Issue Response Report

Superior Harbor Sediment

Former Amoco Oil Barge Dock

Former Amoco Terminal
2904 Winter Street, Superior, Wisconsin

BRRTS #02-16-297977 (Closed Incident)

Antea Group Project No. WISUP171

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Former Amoco Terminal
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1.0 EXECUTIVE SUMMARY

Antea®Group is submitting this report in response to the request by the Wisconsin Department of Resources (WDNR) to "assess the potential for contribution to the sediment impacts from this [Amoco Oil Barge Dock; DNR BRRTS Activity #02-16-297977, which was closed on April 27, 2004] or other Amoco sites in this area." The sediment impacts referenced by the WDNR were described in a report by EA Engineering, Science and Technology, Inc. entitled *Site Characterization Report: Assessment of Contaminated Sediment Superior Waterfront Characterization, St Louis River and Bay Area of Concern, Superior, Wisconsin* (February 2016). The report was prepared on behalf of the Great Lakes National Program Office within the United States Environmental Protection Agency (USEPA) Region 5. The site characterization effort involved sediment sampling and data evaluation in the St. Louis and Superior Bay areas. Eighteen samples were collected in the St. Louis Bay area (**Figure 1**), and 41 samples were collected in the Superior Bay area (**Figure 2**). In the St. Louis Bay area, two sediment samples locations (SW15-SLB02 and SW15-SLB03) were within 1,000 feet of the closed WDNR BRRTS #02-16-297977 associated with the subject site Barge Dock, as shown in **Figure 3**. This report addresses the sample proximities to the subject site while also examining the nature and allocation of the observed sediment contamination.

Section 2.0 outlines the history of the site and surrounding properties.

- The Former Amoco Bargo Dock (BRRTS 02-16-297977) was used for petroleum delivery operations from at least 1890 until 1993. Before that time, the Barge dock operated as a coal dock under Eastern Minnesota Railroad.
- During the investigation of the Barge Dock in 2001, an underground storage tank (UST) was found approximately 3 feet below ground. The UST was removed October 2002, and approximately 1,200 tons of impacted soil was excavated. Soil and groundwater samples taken around the side wall of the excavation area revealed no residual petroleum contamination, and no pathway to surface water contamination.
- Contaminant releases surrounding the Barge Dock include Murphy Marine Terminal Tank #2 (BRRTS #03-16-000721) involving petroleum contaminated soil and groundwater. This site is 900 feet south of the Barge Dock and sediment sample SW15-SLB03, and may have been a contributor to the PVOCs found in the sediment sample. The Murphy Marine Terminal (BRRTS #03-16-000320) is located 2,000 feet southwest of the Barge Dock, and 100 feet east of sediment sample SW15-SLB02. This site involves petroleum contaminated soil. Fill material used to construct the dock was determined to be the source of

the PVOC and PAH contamination, and this same source may have contributed to the contamination found in the sediment sample.

Section 3.0 outlines contaminant transport mechanisms.

- Predominant wind directions in the St Louis Bay area create upwellings, or seiche effects in the northeastern direction. This is directly across from the Superior shoreline, where increased mobilization and sediment deposition can occur.
- A surface runoff study was performed near the Barge Dock on August 30, 1990 in a drainage ditch at the corner of Winter Street and Susquehanna Avenue. Soil and water samples collected 40 feet from St Louis Bay revealed no contamination concentrations above Preventative Action Limits (PALs).

Section 4.0 outlines the contaminant description and source allocation.

- Polycyclic aromatic hydrocarbon (PAH) contamination can be derived from three sources: fossil fuels (petrogenic/thermogenic), the burning of organic matter (pyrogenic), and organic precursor transformation (biogenic).
- Analysis of the PAH ratios and distributions for sediment sample SW15-SLB03 determined a petrogenic source.
- The heavy metals found in sediment sample SW15-SLB03 are not characteristic of any petroleum product historically shipped on the Amoco Barge Dock, and are more characteristic of coal and the products located at the neighboring coal shipping dock.
- Soil and groundwater results at the closed incident BRRTS 02-16-297977 (Amoco Barge Dock) showed that no pathway existed for surface water contamination, and any PVOC contamination found in the sediment samples is unrelated to the closed incident.

2.0 SITE LOCATION AND HISTORY

2.1 Former Amoco Barge Dock

The Former Amoco Barge Dock is associated with the former Amoco Terminal that was located at 2904 Winter Street in Superior, Wisconsin in the SE ¼ of the NE ¼ of Section 16, Township 49 North Range 14 West, Douglas County, Wisconsin (NE ¼ Sec. 25, SE ¼, Sec. 24 T24N, R20E). The northern end of the Amoco Barge Dock property abuts St. Louis Bay and is located between properties owned by C. Reiss Coal to the west and east. The area of the Barge Dock is 12.6 acres, with dimensions of 3,900 feet long (south to north) by 125 to 136 feet wide (west to east). All Amoco petroleum delivery operations associated with the Former Barge Dock ceased in 1993. Tanks, rail lines, and loading racks associated with the Former Barge Dock have been removed. Pipelines that connected the Barge Dock to the Terminal have also been removed within the boundaries of the Barge Dock property.

The Amoco Barge Dock is currently vacant. The barge dock was man made using fill from an undocumented source. The exact construction date of the dock is unknown, although historical Superior street maps show the docks operating under Standard Oil Company in 1890. Historically, the Amoco Barge Dock contained underground and above ground pipe lines connecting the Barge Dock to the Terminal and Above Ground Storage Tanks (ASTs). All transfer operations including truck, rail, and marine loading and unloading were located on the Barge Dock from 1890 through 1966, at which time the main office was relocated to the northeast of the terminal storage tank property. One 550 gallon UST was located on the Barge Dock. This tank served to collect any spillage that occurred as the tanker ships were delivering petroleum to the Terminal through the pipeline that ran the entire length of the Barge Dock property.

Operational History Summary

1889: Barge Dock under ownership of Eastern Minnesota Railroad and operates as a coal dock.
1890: The Barge Dock was purchased by Standard Oil Company and operated as a North-Western petroleum distribution depot. Above ground storage tanks for petroleum storage were located south of the Barge Dock. All transfer operations including truck, rail, marine loading and unloading, were located on the Barge Dock.
1922: Standard Oil Company (Indiana) incorporated as American Oil Company.
1938: All petroleum storage is relocated to the Terminal property.
1966: Main office is relocated to Terminal property.
1993: Last barge shipment at the marine loading rack on the Barge Dock.

2.2 Historical Remediation – BRRTS #02-16-297977

A preliminary source area investigation of the Amoco Barge Dock area was conducted in 2001, and included a review of historical aerial photographs, Sanborn® maps, and property blueprints. Field activities included a geophysical survey and six push-probe soil borings in the Barge Dock area (BDGP-1 through BDGP-6). During the investigation, an underground storage tank (UST) was located in the barge dock area approximately three feet below ground surface and directly below a steel standpipe to the west of the dock (**Figure 4**).

As part of the source area investigation conducted in November 2001, push-probe soil borings BDGP-1 through BDGP-6 were advanced at the Barge Dock Area in the vicinity of the UST to assess potential petroleum contamination in this area (**Figure 4**). Soils were screened using a photoionization detector (PID) and results indicated readings above background from near surface to the water table at borings BDGP-1, BDGP-3, and BDGP-4. At boring BDGP-2, PID readings above background were observed at the water table only.
Soil samples collected November 2001 were submitted to Pace Analytical for analysis of gasoline range organics (GRO), diesel range organics (DRO), and petroleum volatile organic compounds (PVOCs). Contaminant concentrations exceeding the NR 720 residual contaminant levels (RCLs) and NR 746 Soil Screening Levels were found in samples BDGP-1 through BDGP-4 (**Figure 4**). Laboratory results for soil samples collected from borings

BDGP-5 and BDGP-6 indicated non-impacted conditions. Benzene ranged from non-detect to 1.26 mg/kg. Toluene ranged from non-detect to 2.86 mg/kg. Ethylbenzene ranged from non-detect to 26.4 mg/kg. Xylene ranged from non-detect to 33.2 mg/kg. GRO ranged from non-detect to 3,560 mg/kg, and DRO ranged from non-detect to 11,200 mg/kg. The extent of impacted soil was estimated to extend approximately 90 feet north to south and 40 feet east to west of the barge dock wooden platform.

Following removal of the UST on October 2, 2002 at the Barge Dock Area, impacted soil was excavated October 8-9, 2002 as cited in the *Subsurface Investigation Work Plan and Interim Remedial Response* (Delta Environmental; September 20, 2002). Approximately 857 cubic yards of soil were removed from an area centered around the former UST. The excavated soil totaled approximately 1,200 tons.

Nine soil samples (BDS-1 through BDS-9) were collected from the sidewall of the excavation on October 8, 2002 and submitted to Test America (Watertown, Wisconsin) for analysis of GRO, DRO, PVOCs, naphthalene, and 1,2-dichloroethane (1,2-DCA) (**Figure 5**). All laboratory results were reported as non-detectable with the exception of 8.3 milligrams/kilogram (mg/kg) of GRO for soil sample BDS-1. All sample results were below 2002 RCLs cited in NR 720 or NR 746. Sample results are summarized in **Table 1** below.

Table 1

Sample Results 10-8-02		**Petroleum Hydrocarbon Analyses**										
Sample Designation	**PID**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Total Xylenes**	**1,3,5 TMB**	**1,2,4 TMB**	**MTBE**	**1,2 Dichloro - ethane**	**Naphtha - lene**	**DRO**	**GRO**
	(IUs)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2002 NR 720 RCL		**0.0055**	**1.5**	**2.9**	**4.1**	**-**	**-**	**-**	**0.0049**	**-**	**100**	**100**
2002 NR 746 Values		*8.5*	*38*	*4.6*	*42*	*11*	*83*	*-*	*0.6*	*2.7*	*-*	*-*
BDS-1	0	< 0.030	< 0.030	< 0.030	< 0.042	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 6.0	8.3
BDS-2	0	< 0.032	< 0.032	< 0.032	< 0.045	< 0.032	< 0.032	< 0.032	< 0.032	< 0.032	< 6.4	< 6.4
BDS-3	0	< 0.031	< 0.031	< 0.031	< 0.044	< 0.031	< 0.031	< 0.031	< 0.031	< 0.031	< 6.2	< 6.2
BDS-4	0	< 0.031	< 0.031	< 0.031	< 0.043	< 0.031	< 0.031	< 0.031	< 0.031	< 0.031	< 6.2	< 6.2
BDS-5	0	< 0.031	< 0.031	< 0.031	< 0.044	< 0.031	< 0.031	< 0.031	< 0.031	< 0.031	< 6.2	< 6.2
BDS-6	0	< 0.031	<0.031	< 0.031	< 0.043	< 0.031	< 0.031	< 0.031	< 0.031	< 0.031	< 6.1	< 6.1
BDS-7	1.6	< 0.032	< 0.032	< 0.032	< 0.045	< 0.032	< 0.032	< 0.032	< 0.032	< 0.032	< 6.4	< 6.4
BDS-8	13	< 0.032	< 0.032	< 0.032	< 0.095	< 0.032	< 0.032	< 0.032	< 0.032	< 0.032	< 6.4	< 6.4
BDS-9	0	< 0.031	<0.031	<0.031	< 0.092	< 0.031	< 0.031	< 0.031	< 0.031	< 0.031	< 6.1	< 6.1

Temporary monitoring wells TWBD-1, TWBD-2, TWBD-3 and TWBD-4 were advanced in and surrounding the soil excavation area (**Figure 6**). Soil samples collected from borings TWBD-1, TWBD-2, and TWBD-4 on October 15,

2002 did not indicate PVOC concentrations above 2002 NR 720 RCLs, with non-detect results for all PVOCs and GRO. Soil was not collected from TWBD-3 as all of the original fill material above the water table had been removed as part of the soil excavation. Results for these soil samples are shown in **Table 2** below.

Table 2

Sample Results 10/15/2002			Analytical Parameters							
	Sample Depth	**PID**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**1,3,5-TMB**	**1,2,4 TMB**	**MTBE**	**GRO**
Boring	Feet	IUs	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
NR 720 RCL -->			**0.0055**	**1.5**	**2.9**	**4.1**	**-**	**-**	**-**	**100**
NR 746 Soil Screening Level -->			8.5	38	4.6	42	11	83	-	-
NR 746 Direct Contact Limit (upper 4 ft)-->			1.1	-	-	-	-	-	-	-
TWBD-1	2-3	0	<0.031	<0.031	<0.031	<0.092	<0.031	<0.031	<0.031	<6.1
TWBD-2	2-3	0	<0.031	<0.031	<0.031	<0.094	<0.031	<0.031	<0.031	<6.2
TWBD-4	2-3	0	<0.033	<0.033	<0.033	<0.098	<0.033	0.052	<0.033	<6.5

The temporary monitoring wells were subsequently sampled for two quarters. Groundwater samples collected on November 5, 2002 supported the findings of the soil investigation. Impacted groundwater was not observed at temporary wells TWBD-1, TWBD-2, and TWBD-4. Groundwater at temporary monitoring well TWBD-3 ranged from 0.95 µg/L to non-detect for benzene, 3.60 µg/L to non-detect for ethylbenzene, 56 µg/L to non-detect for xylenes, 75 µg/L to non-detect for total trimethylbenzenes, and 7.90 µg/L to non-detect for naphthalene; none of these results were above its respective Wisconsin Administrative Code NR 140 Enforcement Standard (**Table 3**).

2.3 Adjacent Properties

Properties immediately adjacent to the Amoco Barge Dock include C. Reiss Coal to the west; St. Louis Bay to the north; C. Reiss Coal and Midwest Energy Resources to the east; and the Amoco Barge Dock Manifold and Aboveground Storage Tank (AST) area to the south (**Figure 7**). The C. Reiss Coal Property directly west of the Amoco Barge Dock is currently undeveloped.

Hallett Dock No. 8 is located to the west of the Amoco Barge Dock and directly west of sediment sample SW15-SLB02. The dock is man-made fill and receives a variety of bulk and liquid commodities by vessel or barge. Materials handled include salt, coal, liquid calcium chloride, slag, slag-roofing granules, and limestone. After these materials are unloaded, they are stockpiled, stored, or shipped to customers by truck or rail. The current barge dock capacity, as listed in Duluth Seaway Port Authority's port facilities map, is 800,000 tons for bulk storage and 2.1 million gallons for liquid storage. A BRRTS number was opened on the site in 2005 (#02-16-544665) after polynuclear aromatic hydrocarbons and metals contamination was found in the sediment. After sediment dredging, Hallett Dock incient #02-16-544665 was closed on November 11, 2014.

The Midwest Energy Resources Company and C Reiss Coal Teminal are located directly to the east of the Amoco Barge Dock. Sediment sample SW15-SLB03 was collected in the slip between the the subject site Barge Dock and the C. Reiss Coal property. This site is constructed with man-made fill and was once divided by multiple shipping slips for coal receiving. The current Midwest Energy export terminal was commissioned in 1976 to provide for the coal needs of the DTE Electric power plants. Coal is received from the Powder River Basin of Montana and Wyoming via 123-car unit trains. The coal is then loaded at up to 11,500 net tons per hour onto vessels that are destined for various locations in the Great Lakes and Canada, which makes this location one of the busiest ports in the United States. The Duluth Seaway Port Authority's port facilities map notes that the ground storage capacity of the site totals 5 million net tons, and annual coal throughput is currently 25.5 million net tons.

2.4 Adjacent Known Contaminant Releases

2.4.1 BRRTS No. 03-16-000721 (Murphy Marine Terminal Tank #2)

The Murphy Marine Terminal (BRRTS No. 03-16-000721) is located approximately 900 feet southeast of The Amoco Barge Dock area. The Murphy Marine site has been impacted by a 430-gallon spill protection UST that was removed on March 24, 1993. On July 14, 1993 an investigation of soils beneath the former tank basin indicated that GRO and DRO contamination did not exceed applicable Wisconsin Administrative Code NR 720 RCLs. WDNR requested additional sampling, so 77 soil samples were collected between 1994 and 1996, and submitted for analysis of PVOCs, DRO, GRO, and polycyclic aromatic hydrocarbons (PAHs). Soil sampling results exceeded the applicable NR 720 RCL for PVOCs, DRO, and GRO as shown in **Tables 1** and **2** in **Appendix A.** On November 3 and 4, 2004, six permanent monitoring wells were installed at the site (MW-1 through MW-6) to investigate the extent of the petroleum release. The groundwater flow direction in the investigation area is noted as north within the shallow six monitoring well network in the Gannett Fleming Remediation Progress Report dated May 11, 2017 (**Appendix B**). However, the historical groundwater flow direction based on hydrology in the more extensive network of monitoring wells across the Superior Terminal and Barge Dock area is consistently northwest, placing the BRRTS #03-16-000721 release directly upgradient of the subject site Barge Dock investigation and sediment sample SW15-SLB03.

Groundwater samples were regularly collected from all six monitoring wells between 2005 and 2016. Downgradient monitoring wells MW-2 through MW-4 have been sampled since March 2005 with concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), trimethylbenzenes (TMBs), and naphthalene exceeding their applicable NR 140 enforcement standards (ES) (**Appendix B**).

The results for the groundwater sampling at Murphy Marine Terminal Tank #2 in October 2016 are summarized below:

- The following Murphy Marine Terminal Tank #2 monitoring wells were found to exceed the NR 140 ES for benzene (5 µg/L) in October 2016: MW-2 (5,770 µg/L), MW-3 (8,780 µg/L), and MW-4 (7,180 µg/L).
- The following Murphy Marine Terminal Tank #2 wells were found to exceed the NR 140 ES for ethylbenzene (700 µg/L) in October 2016: MW-3 (1,210 µg/L), and MW-4 (868 µg/L).
- None of the Murphy Marine Terminal Tank #2 wells were found to exceed the NR 140 ES for toluene (800 µg/L) in October 2016.
- The following Murphy Marine Terminal Tank #2 wells were found to exceed the NR 140 ES for xylene (2,000 µg/L) in October 2016: MW-2 (2,580 µg/L), MW-3 (3,582 µg/L), and MW-4 (3,991 µg/L).
- The following Murphy Marine Terminal Tank #2 wells were found to exceed the NR 140 ES for TMBs (480 µg/L) in October 2016: MW-2 (1,245 µg/L), MW-3 (1,419 µg/L), and MW-4 (1,717 µg/L).
- The following Murphy Marine Terminal Tank #2 wells were found to exceed the NR 140 ES for naphthalene (100 µg/L) in October 2016: MW-2 (113 µg/L), and MW-4 (191 µg/L).

