4678A8	o-Terphenyl	53 (60-120)	TPH as extractables	UJ (all non-detects)	P
MW9/0	o-Terphenyl	57 (60-120)	TPH as extractables	UJ (all non-detects)	P
MW7/0	o-Terphenyl	58 (60-120)	TPH as extractables	UJ (all non-detects)	P
MW7/K LDC Report# 4678B8	o-Terphenyl	140 (50-110)	TPH as extractables	NA (J+ all detects) <i>No samples qualified, all ND</i>	P
MW-4 LDC Report# 4837A8	o-Terphenyl	115 (50-110)	TPH as extractables	NA (J+ all detects) <i>No samples qualified, all ND</i>	P
TNT-2F/2 (<i>NOT USED</i>) <i>High TNT interference</i>	o-Terphenyl	0.0 (60-120)	TPH as extractables	J- (all detects) R (all non-detects)	P
TNT-2F/2RE <i>High TNT interference</i>	o-Terphenyl	0.0 (30-120)	TPH as extractables	J- (all detects) R (all non-detects)	P
TNT-1Q/1 (<i>NOT USED</i>) <i>High TNT interference</i>	o-Terphenyl	0.0 (60-120)	TPH as extractables	J- (all detects) R (all non-detects)	P
TNT-1Q/1RE <i>High TNT interference</i> LDC Report# 4868A8	o-Terphenyl	0.0 (30-120)	TPH as extractables	J- (all detects) R (all non-detects)	P
MW-3B LDC Report# 4827F8	o-Terphenyl	116 (50-110)	TPH as extractables	NA (J+ all detects) <i>No samples qualified, all ND</i>	P

Note:

Bold highlight indicates that associated sample results were blank qualified for this compound.

Table 3.4-4. Surrogate Recovery Tables
Summary of QC Outliers (Page 2 of 2)

Table 3.4-4B Surrogate Recoveries for SW8260B - VOCs

Sample	Surrogate	%R (Limits)	VOCs: EPA Method SW8260B Compound	Flag	A or P
HF-9/10 LDC Report# 4743A1	1,2-Dichloroethane-d4	133 (70-130)	All TCL compounds	J+ (all detects): <i>(2-butanone only)</i>	P
HF-5/4.0	Bromofluorobenzene	69 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
HF-7/0.5 LDC Report# 4754A1	Bromofluorobenzene 1,2-Dichloroethane-d4	61 (70-130) 134 (70-130)	All TCL compounds	J (all detects) UJ (all non-detects)	A
MW-13/10 LDC Report# 4868A1	Bromofluorobenzene	61 (65-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

Note: **Bold highlight** indicates that associated sample results were blank qualified for this compound.

Table 3.4-4C Surrogate Recoveries for SW8310 - PAHs

Sample	Detector	Surrogate	%R (Limits)	Compound	Flag	A or P
MW-7	NA	1-Methylnaphthalene	23 (40-140)	All TCL compounds	UJ (all non-detects)	A
MW-7RE (NOT USED)	NA	1-Methylnaphthalene	34 (40-140)	All TCL compounds	UJ (all non-detects)	A

Note: **Bold highlight** indicates that associated sample results were blank qualified for this compound.

Table 3.4-4D Surrogate Recoveries for SW8330 - Explosives

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
TNT-2F/1 LDC Report# 4868A40	2,4-Dinitrofluorobenzene	33 (65-135)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

Note: **Bold highlight** indicates that associated sample results were blank qualified for this compound.

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