

# PERFORMANCE EVALUATION

Quarterly Study

**WP10-1**

WPCHEM / DMRQA 30

20-Jan-2010 through 5-Mar-2010

**RT1068**

RTC Labcode

**WY00006**

US EPA Labcode

Energy Laboratories  
Terry Friedlan  
400 West Boxelder Rd.  
Gillette WY 82718

Thank you for participating in study WP10-1. Additional information about this study may be found online at [www.rt-corp.com](http://www.rt-corp.com).  
If you have any questions or comments about this study please contact me.

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**This report may contain data that are not covered by the A2LA accreditation.**

Sincerely,



Christopher Rucinski  
Quality Director

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Laramie, WY 82070  
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Dataset

**WP10-1DJK****Dataset Analyst**

Kaufmann, Daniel

**Include in DMRQA Study**

Evaluations from this dataset will be included in DMRQA 30.

**Accreditors**

Evaluations of this dataset will be sent to the accreditor(s) listed below using your laboratory's labcode listed above each accrediting agency. If any of the information listed below is incorrect, please contact RTC immediately.

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Water Quality Division

**206** Edward Mock  
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UNITED STATES

**Miscellaneous Analytes**

Analysis

EPA 1664A - Analyst: D. Kaufmann

Method Number 10127603

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Oil & Grease 1, 3, 4 1860 / I-029 - Lot 015834 /Analyst: DJK/ Analysis Date: 1/27/10	24.1 mg/L	26.30	15.4 to 37.2	-0.61	Acceptable

**Petroleum Hydrocarbons in Water**

Analysis

EPA 1664A (HEM) (1999) - Analyst: D. Kaufmann

Method Number 10127807

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Total Petroleum Hydrocarbons (TPH), (C6-C35) 1, #050 / O-115 - Lot 016021a /Analyst: DJK/ Analysis Date: 2/2/10	24.5 mg/L	25.00	11.1 to 39.0	-0.11	Acceptable



## Petroleum Hydrocarbons in Water (continued)

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End of WP10-1DJK



Dataset

**WP10-1KLR****Dataset Analyst**

Ruff, Kasey

**Include in DMRQA Study**

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Analysis

SM/APHA 2130 B 21st ED (2005) - Analyst: K. Ruff

Method Number 20042608

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Turbidity 1, 4 2055 / I-250 - Lot 016007 /Analyst: KLR/ Analysis Date: 2/11/10	5.07 NTU	5.10	4.22 to 5.97	-0.10	Acceptable

**Miscellaneous Analytes**

Analysis

SM 18/19/20thED 4500-CI F - Analyst: K. Ruff

Method Number 20015003

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Total residual chlorine 1, 3, 4 1940 / I-033 - Lot 016014 /Analyst: KLR/ Analysis Date: 2/11/10	1.375 mg/L	1.31	0.962 to 1.67	0.56	Acceptable



## Miscellaneous Analytes (continued)

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End of WP10-1KLR



Dataset

**WP10-1MLI****Dataset Analyst**

Ingram, Mary

**Include in DMRQA Study**

Evaluations from this dataset will be included in DMRQA 30.

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**Demands**

Analysis

Hach 8000 - Analyst: M. Ingram

Method Number 60003001

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Chemical oxygen demand (COD) 1, 3, 4 1565 / I-026 - Lot 015966 /Analyst: MLI/ Analysis Date: 2/1/10	38 mg/L	36.40	23.7 to 49.0	0.38	Acceptable

Analysis

SM/APHA 5210 B 18th ED (1992) - Analyst: M. Ingram

Method Number 20027401

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Biochemical oxygen demand (BOD) 1, 3, 4 1530 / I-026 - Lot 015966 /Analyst: MLI/ Analysis Date: 1/27/10	20.53 mg/L	24.80	12.2 to 37.4	-1.02	Acceptable

**Minerals**

Analysis

EPA 300.0 - Analyst: M. Ingram

Method Number 10053006

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
<b>Chloride</b> 1, 3, 4 1575 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>52.403</b> mg/L	53.80	45.5 to 62.1	-0.50	<b>Acceptable</b>
<b>Fluoride</b> 1, 3, 4 1730 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>1.855</b> mg/L	2.02	1.65 to 2.40	-1.31	<b>Acceptable</b>
<b>Sulfate</b> 1, 3, 4 2000 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>12.674</b> mg/L	13.50	10.2 to 16.9	-0.74	<b>Acceptable</b>

Analysis

SM 18/19/20thED 2320 B - Analyst: M. Ingram

Method Number 20003003

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
<b>Alkalinity as CaCO<sub>3</sub></b> 1, 3, 4 1505 / I-027-12 - Lot 015970/0 /Analyst: MLI/ Analysis Date: 2/1/10	<b>77.67</b> mg/L	76.30	67.6 to 85.0	0.47	<b>Acceptable</b>

**Miscellaneous Analytes**

Analysis

EPA 300.0 - Analyst: M. Ingram

Method Number 10053006

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
<b>Bromide</b> 1, 4, 5 1540 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>3.866</b> mg/L	3.92	3.33 to 4.51	-0.28	<b>Acceptable</b>