The contamination at the Murphy Oil Marine Terminal Tank #2 is not delineated vertically or horizontally and only monitored at the shallow contact with groundwater by Murphy Oil Marine Terminal Tank #2 monitoring wells (MW-1 through MW-6). Any groundwater samples collected north or northwest of this site (BRRTS # 03-16-000721) may encounter contamination that migrated from the Murphy Oil Marine Terminal Tank #2, and this source may have been a contributor to the PVOCs found in sediment sample SW15-SLB03.

2.4.2 BRRTS No. 03-16-000320 (Murphy Marine Terminal)

Located approximately 2,000 feet southwest of the Barge Dock, BRRTS No. 03-16-000320 (Murphy Marine Terminal) is an open leaking underground storage tank includent involving soil contamination from engine waste oil. This incident location is also approximately 100 feet to the east of sediment sampling location SW15-SLB02. Two USTs and one AST were formerly located on the site, which operated as a petroleum product loading facility. All of the tanks were removed in December 1990, and soil samples collected after removal identified the presence of petroleum-impacted soil. Soil excavation events in this area were performed in November/December 1990, and July 2007. To monitor soil conditions surrounding the excavation areas, soil samples were collected in May 2005 (GP-1 through GP-7), July 2007 (E, N, S, W), September 2007 (E-1, N-1, S-1, W-1), September 2009 (E-15, N-15, S-15, W-15), and May 2010 (N-25, N-35, S-25, S-35). Soil analytical results collected from May 2005 through May 2010 are presented in **Appendix C**.

The results for the soil sampling at Murphy Marine Terminal from May 2005 through May 2010 that exceeded the NR 720 standards for industrial direct contact are summarized below:

- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Industrial Direct Contact Standard for benzo(a)anthracene (2.11 mg/kg): GP-5 (2.64 mg/kg), GP-7 (16.5 mg/kg), and S-25 (2.61 mg/kg).

- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Industrial Direct Contact Standard for benzo(a)pyrene (0.211 mg/kg): GP-4 (0.863 mg/kg), GP-5 (1.86 mg/kg), GP-7 (7.24 mg/kg), E (0.275 mg/kg), N (1.15 mg/kg), S (0.329 mg/kg), W (0.912 mg/kg), E-1 (0.373 mg/kg), N-1 (0.407 mg/kg), W-1 (0.732 mg/kg), E-15 (0.442 mg/kg), N-15 (0.545 mg/kg), S-15 (0.346 mg/kg), N-25 (0.237 mg/kg), N-35 (0.260 mg/kg), S-25 (1.69 mg/kg), and S-35 (0.258 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Industrial Direct Contact Standard for benzo(b)fluoranthene (2.11 mg/kg): GP-5 (2.42 mg/kg), and GP-7 (8.88 mg/kg)

The results for the soil sampling at Murphy Marine Terminal from May 2005 through May 2010 that exceeded the NR 720 soil to groundwater pathway standards are summarized below:

- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for benzene (0.00512 mg/kg): GP-1 (0.352 mg/kg), E (0.280 mg/kg), N (1.151 mg/kg), S (0.313 mg/kg), W (0.603 mg/kg), E-1 (0.253 mg/kg), N-1 (0.089 mg/kg), S-1 (0.161 mg/kg), W-1 (0.285 mg/kg), E-15 (0.124 mg/kg), S-15 (0.475 mg/kg), W-15 (0.154 mg/kg), and S-25 (0.063 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for toluene (1.107 mg/kg): E (1.18 mg/kg), S (1.39 mg/kg), W (1.44 mg/kg), E-1 (2.04 mg/kg), W-1 (1.65 mg/kg), and S-15 (2.68 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for benzo(a)pyrene (0.47 mg/kg): GP-4 (0.863 mg/kg), GP-5 (1.86 mg/kg), GP-7 (7.24 mg/kg), N (1.15 mg/kg), W (0.912 mg/kg), W-1 (0.732 mg/kg), N-15 (0.545 mg/kg), and S-25 (1.69 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for benzo(b)fluoranthene (0.479 mg/kg): GP-4 (0.526 mg/kg), GP-5 (0.608 mg/kg), GP-7 (0.521 mg/kg), N (0.791mg/kg), W (0.653 mg/kg), E-1 (0.520 mg/kg), S-1 (1.39 mg/kg), W-1 (0.844 mg/kg), E-15 (0.526 mg/kg), N-15 (0.608 mg/kg), S-15 (0.521 mg/kg), and S-25 (1.64 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for chysene (0.145 mg/kg): GP-4 (1.04 mg/kg), GP-5 (2.03 mg/kg), GP-7 (10.7 mg/kg), E (0.279 mg/kg), N (1.18 mg/kg), S (0.308 mg/kg), W (0.655 mg/kg), E-1 (0.453 mg/kg), N-1 (0.712 mg/kg), S-1 (2.78 mg/kg), W-1 (1.35 mg/kg), E-15 (0.971 mg/kg), N-15 (0.732 mg/kg), S-15 (0.735 mg/kg), W-15 (0.363 mg/kg), N-25 (0.262 mg/kg), S-25 (1.89 mg/kg), and S-35 (0.170 mg/kg).
- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for naphthalene (0.658 mg/kg): GP-7 (3.98 mg/kg), and W-1 (0.697 mg/kg).

- The following Murphy Marine Terminal soil samples were found to exceed the NR 720 Soil to Groundwater Pathway Standard for lead (27 mg/kg): E (48.8 mg/kg), N (109 mg/kg), S (125 mg/kg), and W (48.4 mg/kg).

During the soil sampling event conducted in May 2005, two soil borings were reported to contain sand-sized coal fragments from 0.1-2.0 ft bgs. Soil boring logs are presented in Attachment B of Gannett Fleming's *Results of Site Investigation and Request for Site Closure* dated September 22, 2005. In the *2014 Remediation Progress Report* (August 13, 2014) prepared by Gannett Fleming, it was concluded that the elevated levels of "signature" PVOC and PAH parameters found in the soil samples could be attributed to the industrial fill placed when the ship loading slip was constructed. The location of this event is directly to the east of sediment sample SW15-SLB02. Due to the prevalence of PAH results and similarity in magnitude, fill material from this location may very well have contributed to the contaminants found in the sediment sample.

2.5 Additional Contaminant of Concern Sites

Across St Louis Bay from the Barge Dock property is the Duluth, Missabe and Iron Range railway and ore docks. The ore dock in Duluth was constructed in 1893, and after completion began to ship iron ore from Mountain Iron Mine to Superior and Duluth. The iron range railway's primary purpose was to haul iron ore to the docks for shipment, with approximately 49 million tons of ore being hauled in 1953 (Hanson, 2017). When the yield of the natural ore fields began to decline in the late 1950's, the ore was replaced with taconite pellets, which contain as much as 30 percent iron (Hubbell, 2001).

Directly to the west of the Missabe and Iron Range railway and associated ore docks in Duluth, is Hallett Dock No. 5. This dock is referred to as an "outgoing dock" as it focuses primarily on receiving material by rail or truck, stockpiling, and loading vessels for shipment. The materials shipped out of these slips include bentonite clay, chrome ore, sinter feed, blast furnace trim, mill scale, and iron concentrate (Duluth, 2017). The Duluth Seaway Port Authority lists that this dock has an 800,000-ton stockpile capacity as well as a dry storage capacity of 20,000 tons for commodities such as salt and fertilizers (Duluth, 2017).

3.0 CONTAMINANT TRANSPORT MECHANISMS

3.1 Bay Area Wind and Water Currents

The National Oceanic and Atmospheric Administration monitors the state of the Earth's climate in real-time and has monitoring stations all over the country. The monitoring station in Duluth, MN (ID 9099064) is located approximately 15,000 feet northeast of the Barge Dock and was installed on August 20, 1997. The station is presently still collecting data. This station is the closest location to the St. Louis Bay area located on the western

edge of the Duluth entry port in Superior Bay. Real-time data collection includes water levels, winds, air temp, water temp, and air pressure. Wind can be dominant over the counterclockwise current, and if prevailing winds or strongest winds occur in a particular direction, then sediments will be moved continually in the same direction by currents. An analysis of the data inventory on the NOAA website showed wind directions throughout history that were primarily from the southwest. This predominant wind direction pushes the St. Louis Bay water surface elevation to the northeastern direction, creating an upwelling or seiche. The seiche upwelling effect is directly across from the superior shoreline, where a downwelling effect may likely be present. River currents likely take advantage of the downwelling which in turn can cause increased mobilization of sediments from upstream, and subsequent deposition in bays, harbors, or slips.

3.2 Precipitation and Surface Runoff

Superior is located within the St. Louis and Lower Nemadji River watershed, which drains 3,634 square miles into the southwest corner of the lake between Duluth and Superior (WDNR, 2010). On average, precipitation through the year ranges from a low of 0.75 inches in February to a high of 4.09 inches in June (U.S. Climate Data, 2017). During the high precipitation months of June through September, soil and sediment transport increases. Red clay rich in iron oxides accounts for approximately 40 percent of the Superior Area soil (Caine, 1904). This clay erodes into the bay area during heavy precipitation through smaller tributaries and surface runoff.

The mechanisms of sediment transport in St. Louis Bay are dynamic and the sediment characterization provided by EA Engineering is insufficient to determine where sampled sediments originated. The Amoco dock was created with dredge material from an unknown and undocumented source, which Murphy Marine Terminal proposes may have contributed to documented sediment contaminants of concern (see Section 2.4.2). Samples that were taken into the bay area and in the innermost portions of barge dock slips may contain sediment contributions from upstream and nearby regions.

Surface water runoff has been historically analyzed on the Amoco Terminal property (approximately 5,000 feet southwest of the Barge Dock) to understand the runoff chemistry. A surface water assessment was performed on the former drainage ditch located at the corner of Winter Street and Susquehanna Avenue on August 30, 1990. The drainage ditch was connected to St. Louis Bay via a drainage pathway (**Figure 8**). Two sample locations were chosen along the drainage pathway, with both a soil and water sample taken at each location. One location was selected immediately below the drainage ditch outfall (samples SWRO-1 and SROS-1), with the second near the end of the drainage ditch approximately 40 feet from St. Louis Bay (samples SWRO-2 and SROS-2). The soil and water samples were analyzed for VOCs, PAHs, and purgable halocarbons. Water sample results are summarized in **Table 9 Appendix D**, and soil sample results are summarized in **Table 10 Appendix D**. Drainage water at neither location contained detectable concentrations of VOCs or PAHs, and lead at both locations was below the Wisconsin Preventative Action Limit of 0.005 mg/L. Soil results at location SROS-1 were found to contain PAHs at

concentrations ranging from 0.1 to 1.0 mg/kg. The soil sample 40 feet south of the bay only contained a detectable benzo(b)fluoranthene concentration of 0.044 mg/kg, which is below the NR 720 soil to groundwater pathway standard of 0.4793 mg/kg. VOCs were not detected at either location.

4.0 CONTAMINATION DESCRIPTION AND SOURCE ALLOCATION

4.1 Contaminant Characterization - Pyrogenic vs. Petrogenic PAH

PAHs are composed of two or more fused benzene rings, and are often found in sediments as complex mixtures of hundreds or thousands of compounds. Sources of PAH contamination in sediments may be derived from three different sources, which include fossil fuels (petrogenic/thermogenic PAH), the burning of organic matter (pyrogenic PAH), and organic precursor transformation by chemical or biological processes (biogenic PAH). The naturally produced biogenic PAH compounds usually do not contribute much to the total PAH mass in sediments if anthropogenic sources also exist, as these compounds are simple.

Petrogenic PAH compounds are low molecular weight hydrocarbons containing two or three fused aromatic rings. PAHs of higher molecular weight, when present, are generally at lower concentrations. The type and concentration of these compounds will vary according to the distillation temperature of the product. Gasoline contains mainly low molecular weight aromatic hydrocarbon compounds and is limited to 2-ring PAHs such as naphthalene and alkylnapthalene (Neff, 2005). Diesel fuels and engine oils may contain aromatic hydrocarbons ranging from benzene (one aromatic ring) to fluoranthene (four aromatic rings).

Pyrogenic PAHs are more often characterized by two and three ring aromatic hydrocarbons in the vapor phase, and four and six aromatic rings in the particulate phase. The assemblages of the compounds are more complex, although the dominant compound in each is the unalkylated parent compound or a homologue with only one to two alkyl substituents (Neff, 2005). These dominant unalkylated compounds aid in the determination of pyrogenic sources, as the distribution of PAH compounds in petrogenic sources contain lower fractions of the unalkylated parent compounds to the alkylated substituents.

The concentrations and patterns of PAHs in unburnt hard coals varies and is dependent on the original organic matter material type, along with temperature and pressure conditions during coalification. The molecular structures generally consist of 2-6 polyaromatic condensed rings with ethyl or methylene bridges carrying methyl and phenol side chains. Although the environmental impact of unburnt coal-bound PAH in soils and sediments is not well studied, coal dust can carry native PAH concentrations up to hundreds, and sometimes thousands, of mg/kg (Achten, 2009). Unburnt coal particles can be released by spills during coal loading and transport or accidents releasing coal into freshwater or marine systems. When stored in stockpiles for shipping sites, the coal is

subject to erosion. For example, at an opencast project at Jharia coalfield in India, predominant coal dust emission sources were studied and determined to result from the crushing and feeding point for size reduction (40%), the unloading point of the conveyor belt (13%), wind erosion of the total storage area (17%), transportation on haul road (5.2%), loading into a dumper (3%), and loading onto the conveyor belt (2%) (Achten, 2009).

4.2 Potential and Suspected Contaminant Sources

4.2.1 PAH Assemblage Source Allocation

The U. S. Environmental Protection Agency's (U.S. EPA) priority pollutant list contains 16 PAHs of primary environmental concern, which are the most commonly analyzed in contaminated site assessments. In recent years however, hundreds of PAHs between naphthalene (molecular weight 128.2) and coronene (molecular weight 300.4) are present in petrogenic or pyrogenic contaminated environmental matricies at concentrations high enough to be of environmental concern (Neff, 2005). All of the 16 PAHs listed in the EPA's priority pollutant list are unalkylated parent PAHs, although the most abundant PAH in petrogenic assemblages are alkyl PAHs. In order to successfully determine the source of PAH contamination in sediments when petrogenic and pyrogenic sources exist, the list of examined PAHs must expand beyond the priority pollutants required by the EPA, and must also include alkylated PAHs.

For the samples in the St. Louis Bay and Superior Bay area analyzed by EA Engineering, analysis included Acid Volatile Sulfide/Simultaneously Extracted Metals (AVS/SEM) analysis, grain size, 17 PAHs on the EPA priority pollutant list, 34 PAHs including additional alkylated derivatives, polychlorinated biphenyls (PCBs), VOCs, semivolatile organic compounds (SVOCs), organotins, pesticides, total organic carbon (TOC), target analyte list (TAL) metals, mercury, and percent moisture. The suite of analysis for each sample varied by location and was noted to be dependent on recovery volumes, refusal, or other limitations (EA Engineering, 2016, pp. 2-4). All sediment samples were analyzed for 17 PAHs (16 EPA priority pollutants + benzo(e)pyrene). In addition, 20 samples were selected to be analyzed for the full 34 PAHs, which included alkylated compounds. Locations for expanded PAH analysis were "pre-selected by EPA and WDNR" (EA Engineering, 2016, pp. 2-5). It was not explained how this pre-selection was determined.

Of the 18 samples taken by EA Engineering in the St. Louis Bay area, this report will focus on sediment sample SW15-SLB03 located approximately 350 feet south of the closed incident BRRTS #02-16-297977. Additional analysis is provided for samples SW15-SLB01, SW15-SLB02, and SW15-SLB04 through SLB15-SLB06 due to the similarity of sample locations (**Figure 1**). Of these six samples, locations SLB15-SLB02, SLB15-SLB03, SLB15-SLB04, and SLB15-SLB05 were analyzed for 34 PAHs with the remaining two samples analyzed for only 17 PAHs. A summary of the results for the 17 PAHs and select metals is provided in the EA Engineering report as Appendix D, with full analytical reports provided as Appendix G. Appendix G as obtained did not include results for the

additional 34 analyzed PAHs for SW15-SLB04. A summary of all analytical results for the six sample locations has been compiled and provided as **Appendix E**.

For source identification, ratio calculations of parent to alkyl-substituted PAHs can be used to help in the determination of a pyrogenic or petrogenic source (Neff, 2005). If only priority pollutant data are available, ratios of phenanthrene to anthracene (PH/AN) and fluoranthene to pyrene (FL/PY) can be calculated for source identification. Anthracene and Fluoranthene are produced during rapid, high temperature pyrosynthesis, and are thermodynamically less stable than their isomers, phenanthrene and pyrene (Neff, 2005). This ratio, which has been documented for various petrogenic and pyrogenic sources, is presented in **Table 4**. Thus, the PH/AN ratio from pyrogenic PAH sources is usually less than 5 and the petrogenic ratio is usually greater than 5. A plot of these ratios with PH/AN on the y axis and FL/PY on the x axis for PAH assemblages from single and mixed sources will produce a distribution with a negative slope. Samples that contain primarily petrogenic PAHs will be found on the upper left side of the graph and data points distribute towards the lower right as the fraction of total pyrogenic PAHs increases. Calculations of these ratios for samples SW15-SLB01 through SW15-SLB06 are found in **Table 5**. A graph of PH/AN ratios against FL/PY ratios for the six samples as described above is provided as **Figure 9**. Samples located in the upper left hand side of the graph only include samples from SW15-SLB03, which suggests a petrogenic source of fuel or coal origin. Samples falling to the lower right side of the graph include a majority of SW15-SLB05 and SW15-SLB06 samples, which suggests a pyrogenic source related to burning organic matter (Neff, 2005).

Other diagnostic ratios can be calculated to help distinguish between pyrogenic and petrogenic sources, many of which rely on specific primarily petrogenic alkyl PAHs to specific primarily pyrogenic parent PAHs. The ratio of Fluoranthene plus Pyrene (FLPY) to the sum of C2 to C4 phenanthrenes (C24PH), which is expressed as FLPL/(FLPY + C24PH) has been effective in differentiating between pyrogenic and petrogenic sources in sediment and biological samples. This ratio is nearly always less than 0.1 for petrogenic PAH assemblages, and pyrogenic PAH assemblages are usually greater than 0.75 (Neff, 2005). This has been documented for different types of petrogenic and pyrogenic sources and is shown in **Table 6**. Ratios were calculated for sediment samples with detectable alkyl PAH results, and are shown in **Table 7**. The average ratio result for sample SW15-SLB03 was 0.151, again suggesting a petrogenic source although the ratio is between the reported range for both gasoline and coal sources (**Table 6**). The surface sample ratio for SW15-SLB02 fell into the range of creosote, a pyrogenic source, and SW15-SLB05 ratios averaged 0.697 also falling into the pyrogenic range for creosote.

Zymax Forensics, a division of Pace Analytical Energy Services, provides a suite of hydrocarbon fingerprinting analyses focused on source identification. Dr. Allan Jeffery, Senior Geochemist, focuses on environmental science and geochemistry, and has over 20 years of U.S. and international experience. Dr. Jeffrey has provided PAH analysis and source identification for previous Antea Group sites, and was tasked with analyzing the results

provided by EA Engineering to indentify a source. His observations and conclusions on samples SW15-SLB01 through SW15-SLB06 with a focus on PAH and metals analysis is provided in a summary letter found in **Appendix F**.

In Dr. Jeffrey's conclusion, he agrees that pyrogenic products are the most likely source for sediments at locations SW15-SLB02, SW15-SLB-04, SW15-SLB-05, and SW15-SLB-06. Due to the differences in PAH ratios and distributions for sediments at SW15-SLB03 compared to the other sampled locations, a petrogenic product was noted to be the source. Definitive conclusions for whether or not coal or petroleum was the source could not be determined due to the limited hydrocarbon suite analysis, athough it was noted that the arsenic concentrations in the sample were suggestive of coal.

After internal and expert analysis of the PAH ratios and disributions present in sediment samples SW15-SLB01 through SW15-SLB06, a petrogenic source is indicated for sample SW15-SLB03, while pyrogenic sources are likely for the remaining five sediment samples. Sample SW15-SLB02 is located next to the Murphy Marine Terminal (BRRTS # 03-16-000320), which has shown similar PAH contamination in the soil samples (see Section 2.4.2). This contamination has been attributed to the industrial fill that was used to create the barge dock slip, which contained sand-sized coal fragments, and may also be a source for the contamination found in the bay sediments.

4.2.2 Metals

Metals included on the US EPA's priority pollutant list as well as metals such as iron and lead were analyzed for all sediment samples collected by EA Engineering. Sediments are the primary depositional end-point for heavy metals in aquatic environments, and sources of these metals include urban areas, agricultural areas, and industrial sites. Of the six samples focused on in this report (SW15-SLB01 through SW15-SLB06), only sample SW15-SLB03 had probable effect concentration (PEC) exceedances for metals. The metals that exceeded these limits were arsenic, iron, and lead, with cadmium, copper, and zinc exceeding the threshold effect concentration (TEC) (**Appendix E**).

Historical data on the formulation and composition of Amoco fuels refined at various locations around the country has been analyzed and is provided in **Appendix G** and **Appendix H** as weight percentages. This fuel analysis is representative of the refined petroleum products that would have been delivered to the former Amoco Barge Dock location. The fuel analyses include the entire suite of hydrocarbons, metals, PAHs, and other constituents for gasoline (**Appendix G**), as well as compositions of the middle distillates such as diesel fuel, jet fuel, and kerosene (**Appendix H**). When converted from the given weight percent values to µg/kg or ppb (**Appendix I**), metals that measure into the range of parts per million or mg/kg include:

Aluminum: 5-24 mg/kg,
Copper: 0.005-1.2 mg/kg,
Iron: 0.1-22.5 mg/kg,
Magnesium: 0.001-3.0 mg/kg,

Nickel: 0.058-19.9 mg/kg,
Sodium: 1.9-15.67 mg/kg, and
Zinc: 0.001-1.6 mg/kg.

Other metals occurred at much lower concentrations. Even with sediment accumulation, it is unlikely that that metals from a fuel source could reach the high concentrations of arsenic, iron, and lead that were found in St. Louis Bay sediment samples SW15-SLB01 through SW15-SLB06.

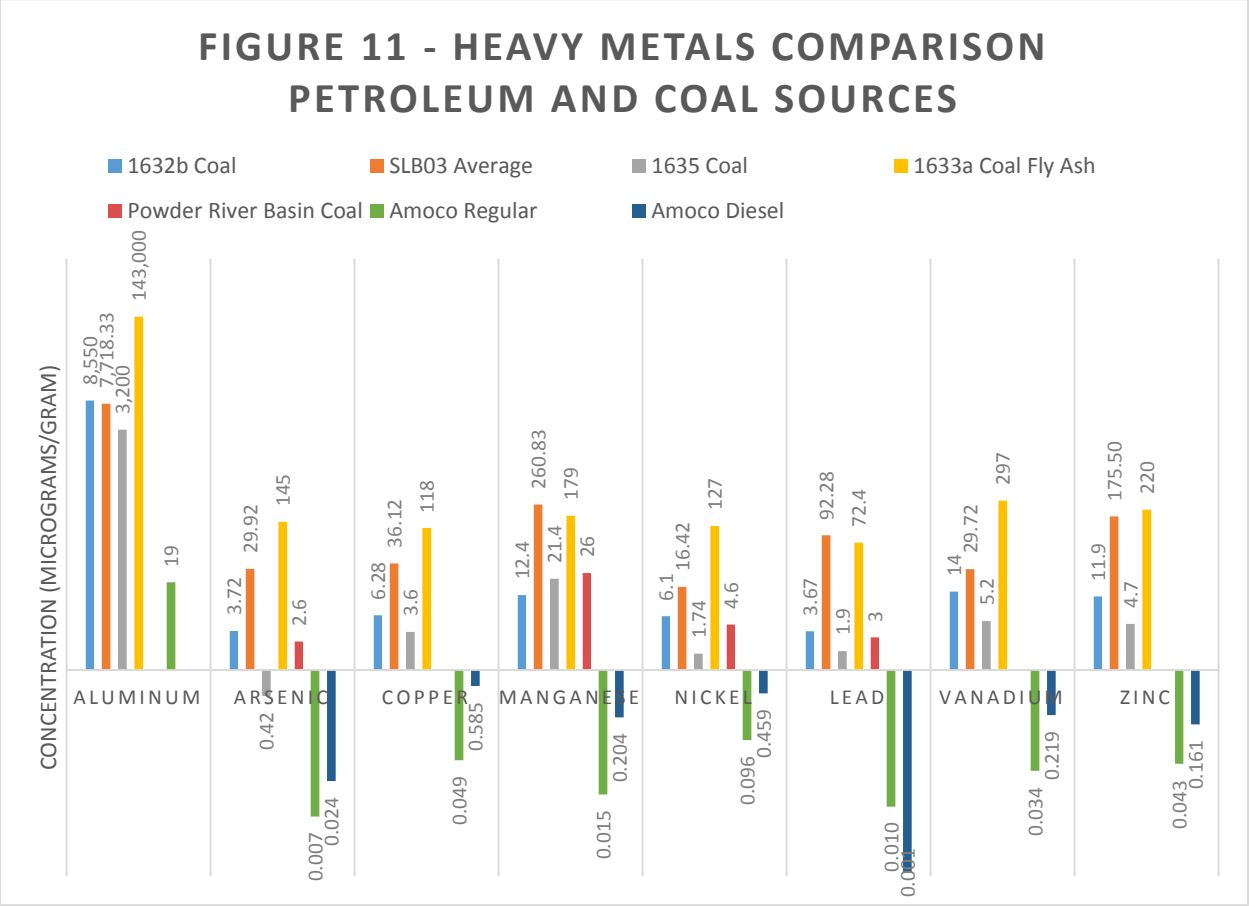
The Duluth Seaway Port Authority website notes that coal stockpiled at the Midwest Energy Resources Company dock originates from the Powder River Basin of Montana and Wyoming. The U.S. Geological Society (USGS) provided a summary of the coal quality and geochemistry at this site and is provided in **Appendix J**. Metals studied by the USGS include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, and uranium. From the study, the coal zone contained the following arithmetic mean values for metals:

Arsenic: 2.6 mg/kg,
Beryllium: 0.54 mg/kg,
Cadmium: 0.21 mg/kg,
Chromium: 6.1 mg/kg,
Cobalt: 1.9 mg/kg,
Lead: 3 mg/kg,
Manganese: 26 mg/kg,
Mercury: 0.13 mg/kg,
Nickel: 4.6 mg/kg,
Selenium: 1.1 mg/kg, and
Uranium: 1.3 mg/kg

In 1999, the USGS initiated a National Coal Quality Inventory project that summarized information on coals that will be mined during the next 20-30 years. Chemical analyses were performed on 729 samples that included 697 samples from unburned coal, and 32 samples from coal combustion products. Nine coal producing states supplied these samples (Colorado, Kentucky, West Virginia, Wyoming, Illinois, Indiana, Pennsylvania, Tennessee, and Oaklahoma). Idenification and analysis of the 729 samples is available in the the USGS Open File Report 2006-1162 (Hatch, 2006), and a list of the minor and trace element content results is provided in **Table 8**. Average metal concentration values for all of the samples were calculated and are summarized in **Table 9**.

A comparison of metal concentrations from the USGS National Coal Survey, USGS Powder River Basin Coal Survey, and Amoco fuel analysis is shown below in **Figure 11**. Metals of interest were chosen based on TEC or PEC exceedances observed in sediment sample SW15-SLB03. Results were plotted on a log scale for ease of comparison due to concentrations differing by orders of magnitude. The metal concentrations observed in coal are closer in

magnitude to the results presented in sediment sample SW15-SLB03, and are a more likely source for the metals that exceeded the TEC and PEC values.



4.2.3 SVOC

Of the SVOCs analyzed in EA Engineering's report, compounds with sediment quality guideline limits (SQGs) were included in the PAH17 summation with the exception of dibenzofuran. The PAH17 summation was based on the US EPA's priority pollutant compound list.

Dibenzofuran is an aromatic compound that has two benzene rings fused to a central furan ring. The US EPA lists sources and potential exposure of dibenzofuran as originating from sites engaged in combustion or carbonization processes, such as coal tar and coal gasification, or the handling of creosote. It can also be found in coke dust, grate ash, and flame soot, and can be recovered from a wash oil fraction of coal tar that boils at 275 and 290°C. Sanborn® maps from 1889 show that coke ovens were present near the bay area, approximately 600 feet south of

what is now the Midwest Energy Coal barge dock (**Figure 10**), which may have contributed to the dibenzofuran found in the sediment.

4.2.4 VOC

A total of 20 samples in EA Engineering's report were analyzed for VOCs after being pre-selected by EPA and WDNR. It was not explained in the report how this pre-selection was determined. From the samples of focus, only locations SW15-SLB02 and SW15-SLB03 contained results for benzene and xylene.

Only one soil sample from the pre-excavation soil samples in the OW Separator and Loading Rack Area had benzene and xylene concentrations that exceeded the NR 720 and NR 746 standards (**Figure 4**). After excavation in the area, all soil samples surrounding the excavation area indicated benzene and xylene concentration levels that were non-detect (**Figure 5**), and groundwater analytical results were either non-detect or lower than the NR 140 enforcement standard requirements (**Table 3**). Based on the pre- and post-excavation soil and water analytical results for the Barge Dock closed incident, benzene and xylene concentrations found in sediment sample SW15-SLB03 are unrelated to historical contamination at the Superior Terminal site.

The Murphy Oil Marine Site (BRRTS #03-16-000721) contains benzene and xylene concentration values that exceed NR 140 enforcement standard requirements as discussed in Section 2.4.1. The historical groundwater gradient based on hydrology in the vast network of monitoring wells across the Superior Terminal Barge Dock area is consistently oriented to the northwest, placing the BRRTS #03-16-000721 release directly upgradient of the subject site investigation, and sediment sample SW15-SLB03.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the available site information, Antea Group makes the following conclusions and recommendations:

Conclusions:

- Any residual soil or groundwater contamination related to the Amoco Barge Dock near sediment sample SW15-SLB03 has been identified and/or removed during the October 2002 delineation and excavation. Sidewall soil samples collected around the excavation area performed in October 2002 indicated no PVOC contaminant levels that exceeded NR 720 RCL or NR 746 Soil Screening Levels. Two rounds of groundwater sampling performed in the area of the excavation in November 2002 and April 2003 indicated no contaminant levels that exceeded NR 140 ES Standards.

- The Murphy Oil Marine Terminal Tank #2 open LUST investigation (BRRTS #03-16-000721) is located upgradient of sediment sample site SW15-SLB03. The concentrations of PVOCs at the site greatly exceed the NR 720 RCL, and are a potential source for the results found in the sediment sample.
- The Murphy Marine Terminal open LUST investigation (BRRTS #03-16-000320) is located approximately 100 feet to the east of sediment sample location SW15-SLB02. Soil samples have exceeded the NR 720 Soil to Groundwater Pathway and NR720 Industrial Direct Contact standards for PVOCs and PAHs through all soil sampling periods. This contamination has been attributed to the industrial backfill used to create the ship loading slip, and is a probable contributing source for the PAH results found in sediment sample SW15-SLB02.
- After analysis on PAH ratios and concentration distributions, including independent expert analysis, it can be concluded that the sediment contamination found in SW15-SLB03 originates from a thermogenic (petrogenic) source, suggestive of coal. Sediment samples SW15-SLB01, SW15-SLB02, SW15-SLB04, SW15-SLB05, and SW15-SLB06 have PAH ratios that suggest pyrogenic sources.
- Heavy metals contained in SW15-SLB03 are representative of coal compounds and do not resemble the contents of any gasoline, diesel, or other distillates that were historically shipped to the Amoco Barge Dock slip. Docks across the bay from the sediment sample location have been shipping iron ore or taconite pellots from 1893 up to the present day. These industrial shipping areas are a suspected source for the high levels of iron found in the sediment.
- The SVOC dibenzofuran detected in the sediment samples has been identified by the US EPA as relating to coal/coke sources.

Recommendations:

- No further action recommended as the sediment contamination found in St. Louis Bay by EA Engineering is unrelated to any activities performed on the Amoco Barge Dock area.
- Antea Group requests a letter from the WDNR confirming that this harbor sediment issue is closed as it pertains to the Amoco Terminal Barge Dock.

6.0 REMARKS

The recommendations contained in this report represent Antea USA, Inc.'s professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Antea USA, Inc. and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Antea USA, Inc.'s client and anyone else specifically

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Date: 11/17/17

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Senior Hydrogeologist

Layne Kortbein

Date: 11/17/17

Layne Kortbein
Staff Professional

Reviewed by:

Date: 11/17/17

Jonathan Zimdars
Consultant

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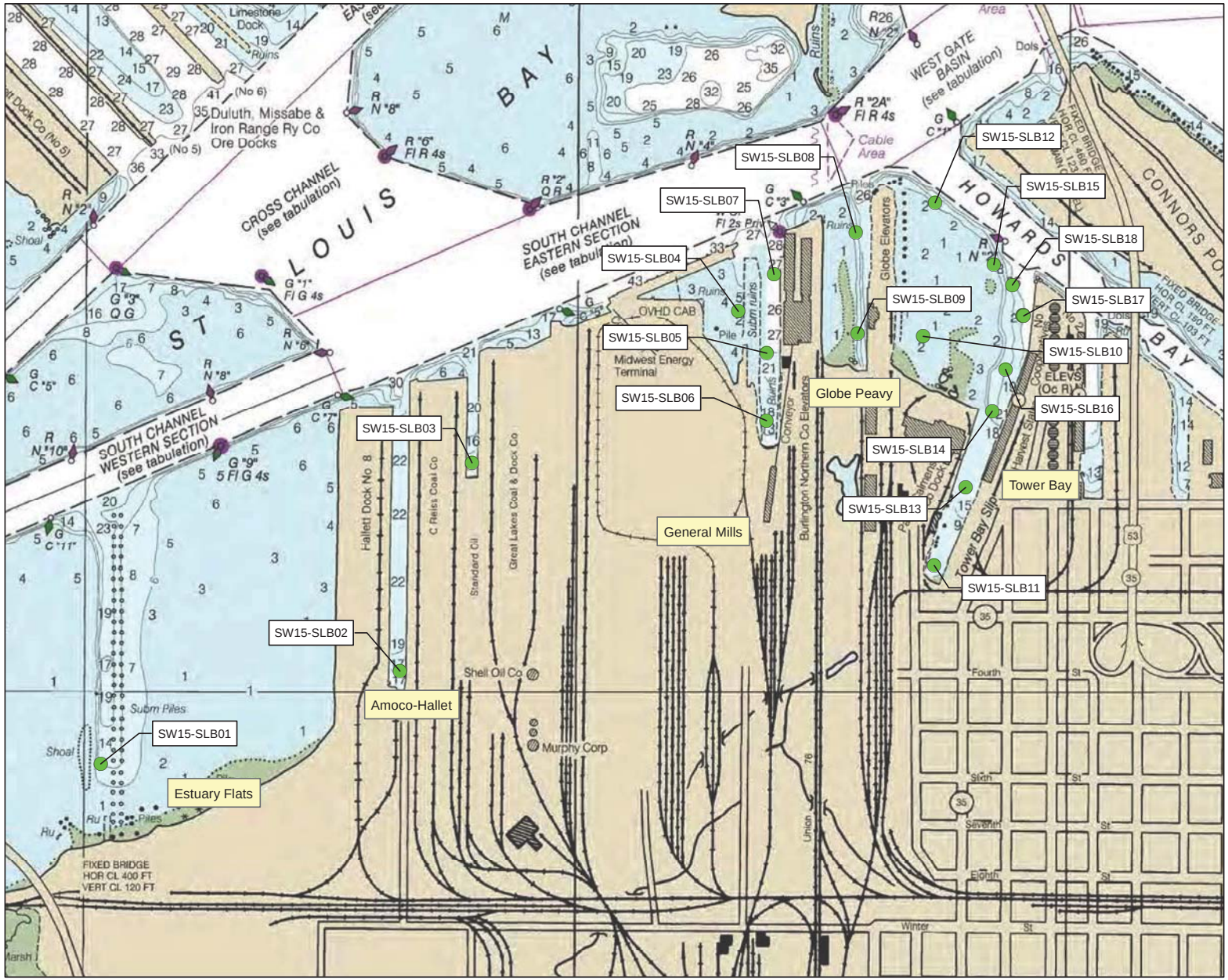
Figures