Analysis

SM/APHA 2540 D 18th ED (1992) - Analyst: M. Ingram

Method Number 20004802

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
<b>Residue-nonfilterable (TSS)</b> 1, 3, 4 1960 / I-079 - Lot 016011 /Analyst: MLI/ Analysis Date: 2/3/10	<b>64.74</b> mg/L	63.60	52.9 to 74.2	0.32	<b>Acceptable</b>

**Nutrients**

Analysis

EPA 300.0 - Analyst: M. Ingram

Method Number 10053006

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
<b>Nitrate as N</b> 1, 3, 4 1810 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>2.687</b> mg/L	2.64	2.06 to 3.22	0.24	<b>Acceptable</b>
<b>Nitrite as N</b> 1, 4 1840 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>1.67</b> mg/L	1.76	1.44 to 2.08	-0.92	<b>Acceptable</b>



### Nutrients (continued)

Analysis  
EPA 300.0 - Analyst: M. Ingram

(continued)  
Method Number 10053006

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Orthophosphate as P 1, 3, 4 1870 / I-051 - Lot 015976 /Analyst: MLI/ Analysis Date: 2/2/10	<b>3.125</b> mg/L	2.90	2.36 to 3.45	1.24	<b>Acceptable</b>

End of WP10-1MLI



Dataset

**WP10-1SLB****Dataset Analyst**

Bath, Stephanie

**Include in DMRQA Study**

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**Minerals**

Analysis

SM/APHA 2510 B 20th ED (1998) - Analyst: S. Bath

Method Number 20048208

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Specific conductance, Conductivity (25°C) 1, 3, 4 1610 / I-027-12 - Lot 015970/0 /Analyst: SLB/ Analysis Date: 2/1/10	822.7 µmhos/cm	814.00	740 to 889	0.35	Acceptable

**Miscellaneous Analytes**

Analysis

SM/APHA 4500-H+ B 21st ED (2005) - Analyst: S. Bath

Method Number 20105004

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
pH 1, 3, 4 1900 / I-027-100 - Lot 015362 /Analyst: SLB/ Analysis Date: 2/4/10	8.18 Units	8.19	7.99 to 8.39	-0.15	Acceptable



**Miscellaneous Analytes (continued)**

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End of WP10-1SLB



Dataset

## WP10-1WRW

### Dataset Analyst

Wandler, Whitney

### Include in DMRQA Study

Evaluations from this dataset will be included in DMRQA 30.

### Accreditors

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## Minerals

Analysis

SM/APHA 2540 C 20th ED (1998) - Analyst: W. Wandler

Method Number 20050004

	Result Units	Proficiency Value	Accept. Window	Z	Evaluation
Residue-filterable (TDS) 1, 3, 4 1955 / I-027-12 - Lot 015970/0 /Analyst: WRW/ Analysis Date: 2/2/10	479.42 mg/L	492.00	378 to 607	-0.33	Acceptable

End of WP10-1WRW



## Sample Information

### Demand - WP

PEI-026 / Lot 015966

	Units	Assigned Value	Study Mean	Study Std. Dev.
Biochemical oxygen demand (BOD) 1530 Demands	mg/L		24.10	4.12
Carbonaceous BOD (CBOD) 1555 Demands	mg/L		21.50	5.20
Chemical oxygen demand (COD) 1565 Demands	mg/L	37.7 ± 0.192	36.40	3.47
Dissolved organic carbon (DOC) 1710 Demands	mg/L	14.9 ± 0.076	14.90	0.96
Total organic carbon (TOC) 2040 Demands	mg/L	14.9 ± 0.076	14.70	1.79

### pH 100 mL

PEI-027-100 / Lot 015362

	Units	Assigned Value	Study Mean	Study Std. Dev.
pH 1900 Miscellaneous Analytes	Units	8.19 ± 0.042	8.17	0.10

### Minerals - WP

PEI-027-12 / Lot 015970/015971

	Units	Assigned Value	Study Mean	Study Std. Dev.
Calcium, Ca 1035 Minerals	mg/L	65.8 ± 0.336	65.70	2.67
Magnesium, Mg 1085 Minerals	mg/L	25.4 ± 0.13	25.30	0.80
Potassium, K 1125 Minerals	mg/L	18.2 ± 0.09	18.30	1.01
Sodium, Na 1155 Minerals	mg/L	35.5 ± 0.181	35.90	1.85
Alkalinity as CaCO <sub>3</sub> 1505 Minerals	mg/L	76.8 ± 0.392	76.90	3.08
Calcium hardness as CaCO <sub>3</sub> 1550 Minerals	mg/L	164 ± 0.838	163.00	4.88
Specific conductance, Conductivity (25°C) 1610 Minerals	µmhos/cm	814 ± 4.35	814.00	33.90
Hardness, total as CaCO <sub>3</sub> 1755 Minerals	mg/L	269 ± 1.37	265.00	6.90
Residue, total (TS) 1950 Minerals	mg/L	625 ± 3.19	535.00	80.50
Residue-filterable (TDS) 1955 Minerals	mg/L	492 ± 3.19	492.00	81.20