VICINITY MAP

Legend

- Sample Location

0 1,000 2,000
Feet

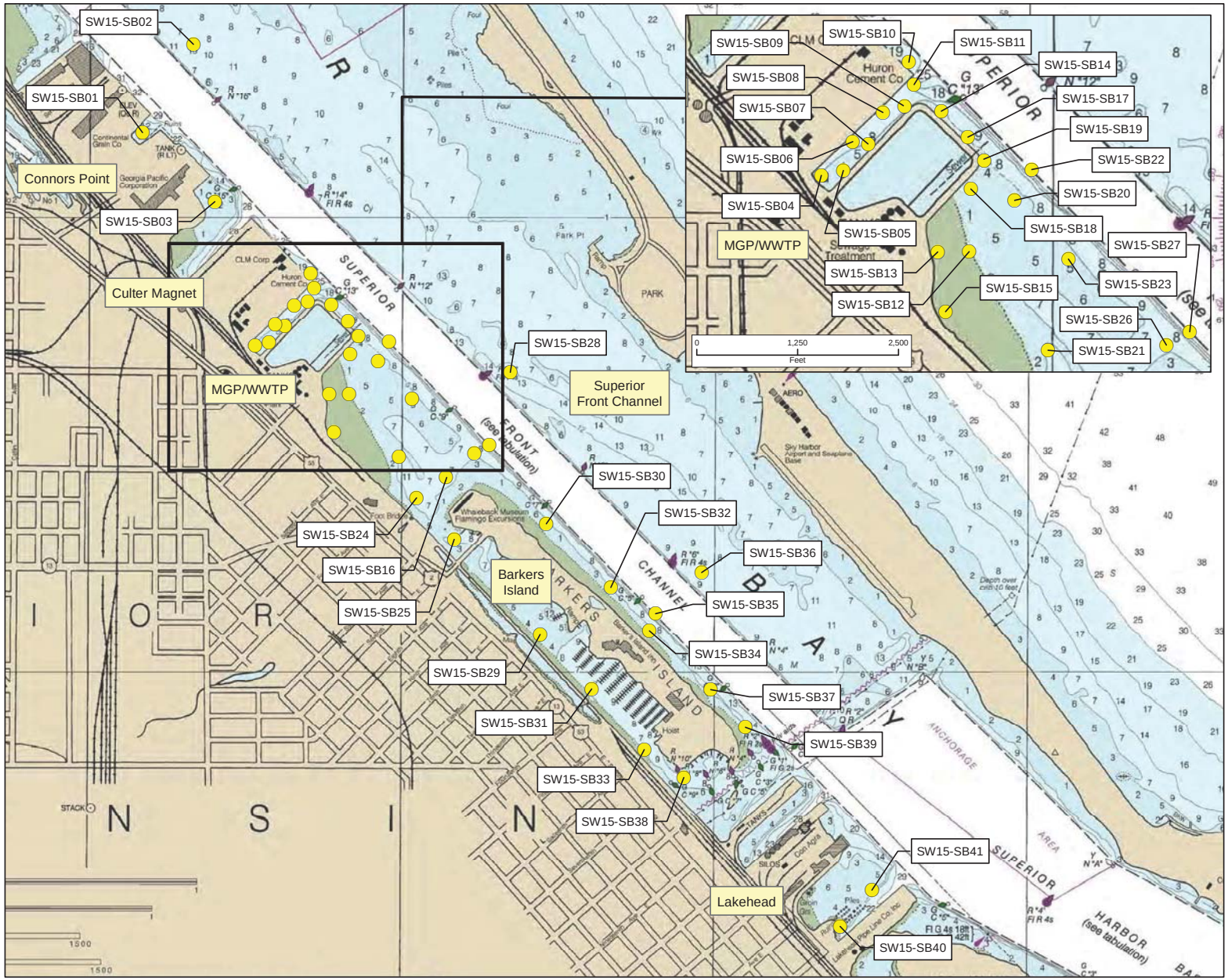
Data Sources:
ArcGIS Online Imagery 2012

Map Date: 12/16/2015

FIGURE 1
Sample Locations
St. Louis Bay

Superior Waterfront Characterization
St. Louis River and Bay Area of Concern
Superior, Wisconsin

Document Path: \\lovetong\s\GIS\data\Federal\Midwest\Wisconsin\Superior_Waterfront\MXD\SSTM\SSTM_Figure 2-1 SampleLocations_StLouisBay.mxd



VICINITY MAP

Legend

- Sample Location

0 2,000 4,000
Feet

Data Sources:
ArcGIS Online Imagery 2012

Map Date: 12/16/2015

FIGURE 2
Sample Locations
Superior Bay

Superior Waterfront Characterization
St. Louis River and Bay Area of Concern
Superior, Wisconsin

Document Path: \\lovetongis\GIS\data\Federal\Midwest\Wisconsin\Superior_Waterfront\MXD\SSTM\SSTM_Figure 2-2 SampleLocations_SuperiorBay.mxd

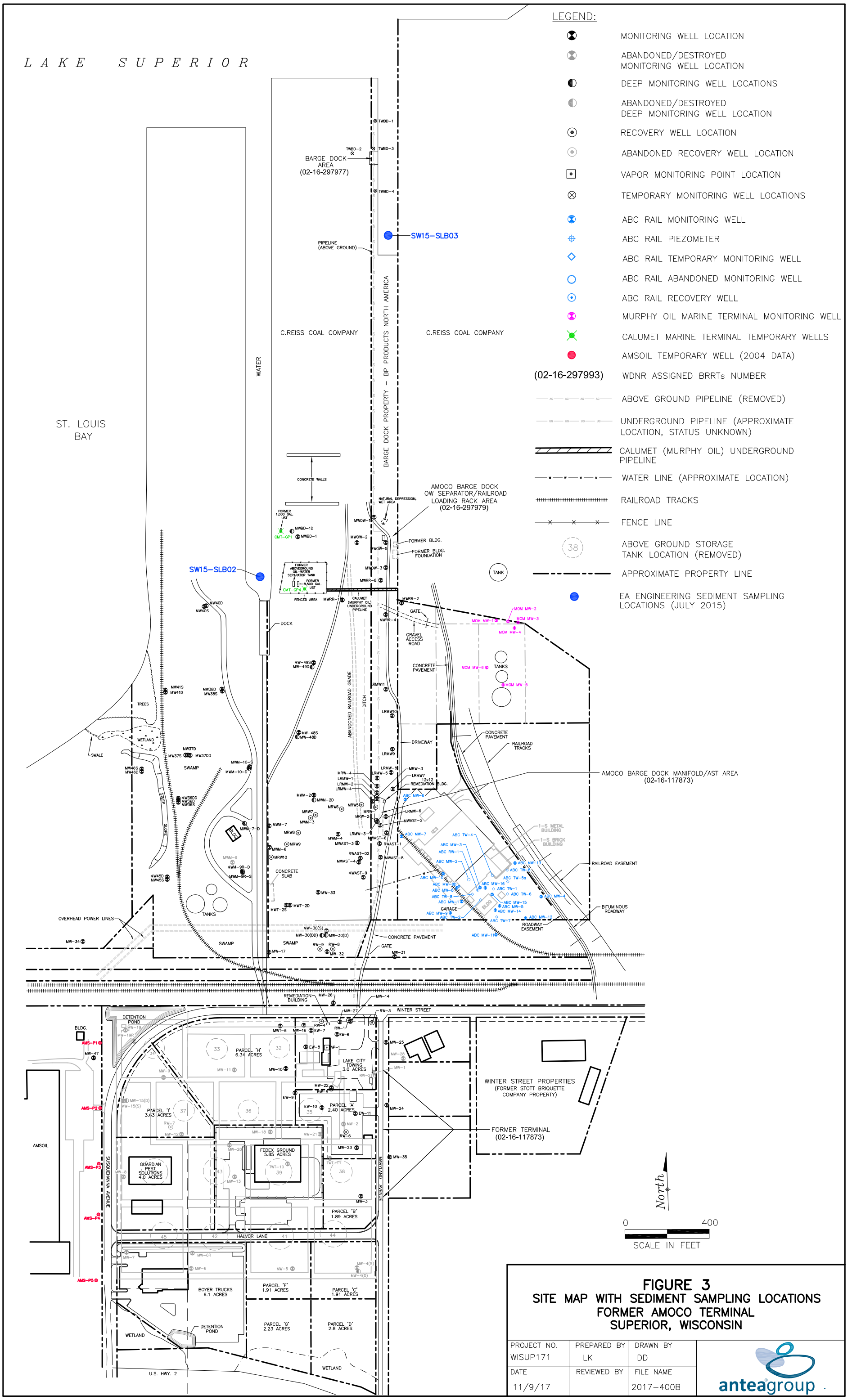
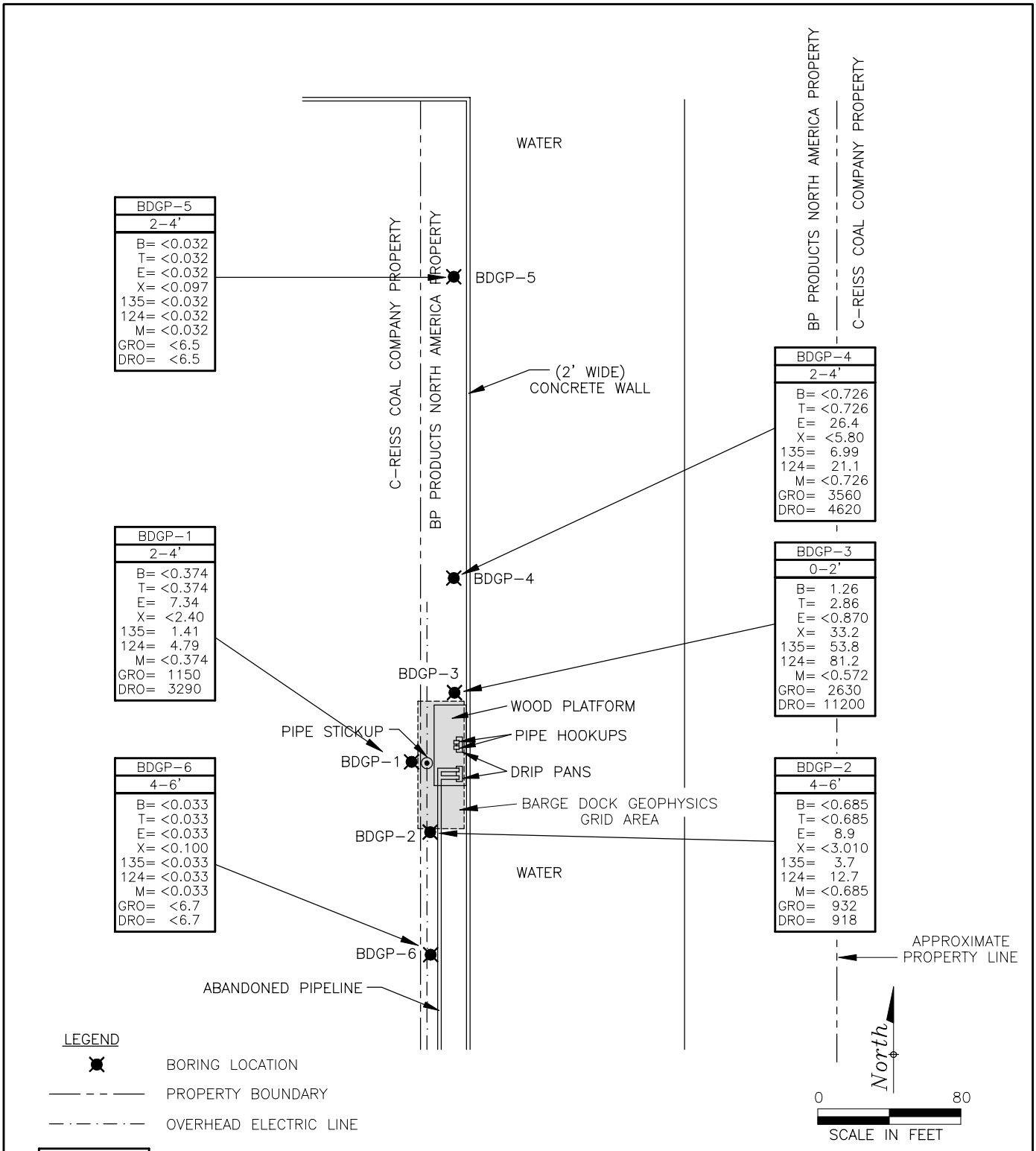


FIGURE 3
SITE MAP WITH SEDIMENT SAMPLING LOCATIONS
FORMER AMOCO TERMINAL
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY	
WISUP171	LK	DD	
DATE	REVIEWED BY	FILE NAME	
11/9/17		2017-400B	anteagroup



LEGEND

- BORING LOCATION
- PROPERTY BOUNDARY
- OVERHEAD ELECTRIC LINE

SAMPLE ID	SAMPLE NAME
DEPTH	SAMPLE DEPTH (FEET)
B=	BENZENE
T=	TOLUENE
E=	ETHYLBENZENE
X=	TOTAL XYLENES
135=	1,3,5-TRIMETHYLBENZENE
124=	1,2,4-TRIMETHYLBENZENE
M=	METHYL TERT BUTYL ETHER
GRO=	GASOLINE RANGE ORGANICS
DRO=	DIESEL RANGE ORGANICS

ALL RESULTS IN MILLIGRAMS/KILOGRAM (Mg/Kg).

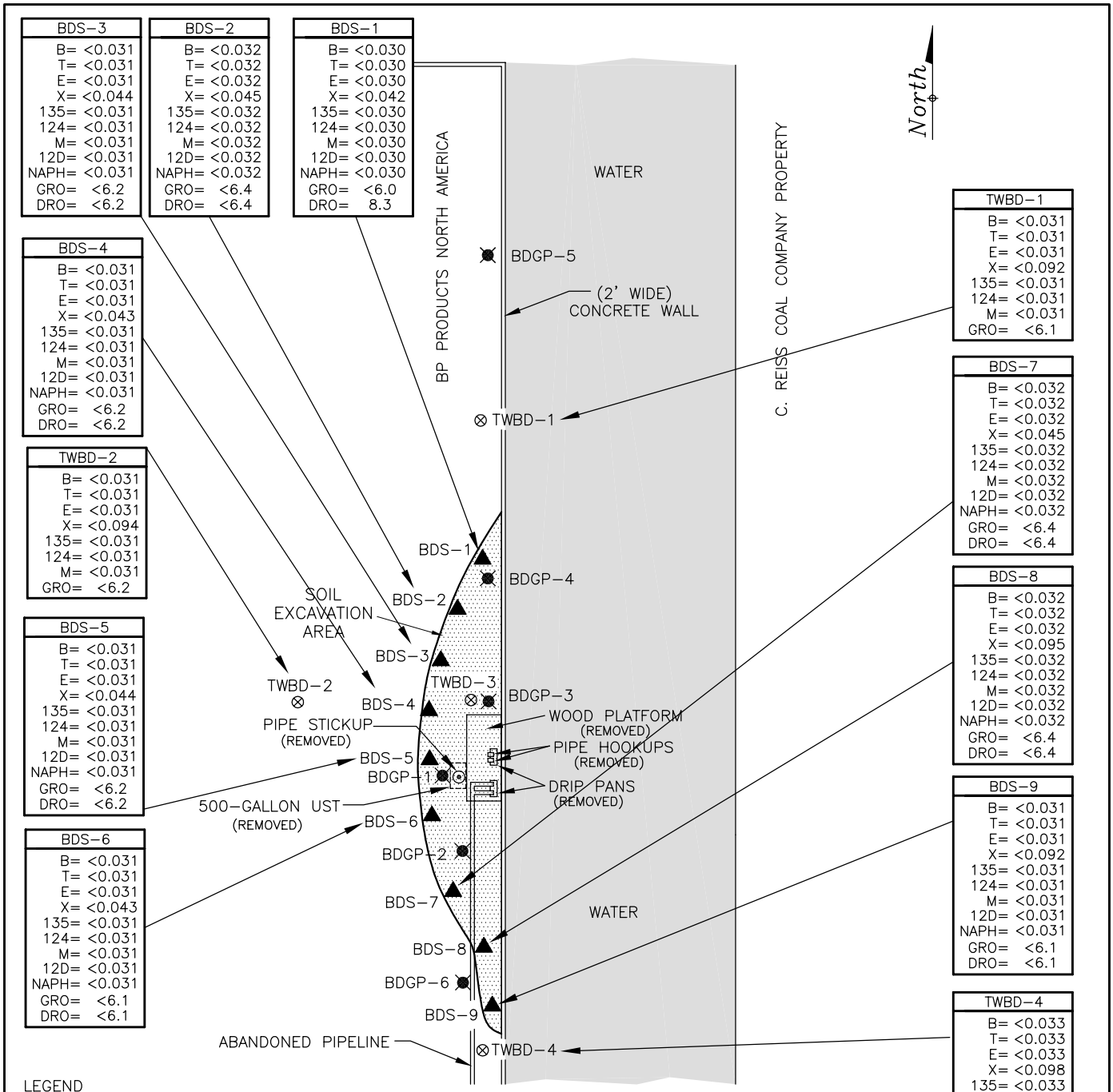
SAMPLES COLLECTED NOVEMBER 6 AND 7, 2001

FIGURE 4

SOIL CHEMICAL CONCENTRATION MAP
BARGE DOCK
BP PRODUCTS NORTH AMERICA
BARGE DOCK PROPERTY
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY
29320	SR	DD
DATE	REVIEWED BY	FILE NAME
1/24/02		29320-BD

Delta Environmental Consultants, Inc.



LEGEND

⊗ TEMPORARY MONITORING WELL

BORING LOCATION

SIDEWALL SOIL SAMPLE LOCATION

SAMPLE ID	SAMPLE NAME
DEPTH	SAMPLE DEPTH (FEET)
B=	BENZENE
T=	TOLUENE
E=	ETHYLBENZENE
X=	TOTAL XYLENES
135=	1,3,5-TRIMETHYLBENZENE
124=	1,2,4-TRIMETHYLBENZENE
M=	METHYL TERT BUTYL ETHER
12D=	1,2 DICHLOROETHANE
NAPH=	NAPHTHALENE
GRO=	GASOLINE RANGE ORGANICS
DRO=	DIESEL RANGE ORGANICS

ALL RESULTS IN MILLIGRAMS/KILOGRAM (Mg/Kg).

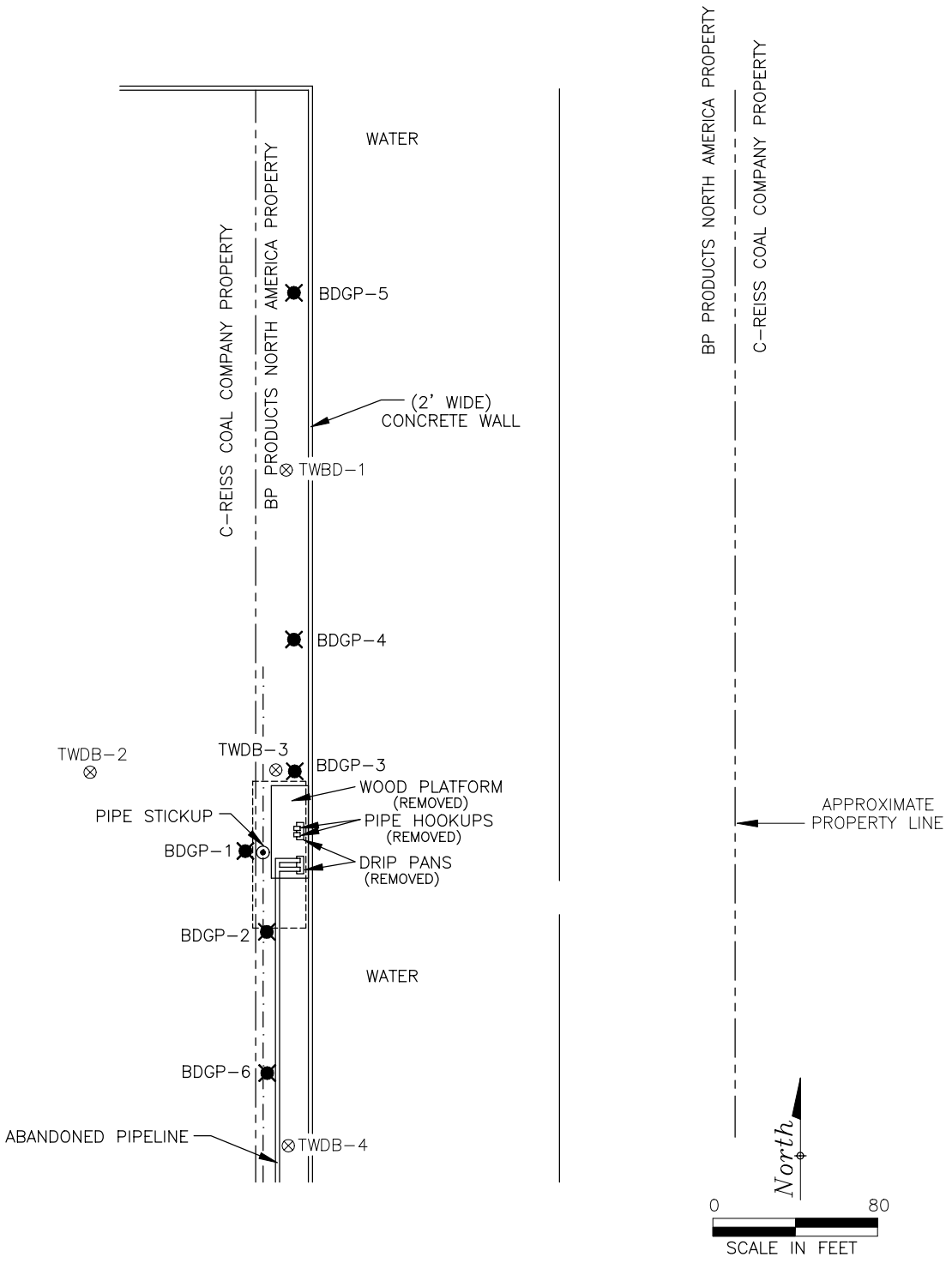
SAMPLES COLLECTED NOVEMBER 6 AND 7, 2001

FIGURE 5

EXCAVATION AREA AND SOIL SAMPLE LOCATIONS
BARGE DOCK
(OCTOBER 5, 2002)
BP PRODUCTS NORTH AMERICA
BARGE DOCK PROPERTY
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY
AMGO-06N	WH	DD
DATE	REVIEWED BY	FILE NAME
6/3/02		Sup-12

Delta Environmental Consultants, Inc.



LEGEND

- ⊗ TEMPORARY MONITORING WELL
- ✱ BORING LOCATION
- PROPERTY BOUNDARY
- OVERHEAD ELECTRIC LINE

FIGURE 6
SITE MAP
BARGE DOCK
BP PRODUCTS NORTH AMERICA
BARGE DOCK PROPERTY
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY
AMGO-06N	WH	DD
DATE	REVIEWED BY	FILE NAME
1/22/03		Sup-5

Delta Environmental Consultants, Inc.

ST. LOUIS BAY

WATER

C. REISS COAL COMPANY

C. REISS COAL COMPANY

BARGE DOCK PROPERTY

TANK

5

DOCK

GATE

GRAVEL ACCESS ROAD

BURLINGTON NORTHERN

CONCRETE PAVEMENT

TANKS

4

TREES

HALLETT DOCK CO.

WETLAND

SWALE

SWAMP

DITCH

DRIVEWAY

CONCRETE PAVEMENT

RAILROAD TRACKS

MIDWEST ENERGY RESOURCES CO.

12x12 REMEDIATION BLDG.

STEEP SLOPE

BLDG

REDEVELOPMENT AUTHORITY CITY OF SUPERIOR

GILLIN PROPERTIES LLC

3

1-S BRICK BUILDING

RAILROAD EASEMENT

CONCRETE SLAB

ABOVE GROUND PIPELINE (REMOVED)

WATER LINE APPROX. LOCATION

GARAGE

BLDG

BITUMINOUS ROADWAY

OVERHEAD POWER LINES

TANKS

SWAMP

SWAMP

ROADWAY EASEMENT

CONCRETE PAVEMENT

GATE

BNSF

BNSF

REDEVELOPMENT AUTHORITY CITY OF SUPERIOR

REMEDIATION BUILDING

WINTER STREET

DETENTION POND

THOMPSON LAND COMPANY LLC (LAKE CITY TOWING)

36x14 REMEDIATION BLDG.

SUE VINJE PROPERTIES LLC

MANION TRUSS & COMPONENTS INC.

WINTER BUSINESS PARK LLC

2

1

SUE VINJE TRUCKING INC

HCI LIMITED PARTNERSHIP (FED EX)

GUARDIAN PEST SOLUTIONS

SUSQUEHANNA AVENUE

MARYLAND AVENUE

HALVOR LANE

1101 BLDG. LTD PARTNERSHIP (AMSOIL)

BOYER FORD TRUCKS INC.

DETENTION POND

WINTER BUSINESS PARK LLC

U.S. HWY. 2

LEGEND - ADJACENT BRRTS

1 = WDNR BRRTS LISTING

COC = CHEMICAL OF CONCERN
WDNR = WISCONSIN DEPARTMENT OF NATURAL RESOURCES
BRRTS = BUREAU FOR REMEDIATION AND REDEVELOPMENT TRACKING SYSTEM

1 BRRTS 02-16-554133 STOTT BRIQUETTE COMPANY
COC - METALS, PAHs

2 BRRTS (NA) MURPHY OIL PIPELINE
COC - DIESEL NO. 1

3 BRRTS 02-16-119619 ABC RAIL COMPRESSOR RELEASE
BRRTS 03-16-000802 ABC RAIL CORP. WASTE OIL UST
BRRTS 03-16-000801 ABC RAIL CORP. FUEL OIL UST
BRRTS 03-16-000059 ABC RAIL (FMR) ABEC GASOLINE UST

4 BRRTS 02-16-554200 MURPHY OIL WEST SPILL
BRRTS 03-16-000320 MURPHY MARINE TERMINAL
COC - PETROLEUM
BRRTS 03-16-000721 MURPHY OIL TANK #2 - COC GASOLINE

5 BRRTS 02-16-544665 HALLETT DOCK #8 - COC METALS, PAHs

LEGEND - COLORS

ACTIVE COMMERCIAL (NO INCIDENT)

ACTIVE COMMERCIAL (INCIDENT)

VACANT

SUBJECT SITE

North

0 300

SCALE IN FEET

FIGURE 7
AREA PROPERTIES MAP

FORMER AMOCO TERMINAL
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY
WISUP171	LK	DD
DATE	REVIEWED BY	FILE NAME
07/06/17		2017-Area

anteagroup.

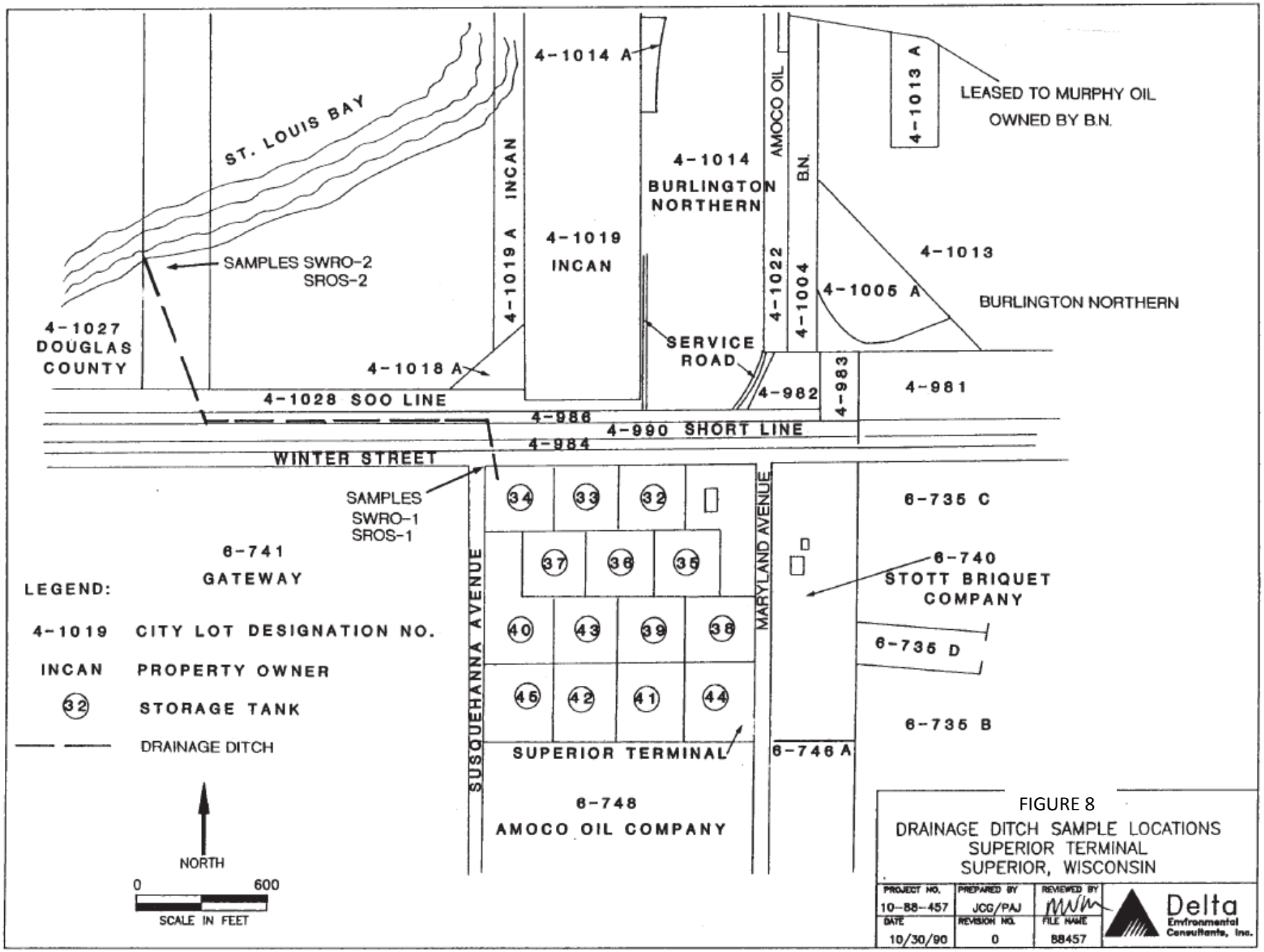


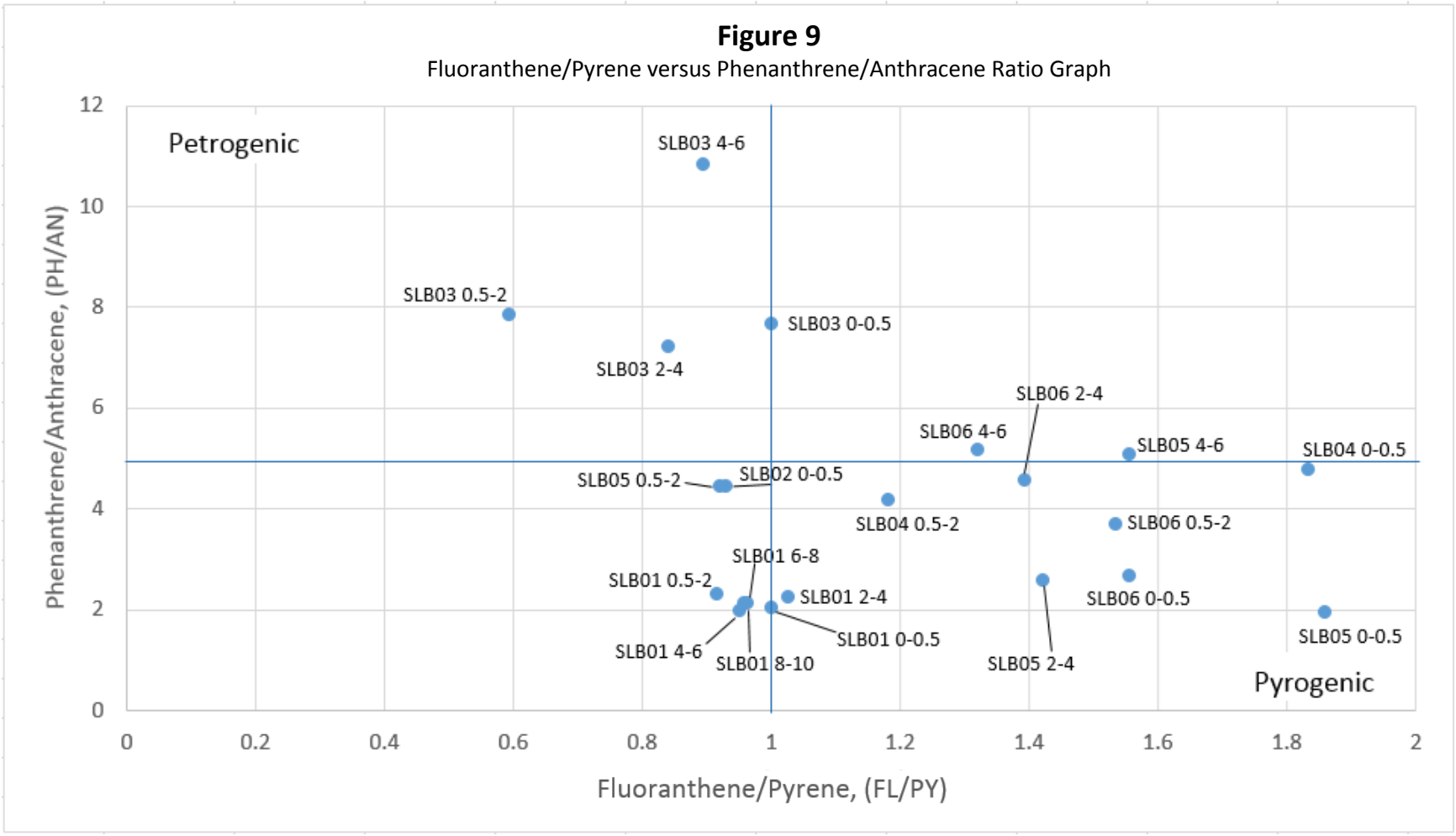
FIGURE 8

DRAINAGE DITCH SAMPLE LOCATIONS
SUPERIOR TERMINAL
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	REVIEWED BY	
10-88-457	JCG/PAJ	MWM	Delta Environmental Consultants, Inc.
DATE	REVISION NO.	FILE NAME	
10/30/90	0	88457	