### pH - WP

PEI-027-3 / Lot 015785

	Units	Assigned Value	Study Mean	Study Std. Dev.
pH 1900 Miscellaneous Analytes	Units	8.97 ± 0.02	8.97	0.12

### Oil and Grease - WP

PEI-029 / Lot 015834

	Units	Assigned Value	Study Mean	Study Std. Dev.
Oil & Grease 1860 Miscellaneous Analytes	mg/L	28.4 ± 0.145	26.80	2.93
Oil and Grease (SGT) 1860 Miscellaneous Analytes	mg/L	14.2		

### Total Residual Chlorine - WP

PEI-033 / Lot 016014

	Units	Assigned Value	Study Mean	Study Std. Dev.

**Total Residual Chlorine - WP**

PEI-033 / Lot 016014

(continued)

	Units	Assigned Value	Study Mean	Study Std. Dev.
Total residual chlorine 1940 Miscellaneous Analytes	mg/L	1.34 ± 0.009	1.31	0.11

**Anions - WP**

PEI-051 / Lot 015976

	Units	Assigned Value	Study Mean	Study Std. Dev.
Bromide 1540 Miscellaneous Analytes	mg/L	3.92 ± 0.02	3.99	0.30
Chloride 1575 Minerals	mg/L	53.5 ± 0.27	54.70	3.38
Fluoride 1730 Minerals	mg/L	2.02 ± 0.01	1.98	0.16
Nitrate as NO3 1805 Nutrients	mg/L	11.7 ± 0.06	14.00	4.20
Nitrate as N 1810 Nutrients	mg/L	2.65 ± 0.013	2.70	0.14
Nitrate+nitrite as N 1820 Nutrients	mg/L	4.41 ± 0.02	4.42	0.35
Nitrite as NO2 1835 Nutrients	mg/L	5.77 ± 0.03	5.61	0.50
Nitrite as N 1840 Nutrients	mg/L	1.76 ± 0.009	1.71	0.08
Orthophosphate as P 1870 Nutrients	mg/L	2.89 ± 0.015	2.79	0.23
Sulfate 2000 Minerals	mg/L	13.7 ± 0.07	13.50	1.07

**Residue (Whole-Volume) - WP**

PEI-079 / Lot 016011

	Units	Assigned Value	Study Mean	Study Std. Dev.
Residue, total (TS) 1950 Minerals	mg/L	362 ± 1.85	358.00	10.70
Residue-filterable (TDS) 1955 Minerals	mg/L	296 ± 1.51	291.00	17.30
Residue-nonfilterable (TSS) 1960 Miscellaneous Analytes	mg/L	66.0 ± 0.337	63.20	3.05

**Turbidity - WP**

PEI-250 / Lot 016007

	Units	Assigned Value	Study Mean	Study Std. Dev.
Turbidity 2055	NTU	5.13 ± 0.026	5.03	0.27

**TPH in Water**

PEO-115 / Lot 016021

	Units	Assigned Value	Study Mean	Study Std. Dev.
Total Petroleum Hydrocarbons (TPH), (C6-C35) 2050 Petroleum Hydrocarbons in Water	mg/L	71.8 ± 0.696		

**TPH in Water**

PEO-115 / Lot 016021a

	Units	Assigned Value	Study Mean	Study Std. Dev.
Total Petroleum Hydrocarbons (TPH), (C6-C35) 2050 Petroleum Hydrocarbons in Water	mg/L	27.0		

## Definitions:

**Assigned Value:** Value attributed to a particular quantity and accepted, sometimes by convention, as having an uncertainty appropriate for a give purpose. See ISO Guide 43 for additional information.

**Accept. Window:** The range of values that constitute acceptable performance for a laboratory participation in this PT study.

**Z:** A Z-Score tells how a single data point compares to normal data. A Z-Score says not only whether a point was above or below average, but how unusual the measurement is. Generally, a method result with a Z-Score less than |2| is considered to be in control, a Z-Score between |2| and |3| is considered 'Questionable', but still within control and a Z greater than |3| is considered not acceptable and the method is out of control.

**Study Mean:** Statistical study mean calculated using a robust statistical model (RTC employs the 'Biweight Program'). Robust statistical techniques to minimize the influence that extreme results can have on estimates of the mean and standard deviation NOTE - These techniques assign less weight to extreme results, rather than eliminate them from a data set.

**Study Std. Dev.:** Standard deviation calculated from study data using robust statisticals (Biweight).

**Gravimetric Value:** The prepared to value, determined by gravimetric means. The uncertainty associated to this value is standard uncertainty and based on RTC's gravimetric tolerances.

Program analyte accrediting footnotes

<sup>1</sup> NELAC

<sup>2</sup> EPA

<sup>3</sup> Other

<sup>4</sup> A2LA

<sup>5</sup> NELAC Experimental