Figure 9

Fluoranthene/Pyrene versus Phenanthrene/Anthracene Ratio Graph



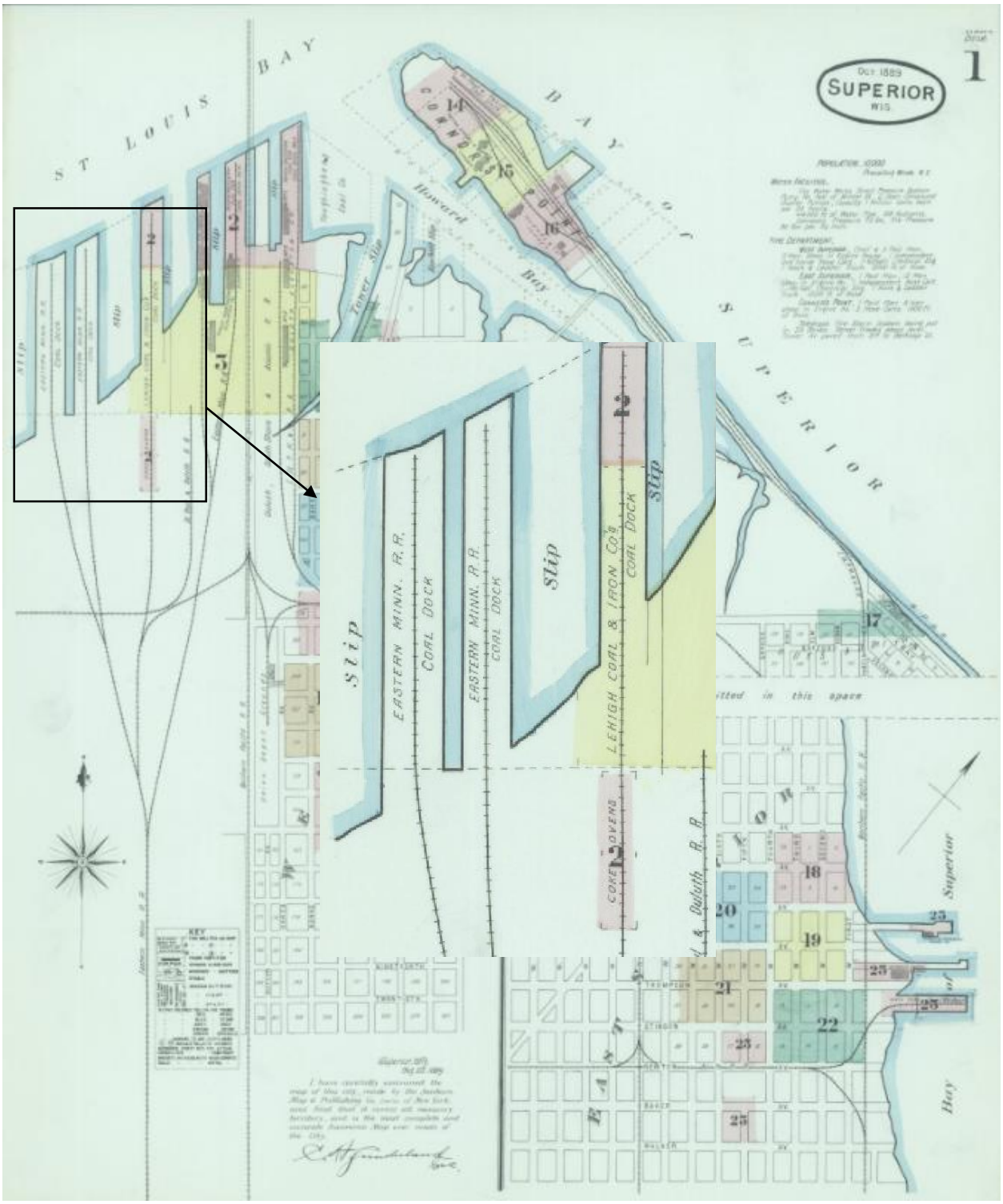


FIGURE 10

Sanborn® Map - 1889

Tables

Table 3
Ground Water Analytical Results
Barge Dock Area
Superior, WI

Well Number	Date Sampled	Analytical Parameters																		Bio-Parameters		
		Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L	Total TMBs µg/L	MTBE µg/L	Naphthalene µg/L	Isopropyl-benzene µg/L	p-Isopropyl-toluene µg/L	Methylene Chloride µg/L	n-Propyl-benzene µg/L	Fluorene µg/L	1-Methyl-naphthalene µg/L	2-Methyl-naphthalene µg/L	Phenanthrene µg/L	Pyrene µg/L	GRO µg/L	DRO µg/L	Dissolved Lead µg/L	DO ppm	REDOX mV	Soluble Iron ppm
	NR 140 ES	***5***	***1000***	***700***	***10000***	***480***	***60***	***40***	-	-	***5***	-	***400***	-	-	-	***10***	-	-	***15***			
TWBD-1	11/08/02	<0.13	<0.20	<0.22	<0.23	<0.29	<0.16	<0.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<100	NA	0.6	-70	2.39
	4/15/2003	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	1.0	-7	3.29
TWBD-2	11/08/02	<0.13	<0.20	<0.22	<0.23	<0.29	<0.16	<0.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<100	NA	0.9	50	3.30
	4/15/2003	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	4.1	20	3.04
TWBD-3	11/08/02	0.95	<1.0	3.60	56	75	<0.80	7.90	NA	NA	NA	NA	NA	NA	NA	NA	NA	380	670	NA	3.8	145	0.49
	4/15/2003	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NM	NM	NM
	4/15/2003 D	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA			
TWBD-4	11/08/02	<0.13	<0.20	<0.22	<0.23	<0.29	<0.16	<0.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<100	NA	2.4	15	3.30
	4/15/2003	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	0.5	-4	2.66

NOTE:

< ..... = the compound was not detected at or above the indicated method detection limit
µg/L ..... = micrograms per liter (equivalent to parts per billion)
µmhos/cm ..... = micromhos per centimeter
ABC MW-6 .... = indicates a well owned by ABC Rail Corporation (data obtained from WDNR files)
°C ..... = degrees celsius
D ..... = duplicate sample
DO ..... = dissolved oxygen
DRO ..... = diesel range organics
FP ..... = the well was not sampled due to the presence of free product
GRO ..... = gasoline range organics
MTBE ..... = methyl tertiary-butyl ether
mV ..... = millivolts
NA ..... = not analyzed for indicated parameter
NM ..... = not measured
NR 140 ES ..... = Wisconsin Administrative Code Chapter NR 140 Enforcement Standard (Revision 3/00)
NS ..... = not sampled
ppm ..... = parts per million
REDOX ..... = reduction/oxidation
TMBs ..... = trimethylbenzenes
..... = shaded cell indicates that the concentration is above the NR 140 ES
(1) ..... = common lab solvent and contaminant
(2) ..... = The Twin Ports Testing 2/17/00 report does not specify whether the reported lead result is total lead or dissolved lead.

Table 4 – PH/AN and FL/PY Ratios for Various Pyrogenic and Petrogenic Sources

Source	PH/AN	FL/PY	Reference
Primarily pyrogenic sources			
Coke oven emissions	1.27–3.57	0.76–1.31	Maher and Aislabe 1992
Iron/steel plant (soot)	0.24	0.62	Yang et al. 2002
Iron/steel plant (flue gas)	0.06	1.43	Yang et al. 2002
Wood-burning emissions	6.41	1.26	Page et al. 1999
Auto exhaust soot (gasoline)	1.79	0.90	O'Malley et al. 1996
Diesel engine soot	0.06	1.26	Bence et al. 1996
Diesel exhaust particles (n = 22)	1.3–78	0.25–1.38	Sjøgren et al. 1996
Highway dust	4.7	1.4	Christensen et al. 1999
Urban runoff	0.56–1.47	0.23–1.07	Stout et al. 2001a
Creosote	0.11–4.01	1.52–1.70	Neff 2002
Coal tar	3.11	1.29	Neff 2002
Coke	0.24	1.49	S.A. Stout (unpublished data)
Creosote-contaminated sediment in Table 5	0.34	1.59	Stout et al. 2001a
Urban sediment in Table 5	0.22	0.79	Stout et al. 2001a
Primarily petrogenic sources			
60 crude oils (mean)	52.0	0.25	Kerr et al. 1999
Australian crude oil	>370[a]	0.78	Neff et al. 2000
Italian crude oil	>232[a]	0.08	Neff et al. 1998
Alaska crude oil	>262[a]	0.2	Bence et al. 1996
Diesel fuel (No. 2 fuel oil)	>800[a]	0.38	Bence et al. 1996
No. 4 fuel oil	11.8	0.16	S.A. Stout (unpublished data)
Bunker C residual fuel oil	14.8	0.14	S.A. Stout (unpublished data)
Road paving asphalt	20	<0.11[a]	Kriech et al. 2002
West Virginia coal (2 samples)	11.2, 27.9	0.95, 1.03	Neff and Sauer 1993

[a]Anthracene or fluoranthene concentration was below the detection limit.

(Neff 2005 pp. 24)

Table 5 - Phenanthrene to Anthracene (PH/AN) and Fluoranthene to Pyrene (FL/PY) Ratios

	X, FL/PY	Y, PH/AN
SW15-SLB01 0-0.5	1.000	2.050
SW15-SLB01 0.5-2	0.914	2.333
SW15-SLB01 2-4	1.025	2.267
SW15-SLB01 4-6	0.951	2.000
SW15-SLB01 6-8	0.963	2.143
SW15-SLB01 8-10	0.957	2.125
SW15-SLB02 0-0.5	0.929	4.444
SW15-SLB03 0-0.5	1.000	7.692
SW15-SLB03 0.5-2	0.593	7.857
SW15-SLB03 2-4	0.839	7.237
SW15-SLB03 4-6	0.895	10.833
SW15-SLB04 0-0.5	1.833	4.792
SW15-SLB04 0.5-2	1.182	4.194
SW15-SLB05 0-0.5	1.857	1.951
SW15-SLB05 0.5-2	0.920	4.444
SW15-SLB05 2-4	1.421	2.600
SW15-SLB05 4-6	1.554	5.091
SW15-SLB06 0-0.5	1.556	2.684
SW15-SLB06 0.5-2	1.533	3.714
SW15-SLB06 2-4	1.393	4.571
SW15-SLB06 4-6	1.320	5.176

Table 6 – (FLPY)/(FLPY + C24PH) Ratios for Various Pyrogenic and Petrogenic Sources

Material	No. of samples	Mean ratio	Ratio range
Petrogenic sources			
Crude oils	22	0.015	0–0.044
#2 Fuel oil/diesel	25	0.044	0.008–0.073
#6 Fuel oil/bunker C	43	0.050	0.028–0.143
IBF-380 heavy fuel	17	0.048	0.018–0.057
Gasoline	12	0.105	0–0.174
Coal	21	0.099	0.021–0.320
Pyrogenic sources			
Soot	2	0.821	0.731–0.909
Creosote	9	0.814	0.387–0.975
Coal tar	15	0.922	0.838–0.983

(Neff 2005 pp. 25)

Table 7 - (FLPY)/(FLPY + C24PH) Ratios for St. Louis Bay Samples

	FLPY/(FLPY + C24PH)
SW15-SLB02 0-0.5	0.47
SW15-SLB03 0-0.5	0.172
SW15-SLB03 0.5-2	0.124
SW15-SLB03 2-4	0.178
SW15-SLB03 4-6	0.153
SW15-SLB03 6-8	0.116
SW15-SLB03 8-10	0.162
SW15-SLB05 0-0.5	0.693
SW15-SLB05 0.5-2	0.733
SW15-SLB05 2-4	0.693
SW15-SLB05 4-6	0.668

Table 8 - Average Heavy Metal Concentration Summary for USGS National Coal Quality Inventory Samples

	Aluminum	Magnesium	Iron	Arsenic	Cadmium	Chromium	Copper
Average Concentration (mg/kg)	19,000	1,000	15,000	24	0.8	24.4	22.0

	Mercury	Nickel	Lead	Selenium	Vanadium	Zinc
Average Concentration (mg/kg)	0.2	27.7	17.4	5.2	48.6	63.8

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
Northern Great Plains Province																		
ERP00101	E-173222	44-23513	Wyoming	Campbell	Ft. Union Formation		21.8	14.0	2.21	1.10	0.57	0.093	0.079	0.074	0.43	0.060		<0.015
ERP00101	E-173223	44-23514	Wyoming	Campbell	Ft. Union Formation		22.4	18.1	4.01	2.16	0.87	0.153	0.054	0.120	0.32	0.141		<0.015
ERP00101	E-173224	44-23515	Wyoming	Campbell	Ft. Union Formation		26.8	4.3	0.51	0.26	0.82	0.112	0.054	0.006	0.12	0.036		<0.015
ERP00101	E-173225	44-23516	Wyoming	Campbell	Ft. Union Formation		27.5	3.9	0.35	0.29	0.73	0.103	0.052	0.006	0.13	0.030		<0.015
ERP00101	E-173226	44-23517	Wyoming	Campbell	Ft. Union Formation		31.7	3.6	0.23	0.28	0.64	0.100	0.051	0.005	0.13	0.028		<0.015
ERP00101	E-173227	44-23518	Wyoming	Campbell	Ft. Union Formation		28.5	3.9	0.27	0.24	0.65	0.096	0.049	0.005	0.25	0.017		<0.015
ERP00101	E-173228	44-23519	Wyoming	Campbell	Ft. Union Formation		28.1	7.3	0.95	0.77	0.88	0.123	0.053	0.030	0.18	0.061		<0.015
ERP00101	E-173229	44-23520	Wyoming	Campbell	Ft. Union Formation		28.9	6.8	0.93	0.66	0.81	0.119	0.050	0.036	0.17	0.027		<0.015
ERP00101	E-173230	44-23521	Wyoming	Campbell	Ft. Union Formation		19.0	35.7	10.50	4.14	0.54	0.202	0.072	0.504	0.42	0.184		<0.015
ERP00101	E-173231	Silo 2A	Wyoming	Campbell	Ft. Union Formation		28.5	4.6	0.48	0.33	0.70	0.100	0.079	0.013	0.14	0.024		<0.015
ERP00101	E-173232	Silo 2B	Wyoming	Campbell	Ft. Union Formation		28.7	4.6	0.51	0.34	0.73	0.103	0.061	0.013	0.14	0.026		<0.015
ERP00101	E-173233	Silo 4A	Wyoming	Campbell	Ft. Union Formation		26.2	4.5	0.47	0.27	0.76	0.103	0.047	0.007	0.13	0.030		<0.015
ERP00101	E-173234	Silo 4B	Wyoming	Campbell	Ft. Union Formation		27.0	4.6	0.49	0.28	0.81	0.111	0.051	0.008	0.15	0.030		<0.015
ERP00302	E-207028	106A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.4	5.7	0.73	0.45	0.99	0.126	0.059	0.012	0.19	0.047	0.37	0.035
ERP00302	E-207029	106B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	16.8	6.5	0.89	0.54	1.05	0.138	0.073	0.016	0.22	0.055	0.37	0.025
ERP00302	E-207030	106C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.9	5.7	0.71	0.46	1.00	0.129	0.067	0.014	0.19	0.047	0.38	0.019
ERP00302	E-207031	106D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.6	6.1	0.85	0.51	0.62	0.132	0.063	0.018	0.20	0.055	0.38	0.023
ERP00302	E-207032	102A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	26.0	6.4	0.91	0.61	0.92	0.136	0.062	0.024	0.25	0.054	0.40	0.019
ERP00302	E-207033	102B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	12.7	7.4	1.07	0.72	1.03	0.153	0.072	0.028	0.30	0.062	0.36	<0.015
ERP00302	E-207034	102C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.9	6.3	0.80	0.55	0.93	0.133	0.061	0.019	0.23	0.049	0.36	0.020
ERP00302	E-207035	102D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.4	6.9	0.98	0.59	0.98	0.141	0.067	0.028	0.25	0.054	0.37	0.017
ERP00302	E-207036	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	25.1	5.6	0.76	0.47	1.00	0.153	0.063	0.016	0.20	0.051	0.32	0.033
ERP00302	E-207037	107REJECT3551(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	25.6	5.4	0.70	0.43	0.95	0.136	0.064	0.013	0.17	0.048	0.34	<0.015
ERP00302	E-207038	107REJECT516	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	25.2	5.4	0.66	0.41	0.91	0.133	0.060	0.012	0.18	0.045	0.35	0.018
ERP00302	E-207039	107B516PRB	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	13.5	6.7	0.83	0.52	1.04	0.157	0.069	0.019	0.21	0.056	0.37	0.021
ERP00302	E-207040	ANDERSONA516	Wyoming	Converse	Ft. Union Formation	Anderson coal	17.8	14.0	3.47	1.10	0.95	0.228	0.049	0.186	0.50	0.068	0.41	0.021
ERP00302	E-207041	ANDERSONB516	Wyoming	Converse	Ft. Union Formation	Anderson coal	12.3	17.4	4.50	1.36	1.16	0.283	0.056	0.260	0.67	0.082	0.39	0.040
ERP00302	E-207042	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	18.6	14.0	3.00	1.02	1.39	0.296	0.049	0.163	0.51	0.067	0.43	0.023
ERP00302	E-207043	ANDERSOND516	Wyoming	Converse	Ft. Union Formation	Anderson coal	13.4	13.9	3.22	1.00	1.17	0.251	0.046	0.173	0.48	0.065	0.42	0.041
ERP00302	E-207044	CANYONA516	Wyoming	Converse	Ft. Union Formation	Canyon coal	13.6	6.3	0.85	0.50	1.01	0.218	0.070	0.023	0.28	0.042	0.22	0.050
ERP00302	E-207045	CANYONB516	Wyoming	Converse	Ft. Union Formation	Canyon coal	10.8	6.8	1.20	0.52	0.79	0.173	0.071	0.037	0.33	0.045	0.24	0.053
ERP00302	E-207046	CANYONC516	Wyoming	Converse	Ft. Union Formation	Canyon coal	16.8	7.7	1.37	0.58	0.90	0.194	0.074	0.045	0.34	0.046	0.22	0.034
ERP00302	E-207047	CANYOND516	Wyoming	Converse	Ft. Union Formation	Canyon coal	16.8	8.3	1.47	0.63	1.00	0.216	0.068	0.047	0.31	0.055	0.26	0.030
ERP00302	E-207048	C3UA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.7	7.7	0.85	0.57	1.06	0.130	0.080	0.022	0.41	0.041	1.26	0.072
ERP00302	E-207049	C3UB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	12.3	9.9	1.30	0.80	1.09	0.137	0.081	0.043	0.53	0.050	1.33	0.066
ERP00302	E-207050	C3UC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.8	6.7	0.61	0.44	0.92	0.126	0.065	0.015	0.47	0.033	1.30	0.058
ERP00302	E-207051	C3UD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.6	8.1	0.90	0.63	1.13	0.142	0.073	0.023	0.45	0.046	1.25	<0.015
ERP00302	E-207052	C1-2MA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.6	5.7	0.60	0.42	0.92	0.157	0.071	0.011	0.25	0.044	1.15	0.057
ERP00302	E-207053	C1-2MB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.2	6.3	0.77	0.48	1.03	0.166	0.079	0.013	0.32	0.053	0.39	0.026
ERP00302	E-207054	C1-2MC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	14.0	5.3	0.61	0.40	0.87	0.142	0.062	0.009	0.26	0.044	0.41	0.054
ERP00302	E-207055	C1-2MD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	20.7	5.4	0.70	0.41	0.88	0.144	0.068	0.010	0.25	0.046	0.41	0.042
ERP00302	E-207056	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	26.4	5.5	0.75	0.44	0.87	0.130	0.062	0.017	0.17	0.046	0.33	0.041
ERP00302	E-207057	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	16.5	14.7	3.46	1.09	1.07	0.248	0.052	0.195	0.48	0.066	0.42	0.080
ERP00357	E-217253	7-11A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.0	6.6	1.00	0.59	0.94	0.147	0.066	0.028	0.22	0.055	0.40	0.015
ERP00357	E-217254	7-11B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.1	6.6	1.03	0.60	0.90	0.147	0.064	0.029	0.23	0.053	0.41	<0.015
ERP00357	E-217255	7-12A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.5	6.3	0.96	0.62	0.94	0.145	0.065	0.021	0.24	0.056	0.45	0.017
ERP00357	E-217256	7-12B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.6	6.5	0.96	0.61	0.96	0.142	0.069	0.021	0.24	0.058	0.47	0.017
ERP00357	E-217257	7-12C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.8	5.9	0.79	0.48	0.94	0.137	0.069	0.015	0.23	0.050	0.45	0.019
ERP00357	E-217258	7-13A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.8	6.1	0.79	0.53	0.96	0.146	0.071	0.014	0.23	0.051	0.44	0.057
ERP00357	E-217259	7-13B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.1	5.5	0.70	0.48	0.86	0.129	0.063	0.013	0.21	0.046	0.42	0.021
ERP00357	E-217260	7-13C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	21.9	6.1	0.76	0.53	1.02	0.154	0.074	0.013	0.23	0.054	0.42	<0.015
ERP00357	E-217261	7-14A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.6	6.3	0.87	0.55	1.01	0.147	0.070	0.016	0.24	0.053	0.45	0.016
ERP00357	E-217262	7-14B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.0	6.2	0.85	0.54	0.96	0.144	0.072	0.015	0.23	0.053	0.44	0.020
ERP00357	E-217263	7-14C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.7	6.3	0.83	0.54	1.02	0.154	0.067	0.015	0.24	0.053	0.47	0.019
ERP00357	E-217264	7-15A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	27.7	5.4	0.65	0.44	0.88	0.135	0.066	0.010	0.20	0.045	0.42	0.017
ERP00357	E-217265	7-15B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.9	5.5	0.68	0.46	0.96	0.139	0.066	0.010	0.21	0.049	0.41	0.019
ERP00357	E-217266	7-15C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.6	5.6	0.70	0.46	0.92	0.136	0.069	0.011	0.20	0.048	0.42	0.020
ERP00357	E-217267	7-15D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	26.9	5.4	0.70	0.45	0.89	0.133	0.068	0.011	0.21	0.047	0.43	0.017

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
Northern Great Plains Province																			
ERP00101	E-173222	44-23513	Wyoming	Campbell	Ft. Union Formation		0.0214	<0.14	3.2	27	172	0.7	0.17	0.17	2.7	13.4	1.12	24.1	5.1
ERP00101	E-173223	44-23514	Wyoming	Campbell	Ft. Union Formation		0.0553	<0.19	2.2	35	317	0.7	0.33	1.14	3.3	16.7	1.47	57.2	6.5
ERP00101	E-173224	44-23515	Wyoming	Campbell	Ft. Union Formation		0.0045	<0.04	0.5	26	186	0.1	0.04	0.03	1.0	1.8	0.01	8.9	0.9
ERP00101	E-173225	44-23516	Wyoming	Campbell	Ft. Union Formation		0.0048	<0.04	0.5	26	193	0.1	0.03	0.02	0.7	1.5	<0.01	6.7	1.0
ERP00101	E-173226	44-23517	Wyoming	Campbell	Ft. Union Formation		0.0189	<0.04	1.0	24	199	0.1	0.03	0.08	0.9	2.5	0.01	3.9	2.3
ERP00101	E-173227	44-23518	Wyoming	Campbell	Ft. Union Formation		0.0133	<0.04	0.6	28	196	0.1	0.02	0.02	0.6	1.9	<0.01	4.0	0.6
ERP00101	E-173228	44-23519	Wyoming	Campbell	Ft. Union Formation		0.1780	<0.07	1.4	29	767	0.1	0.15	0.12	1.4	5.5	0.12	12.6	2.6
ERP00101	E-173229	44-23520	Wyoming	Campbell	Ft. Union Formation		0.1310	<0.07	0.6	33	589	0.3	0.05	0.02	1.4	4.8	0.25	5.5	2.2
ERP00101	E-173230	44-23521	Wyoming	Campbell	Ft. Union Formation		0.0904	<0.36	1.8	36	660	1.5	0.34	0.28	5.1	32.3	4.14	28.0	13.8
ERP00101	E-173231	Silo 2A	Wyoming	Campbell	Ft. Union Formation		0.0482	<0.05	0.5	27	318	0.1	0.05	0.02	0.8	2.1	0.05	5.7	0.9
ERP00101	E-173232	Silo 2B	Wyoming	Campbell	Ft. Union Formation		0.0502	<0.05	0.4	29	329	0.1	0.04	0.03	0.7	1.7	0.05	5.3	0.9
ERP00101	E-173233	Silo 4A	Wyoming	Campbell	Ft. Union Formation		0.0153	<0.05	0.5	25	199	0.1	0.04	0.03	0.8	1.6	0.02	7.1	0.9
ERP00101	E-173234	Silo 4B	Wyoming	Campbell	Ft. Union Formation		0.0159	<0.05	0.5	27	225	0.1	0.04	0.03	0.9	1.7	0.02	7.6	0.9
ERP00302	E-207028	106A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0247	0.29	1.1	39	314	0.2	0.02	0.05	1.5	3.2	0.08	9.7	1.2
ERP00302	E-207029	106B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0285	0.26	1.1	42	337	0.3	0.02	0.07	1.9	4.2	0.10	10.4	1.5
ERP00302	E-207030	106C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0247	0.11	0.7	40	314	0.3	0.02	0.07	1.7	3.7	0.10	9.8	1.4
ERP00302	E-207031	106D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0292	<0.13	0.9	41	188	0.3	0.02	0.06	1.8	3.6	0.12	10.5	1.4
ERP00302	E-207032	102A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0336	<0.13	1.4	39	314	0.3	0.02	0.08	2.0	5.0	0.20	10.3	1.7
ERP00302	E-207033	102B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0357	<0.15	1.9	44	367	0.3	0.03	0.10	2.4	6.0	0.22	12.4	2.0
ERP00302	E-207034	102C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0275	<0.13	1.2	38	298	0.3	0.02	0.07	1.8	4.7	0.14	10.0	1.7
ERP00302	E-207035	102D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0289	0.25	1.4	41	315	0.3	0.10	0.08	2.1	4.7	0.18	10.1	1.7
ERP00302	E-207036	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.0184	0.17	0.7	42	309	0.2	0.05	0.05	1.6	3.7	0.13	9.0	1.3
ERP00302	E-207037	107REJECT3551(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.0155	0.15	0.6	37	290	0.2	0.04	0.04	1.6	3.3	0.06	8.9	1.3
ERP00302	E-207038	107REJECT516	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.0164	0.15	0.7	37	278	0.2	0.04	0.05	1.6	3.5	0.08	9.1	1.3
ERP00302	E-207039	107B516PRB	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.0189	0.22	0.8	42	317	0.2	0.04	0.06	1.8	4.8	0.16	10.7	1.6
ERP00302	E-207040	ANDERSONA516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0128	<0.28	1.4	30	301	0.4	0.04	0.05	3.4	8.3	0.74	9.1	2.6
ERP00302	E-207041	ANDERSONB516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0213	<0.35	1.5	35	416	0.5	0.05	0.08	3.6	12.4	0.91	10.1	3.0
ERP00302	E-207042	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0208	<0.28	1.4	38	423	0.4	0.03	0.06	3.1	8.6	0.67	8.8	2.4
ERP00302	E-207043	ANDERSOND516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0200	<0.28	1.3	32	435	0.4	0.04	0.06	2.8	8.4	0.68	8.2	2.5
ERP00302	E-207044	CANYONA516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0608	0.22	0.8	35	518	0.4	0.03	0.06	2.6	3.4	0.08	6.8	1.5
ERP00302	E-207045	CANYONB516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0478	0.23	0.8	28	408	0.4	0.03	0.08	2.8	3.2	0.12	6.8	1.5
ERP00302	E-207046	CANYONC516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0502	0.20	0.8	31	451	0.4	0.03	0.08	2.7	3.3	0.18	7.1	1.6
ERP00302	E-207047	CANYOND516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0581	0.18	0.8	34	624	0.3	0.03	0.07	2.5	4.4	0.24	7.0	1.6
ERP00302	E-207048	C3UA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0191	<0.16	5.0	49	273	0.5	0.04	0.21	3.0	5.5	0.18	11.1	1.8
ERP00302	E-207049	C3UB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0250	0.30	6.9	49	311	0.5	0.16	0.27	4.0	9.0	0.35	13.7	2.3
ERP00302	E-207050	C3UC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0211	0.19	6.2	49	244	0.4	0.05	0.26	4.1	3.3	0.11	7.9	1.2
ERP00302	E-207051	C3UD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0256	0.20	3.9	54	292	0.4	0.06	0.25	3.2	5.0	0.29	11.1	2.0
ERP00302	E-207052	C1-2MA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0240	0.17	1.1	42	295	0.2	0.03	0.06	1.8	3.0	0.06	8.6	1.3
ERP00302	E-207053	C1-2MB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0273	0.17	1.3	44	347	0.3	0.03	0.07	1.9	3.3	0.08	8.9	1.4
ERP00302	E-207054	C1-2MC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0275	0.15	1.1	39	295	0.2	0.03	0.05	1.6	3.2	0.06	7.9	1.2
ERP00302	E-207055	C1-2MD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0237	0.15	1.0	38	297	0.2	0.03	0.05	1.7	2.8	0.07	8.2	1.2
ERP00302	E-207056	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.0145	0.14	1.1	35	269	0.2	0.03	0.05	1.6	3.0	0.10	8.9	1.3
ERP00302	E-207057	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0173	<0.30	1.3	30	379	0.4	0.05	0.07	3.3	8.2	0.72	9.3	2.6
ERP00357	E-217253	7-11A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0212	<0.14	0.1	36	281	0.3	0.04	0.07	1.8	4.7	0.16	16.0	1.7
ERP00357	E-217254	7-11B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0191	<0.14	0.2	34	279	0.2	0.04	0.07	1.9	4.8	0.18	15.8	1.8
ERP00357	E-217255	7-12A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0230	<0.13	0.4	37	270	0.2	0.03	0.09	1.9	4.5	0.16	17.0	1.8
ERP00357	E-217256	7-12B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0225	<0.13	0.4	37	283	0.2	0.04	0.09	2.0	4.8	0.16	17.8	1.9
ERP00357	E-217257	7-12C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0217	<0.12	0.7	36	293	0.2	0.03	0.07	1.9	3.9	0.08	14.8	1.6
ERP00357	E-217258	7-13A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0238	<0.13	0.5	38	298	0.2	0.03	0.08	2.1	4.2	0.10	16.5	1.8
ERP00357	E-217259	7-13B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0211	<0.12	0.4	33	257	0.2	0.03	0.07	1.8	3.7	0.09	14.3	1.6
ERP00357	E-217260	7-13C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0249	<0.13	0.4	41	291	0.2	0.03	0.08	2.0	4.1	0.09	16.4	1.8
ERP00357	E-217261	7-14A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0229	<0.13	0.4	40	299	0.2	0.08	0.09	2.0	4.2	0.11	19.1	1.8
ERP00357	E-217262	7-14B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0226	<0.13	1.2	38	289	0.3	0.08	0.07	2.0	4.4	0.11	17.0	1.4
ERP00357	E-217263	7-14C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0232	<0.13	1.2	41	291	0.2	0.12	0.07	1.9	4.2	0.11	18.1	1.5
ERP00357	E-217264	7-15A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0211	<0.11	0.9	36	259	0.2	0.04	0.06	1.8	3.4	0.05	14.4	1.3
ERP00357	E-217265	7-15B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0224	<0.11	1.0	39	285	0.2	0.03	0.07	1.7	3.4	0.06	14.2	1.4
ERP00357	E-217266	7-15C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0224	<0.12	1.0	38	273	0.2	0.03	0.06	1.8	3.4	0.06	15.0	1.5
ERP00357	E-217267	7-15D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0215	0.13	1.3	37	258	0.2	0.05	0.06	1.9	3.6	0.06	14.9	1.4

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
Northern Great Plains Province																			
ERP00101	E-173222	44-23513	Wyoming	Campbell	Ft. Union Formation		0.8	0.42	5.1	46.3	1.7	2.2	5.4	5.4	9.1	0.6	3.8	2.2	1.1
ERP00101	E-173223	44-23514	Wyoming	Campbell	Ft. Union Formation		0.8	0.25	7.6	43.1	0.9	3.6	5.0	10.3	11.4	1.0	6.0	4.9	1.7
ERP00101	E-173224	44-23515	Wyoming	Campbell	Ft. Union Formation		0.1	0.04	1.3	35.5	0.2	0.6	1.4	0.4	0.1	0.1	1.0	0.6	0.1
ERP00101	E-173225	44-23516	Wyoming	Campbell	Ft. Union Formation		0.1	0.03	2.3	21.6	0.2	0.6	0.6	0.3	0.1	0.1	0.9	0.6	0.2
ERP00101	E-173226	44-23517	Wyoming	Campbell	Ft. Union Formation		0.5	0.52	1.4	15.0	0.2	1.2	1.1	0.6	0.1	0.1	0.8	0.7	0.4
ERP00101	E-173227	44-23518	Wyoming	Campbell	Ft. Union Formation		0.1	0.03	1.1	12.6	0.2	0.5	1.4	0.1	0.1	0.0	0.5	0.4	0.2
ERP00101	E-173228	44-23519	Wyoming	Campbell	Ft. Union Formation		0.3	0.08	2.6	11.3	0.7	2.8	3.3	1.8	1.9	0.4	1.5	1.3	0.7
ERP00101	E-173229	44-23520	Wyoming	Campbell	Ft. Union Formation		0.3	0.02	1.7	9.6	0.6	1.0	4.4	1.9	2.8	0.2	1.6	0.5	0.3
ERP00101	E-173230	44-23521	Wyoming	Campbell	Ft. Union Formation		3.0	0.04	17.4	13.2	1.5	6.1	10.2	12.1	41.4	1.8	9.2	0.9	2.1
ERP00101	E-173231	Silo 2A	Wyoming	Campbell	Ft. Union Formation		0.1	0.02	1.1	10.4	0.4	0.7	2.3	0.4	0.7	0.1	0.9	0.4	0.2
ERP00101	E-173232	Silo 2B	Wyoming	Campbell	Ft. Union Formation		0.2	0.03	1.0	10.1	0.4	0.4	1.9	0.4	0.7	0.1	0.8	0.4	<0.1
ERP00101	E-173233	Silo 4A	Wyoming	Campbell	Ft. Union Formation		0.1	0.04	1.1	11.8	0.2	0.2	1.4	0.3	0.3	0.1	0.9	0.8	<0.1
ERP00101	E-173234	Silo 4B	Wyoming	Campbell	Ft. Union Formation		0.1	0.04	1.3	13.1	0.2	0.5	1.5	0.4	0.3	0.1	0.9	0.5	0.2
ERP00302	E-207028	106A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	4.5	12.1	0.3	0.9	2.5	1.4	0.8	0.1	1.2	0.7	0.5
ERP00302	E-207029	106B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	5.3	14.8	0.3	1.1	3.4	1.5	1.0	0.1	1.5	0.9	0.4
ERP00302	E-207030	106C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.04	4.7	13.5	0.3	1.0	2.8	1.2	0.9	0.1	1.3	0.8	0.5
ERP00302	E-207031	106D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.07	5.0	14.2	0.3	1.2	3.0	1.7	1.1	0.1	1.4	1.0	0.4
ERP00302	E-207032	102A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.07	5.4	9.8	0.4	1.2	3.0	1.8	2.0	0.2	1.5	0.9	0.3
ERP00302	E-207033	102B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.13	6.4	10.6	0.5	1.4	3.9	2.2	2.3	0.2	1.9	1.3	0.4
ERP00302	E-207034	102C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.09	5.2	10.8	0.5	1.3	2.9	1.4	1.4	0.2	1.5	0.7	1.8
ERP00302	E-207035	102D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.06	5.3	13.5	0.6	1.2	3.3	1.6	1.9	0.2	1.5	0.7	0.8
ERP00302	E-207036	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.2	0.05	4.4	8.3	0.3	1.0	2.0	1.4	1.3	0.1	1.2	0.5	0.4
ERP00302	E-207037	107REJECT3551(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.2	0.05	4.3	8.3	0.3	1.0	2.0	1.2	0.7	0.1	1.2	0.4	0.3
ERP00302	E-207038	107REJECT516	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.2	0.06	4.2	7.8	0.3	1.1	2.1	1.2	0.9	0.1	1.2	0.5	0.3
ERP00302	E-207039	107B516PRB	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.2	0.10	4.9	9.1	0.4	1.8	2.5	1.6	1.6	0.5	1.4	0.5	0.4
ERP00302	E-207040	ANDERSONA516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.59	7.1	36.3	0.5	1.5	4.9	3.2	11.5	0.2	2.0	0.4	4.1
ERP00302	E-207041	ANDERSONB516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.06	8.3	52.0	0.5	1.6	10.8	4.0	14.6	0.2	2.5	0.4	1.1
ERP00302	E-207042	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.06	6.6	43.1	0.9	1.3	4.5	2.9	10.9	0.2	1.9	0.2	<0.4
ERP00302	E-207043	ANDERSOND516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.3	0.04	6.4	31.1	1.0	1.3	3.7	3.1	10.9	0.2	1.9	0.3	<0.4
ERP00302	E-207044	CANYONA516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.3	0.04	3.4	12.9	0.3	1.4	4.7	2.8	1.3	0.1	1.0	<0.1	0.5
ERP00302	E-207045	CANYONB516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.05	3.5	18.0	0.3	1.5	4.9	2.8	1.9	0.1	1.1	0.3	0.8
ERP00302	E-207046	CANYONC516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.10	3.7	18.9	0.3	1.4	4.5	2.4	2.9	0.1	1.2	<0.1	0.6
ERP00302	E-207047	CANYOND516	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.04	4.0	23.8	0.3	1.4	3.9	2.3	3.6	0.1	1.2	0.2	0.4
ERP00302	E-207048	C3UA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.4	0.28	4.4	23.7	1.5	0.8	8.6	1.7	2.1	0.4	2.0	1.2	0.2
ERP00302	E-207049	C3UB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.4	0.11	5.9	22.8	2.1	0.9	13.5	2.7	4.0	0.6	2.4	2.0	0.7
ERP00302	E-207050	C3UC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	3.5	12.6	1.4	0.6	18.9	1.3	1.2	0.3	1.4	<0.1	0.3
ERP00302	E-207051	C3UD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.12	4.7	20.8	1.5	0.8	9.2	2.0	3.2	0.4	2.0	1.3	0.4
ERP00302	E-207052	C1-2MA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.13	3.9	10.2	0.4	0.9	2.9	0.9	0.7	0.1	1.3	0.9	1.3
ERP00302	E-207053	C1-2MB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.05	4.4	10.4	0.4	1.1	3.1	1.1	0.8	0.1	1.3	0.3	1.0
ERP00302	E-207054	C1-2MC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	3.9	8.8	0.3	1.0	2.5	1.0	0.6	0.1	1.1	0.6	0.4
ERP00302	E-207055	C1-2MD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.06	3.8	10.0	0.3	1.0	2.8	0.9	0.7	0.1	1.2	0.2	0.6
ERP00302	E-207056	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	0.1	0.05	4.1	8.2	0.3	1.0	2.0	1.4	1.1	0.1	1.1	0.3	0.3
ERP00302	E-207057	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.3	0.05	6.9	33.7	1.3	1.3	4.5	4.1	11.0	0.2	2.0	0.5	0.5
ERP00357	E-217253	7-11A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.12	5.0	15.1	0.4	1.0	1.3	1.7	1.6	0.2	1.5	4.6	2.6
ERP00357	E-217254	7-11B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.12	5.0	14.7	0.4	1.0	1.5	1.6	1.9	0.2	1.5	0.9	3.6
ERP00357	E-217255	7-12A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	5.4	15.9	0.4	1.1	1.9	1.5	1.4	0.2	1.5	3.9	1.1
ERP00357	E-217256	7-12B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.12	6.5	16.9	0.4	1.2	2.3	1.6	1.4	0.2	1.6	1.4	0.6
ERP00357	E-217257	7-12C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.12	5.7	15.2	0.3	0.9	2.6	1.4	0.9	0.2	1.3	1.3	0.5
ERP00357	E-217258	7-13A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	6.5	16.5	0.4	1.0	2.3	1.7	0.9	0.2	1.4	1.2	0.4
ERP00357	E-217259	7-13B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	5.5	14.6	0.3	0.9	1.8	1.2	0.8	0.1	1.3	1.3	0.4
ERP00357	E-217260	7-13C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.14	5.9	16.9	0.4	1.1	2.0	1.1	0.8	0.2	1.4	1.0	0.5
ERP00357	E-217261	7-14A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.16	6.0	21.6	0.4	1.0	2.4	9.4	1.1	0.2	1.5	1.1	1.4
ERP00357	E-217262	7-14B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.18	6.2	17.3	0.5	0.9	2.3	1.1	0.9	0.2	1.5	1.1	0.6
ERP00357	E-217263	7-14C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.11	5.9	18.0	0.4	0.9	2.1	9.6	0.9	0.2	1.5	0.9	1.2
ERP00357	E-217264	7-15A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	5.2	15.7	0.3	0.8	1.9	1.1	0.5	0.2	1.3	0.9	1.6
ERP00357	E-217265	7-15B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	5.1	15.7	0.3	0.9	2.0	0.9	0.6	0.2	1.3	1.0	0.6
ERP00357	E-217266	7-15C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	5.3	16.6	0.4	0.9	2.0	1.5	0.6	0.2	1.3	0.8	0.8
ERP00357	E-217267	7-15D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.09	4.7	16.1	0.4	2.3	2.2	1.2	0.5	1.0	1.3	1.3	1.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
Northern Great Plains Province															
ERP00101	E-173222	44-23513	Wyoming	Campbell	Ft. Union Formation		144	0.12	2.8	0.20	1.4	39.2	8.4	17.1	22.7
ERP00101	E-173223	44-23514	Wyoming	Campbell	Ft. Union Formation		181	0.40	4.1	0.14	2.6	56.1	8.6	47.6	37.3
ERP00101	E-173224	44-23515	Wyoming	Campbell	Ft. Union Formation		120	0.09	0.9	<0.01	0.3	8.4	1.9	2.5	12.5
ERP00101	E-173225	44-23516	Wyoming	Campbell	Ft. Union Formation		115	0.09	0.9	<0.01	0.2	7.1	1.2	1.6	9.7
ERP00101	E-173226	44-23517	Wyoming	Campbell	Ft. Union Formation		136	0.30	0.8	0.02	0.3	8.1	1.6	1.8	8.6
ERP00101	E-173227	44-23518	Wyoming	Campbell	Ft. Union Formation		123	0.04	0.5	0.02	0.2	4.9	1.1	2.0	7.7
ERP00101	E-173228	44-23519	Wyoming	Campbell	Ft. Union Formation		569	0.18	1.9	0.04	1.1	12.5	2.3	4.9	18.0
ERP00101	E-173229	44-23520	Wyoming	Campbell	Ft. Union Formation		415	0.06	1.8	0.02	0.6	13.8	2.9	0.3	9.7
ERP00101	E-173230	44-23521	Wyoming	Campbell	Ft. Union Formation		341	0.16	6.8	0.31	3.3	86.8	11.4	<1.5	51.4
ERP00101	E-173231	Silo 2A	Wyoming	Campbell	Ft. Union Formation		205	0.06	0.9	0.04	0.3	7.2	1.8	2.7	8.0
ERP00101	E-173232	Silo 2B	Wyoming	Campbell	Ft. Union Formation		180	0.06	0.8	0.02	0.3	6.6	1.7	2.6	9.0
ERP00101	E-173233	Silo 4A	Wyoming	Campbell	Ft. Union Formation		122	0.09	0.6	0.01	0.2	7.3	1.6	1.0	9.7
ERP00101	E-173234	Silo 4B	Wyoming	Campbell	Ft. Union Formation		133	0.09	1.0	0.01	0.3	7.4	1.7	1.3	10.9
ERP00302	E-207028	106A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	192	0.08	1.3	0.08	0.4	10.8	2.7	5.3	14.1
ERP00302	E-207029	106B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	225	0.10	1.7	0.04	0.5	13.2	3.3	6.7	15.6
ERP00302	E-207030	106C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	207	0.09	1.4	0.02	0.5	12.4	3.1	6.2	14.5
ERP00302	E-207031	106D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	217	0.10	1.5	0.03	0.5	12.1	3.2	5.9	13.7
ERP00302	E-207032	102A516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	214	0.08	1.8	0.04	0.6	16.2	3.0	9.2	14.0
ERP00302	E-207033	102B516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	245	0.12	2.3	0.06	0.7	18.6	3.6	10.8	17.5
ERP00302	E-207034	102C516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	209	0.08	1.8	0.03	0.6	14.6	3.0	7.2	16.6
ERP00302	E-207035	102D516	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	219	0.10	1.8	0.04	0.6	15.7	3.3	9.9	15.9
ERP00302	E-207036	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	187	0.09	1.3	0.02	0.4	11.8	2.3	5.0	14.6
ERP00302	E-207037	107REJECT3551(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	189	0.09	1.4	0.01	0.4	11.3	2.2	4.7	12.3
ERP00302	E-207038	107REJECT516	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	189	0.09	1.6	0.02	0.4	11.1	2.3	4.7	12.9
ERP00302	E-207039	107B516PRB	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	203	0.16	1.5	0.02	0.5	14.1	2.7	6.2	13.7
ERP00302	E-207040	ANDERSONA516	Wyoming	Converse	Ft. Union Formation	Anderson coal	143	0.07	2.4	0.12	0.7	20.3	4.3	20.2	24.6
ERP00302	E-207041	ANDERSONB516	Wyoming	Converse	Ft. Union Formation	Anderson coal	181	0.07	2.7	0.13	0.8	24.2	4.8	23.0	32.2
ERP00302	E-207042	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	161	0.07	2.3	0.13	0.6	18.5	4.0	19.0	22.7
ERP00302	E-207043	ANDERSOND516	Wyoming	Converse	Ft. Union Formation	Anderson coal	172	0.08	2.6	0.09	0.6	18.3	3.6	16.5	22.2
ERP00302	E-207044	CANYONA516	Wyoming	Converse	Ft. Union Formation	Canyon coal	230	0.08	1.7	0.04	0.5	9.2	2.9	16.5	13.7
ERP00302	E-207045	CANYONB516	Wyoming	Converse	Ft. Union Formation	Canyon coal	221	0.10	1.7	0.05	0.5	9.0	3.1	18.9	17.2
ERP00302	E-207046	CANYONC516	Wyoming	Converse	Ft. Union Formation	Canyon coal	202	0.08	1.6	0.07	0.5	10.2	2.9	22.2	16.2
ERP00302	E-207047	CANYOND516	Wyoming	Converse	Ft. Union Formation	Canyon coal	191	0.07	1.8	0.05	0.5	10.9	3.1	19.0	17.7
ERP00302	E-207048	C3UA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	148	0.08	2.2	0.07	0.8	22.2	5.9	34.1	16.4
ERP00302	E-207049	C3UB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	165	0.13	2.5	0.11	1.1	27.3	6.3	39.0	19.6
ERP00302	E-207050	C3UC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	136	0.07	1.4	0.21	0.5	13.0	5.0	39.6	13.8
ERP00302	E-207051	C3UD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	140	0.10	2.4	0.08	0.8	23.1	5.5	30.0	18.3
ERP00302	E-207052	C1-2MA515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	144	0.09	1.3	0.03	0.5	12.1	3.0	8.9	14.5
ERP00302	E-207053	C1-2MB515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	149	0.10	1.6	0.04	0.5	12.4	3.0	9.9	15.4
ERP00302	E-207054	C1-2MC515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	129	0.08	1.4	0.03	0.4	10.5	2.5	7.5	12.5
ERP00302	E-207055	C1-2MD515	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	132	0.08	1.4	0.03	0.4	10.9	2.7	9.3	14.1
ERP00302	E-207056	107REJECT4851(	Wyoming	Converse	Ft. Union Formation	Wyodak coal zone	183	0.09	1.3	0.02	0.4	11.3	2.3	4.9	11.8
ERP00302	E-207057	ANDERSONC516	Wyoming	Converse	Ft. Union Formation	Anderson coal	184	0.11	2.5	0.13	0.7	19.3	4.3	17.8	28.1
ERP00357	E-217253	7-11A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	201	0.09	1.7	0.04	0.6	14.9	3.3	7.5	14.1
ERP00357	E-217254	7-11B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	188	0.09	1.8	0.03	0.5	14.7	3.2	7.3	14.0
ERP00357	E-217255	7-12A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	201	0.09	1.8	0.03	0.6	14.6	3.5	7.4	14.4
ERP00357	E-217256	7-12B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	209	0.09	1.8	0.04	0.6	15.1	3.5	8.0	14.6
ERP00357	E-217257	7-12C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	210	0.08	1.5	0.03	0.5	12.6	3.3	6.8	13.4
ERP00357	E-217258	7-13A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	224	0.09	1.7	0.04	0.5	14.0	3.4	7.7	13.6
ERP00357	E-217259	7-13B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	194	0.08	1.4	0.03	0.4	12.0	3.0	6.3	12.2
ERP00357	E-217260	7-13C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	225	0.09	1.8	0.03	0.5	13.6	3.5	7.5	14.3
ERP00357	E-217261	7-14A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	213	0.09	1.8	0.03	0.5	13.8	3.7	9.2	12.8
ERP00357	E-217262	7-14B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	211	0.11	1.9	0.03	0.6	14.2	3.7	7.6	13.8
ERP00357	E-217263	7-14C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	214	0.10	1.9	0.03	0.6	14.4	3.7	7.7	14.4
ERP00357	E-217264	7-15A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	199	0.08	1.4	0.02	0.5	11.9	3.2	5.9	12.9
ERP00357	E-217265	7-15B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	199	0.08	1.5	0.02	0.5	11.8	3.2	6.3	12.9
ERP00357	E-217266	7-15C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	210	0.08	1.5	0.02	0.5	12.0	3.3	6.1	11.5
ERP00357	E-217267	7-15D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	200	0.32	1.5	0.02	0.5	12.1	3.2	7.0	12.2

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00357	E-217268	7-16B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.9	5.8	0.75	0.49	0.91	0.138	0.066	0.013	0.22	0.049	0.43	0.018
ERP00357	E-217269	7-17A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	26.7	5.7	0.75	0.47	0.88	0.138	0.068	0.014	0.21	0.047	0.46	0.022
ERP00357	E-217270	7-17B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	26.2	5.8	0.78	0.47	0.90	0.135	0.068	0.014	0.22	0.049	0.47	0.022
ERP00357	E-217271	7-17C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	26.5	5.8	0.80	0.48	0.89	0.137	0.067	0.014	0.21	0.048	0.43	0.017
ERP00357	E-217272	605A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.8	5.4	0.73	0.45	0.87	0.141	0.060	0.014	0.17	0.048	0.34	0.016
ERP00357	E-217273	609B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.1	5.4	0.75	0.44	0.86	0.141	0.061	0.015	0.17	0.047	0.31	0.031
ERP00357	E-217274	613B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.5	5.5	0.74	0.46	0.89	0.144	0.065	0.014	0.19	0.048	0.36	<0.015
ERP00357	E-217275	614A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.6	5.4	0.71	0.46	0.87	0.144	0.065	0.013	0.19	0.045	0.35	0.016
ERP00357	E-217276	615	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.7	6.1	0.92	0.56	0.86	0.145	0.056	0.024	0.19	0.050	0.38	0.019
ERP00357	E-217277	616	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.6	5.5	0.80	0.47	0.88	0.145	0.058	0.017	0.18	0.047	0.35	0.016
ERP00357	E-217278	618	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.2	5.4	0.76	0.46	0.85	0.140	0.060	0.016	0.18	0.046	0.35	<0.015
ERP00357	E-217279	619	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.8	5.7	0.83	0.50	0.84	0.142	0.060	0.018	0.19	0.046	0.40	<0.015
ERP00357	E-217280	633	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	19.7	6.7	1.04	0.70	0.86	0.148	0.065	0.027	0.27	0.057	0.37	0.025
ERP00357	E-217281	633B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.3	6.6	1.04	0.67	0.89	0.151	0.064	0.026	0.28	0.056	0.37	0.019
ERP00357	E-217282	633C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.8	6.5	1.11	0.67	0.84	0.145	0.061	0.027	0.27	0.056	0.37	0.028
ERP00357	E-217283	7-15C dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	20.8	5.8	0.81	0.51	0.96	0.146	0.069	0.013	0.23	0.051	0.41	0.019
ERP00357	E-217284	609B dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.1	5.3	0.78	0.44	0.90	0.145	0.060	0.015	0.18	0.047	0.32	0.037
ERP00358	E-217285	634	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.7	6.3	0.95	0.61	0.85	0.137	0.065	0.019	0.25	0.055	0.38	<0.015
ERP00358	E-217286	634B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.3	6.1	0.92	0.60	0.90	0.141	0.061	0.017	0.24	0.055	0.38	0.017
ERP00358	E-217287	634C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.8	6.1	0.89	0.58	0.84	0.136	0.062	0.016	0.23	0.051	0.38	<0.015
ERP00358	E-217288	634D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.3	6.2	0.94	0.60	0.86	0.138	0.062	0.016	0.23	0.054	0.37	<0.015
ERP00358	E-217289	636	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.8	6.4	1.05	0.64	0.84	0.134	0.061	0.022	0.24	0.056	0.36	<0.015
ERP00358	E-217290	637	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.0	6.3	0.98	0.62	0.86	0.141	0.064	0.017	0.25	0.056	0.37	<0.015
ERP00358	E-217291	638	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.4	6.2	0.93	0.60	0.83	0.139	0.061	0.016	0.25	0.054	0.36	0.035
ERP00358	E-217292	638B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	20.3	6.4	0.99	0.62	0.90	0.146	0.064	0.016	0.26	0.058	0.37	<0.015
ERP00358	E-217293	638C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.0	6.1	0.94	0.60	0.87	0.143	0.060	0.015	0.25	0.055	0.39	0.019
ERP00358	E-217294	545	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.7	5.6	0.74	0.49	0.88	0.137	0.066	0.007	0.19	0.051	0.38	<0.015
ERP00358	E-217295	546	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.0	5.5	0.72	0.48	0.86	0.136	0.068	0.006	0.19	0.048	0.38	<0.015
ERP00358	E-217296	550	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.3	5.5	0.70	0.49	0.91	0.144	0.067	0.006	0.20	0.050	0.40	<0.015
ERP00358	E-217297	551	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	24.7	5.6	0.72	0.48	0.87	0.140	0.065	0.007	0.21	0.047	0.40	<0.015
ERP00358	E-217298	552	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	25.8	5.7	0.82	0.53	0.85	0.135	0.066	0.008	0.22	0.054	0.39	<0.015
ERP00358	E-217299	81402A	Wyoming	Converse	Ft. Union Formation	Anderson coal	10.1	7.2	0.99	0.51	1.11	0.245	0.050	0.028	0.28	0.049	0.40	<0.015
ERP00358	E-217300	81402B	Wyoming	Converse	Ft. Union Formation	Anderson coal	9.2	6.5	0.87	0.44	1.10	0.241	0.049	0.017	0.24	0.044	0.38	0.019
ERP00358	E-217301	81402C	Wyoming	Converse	Ft. Union Formation	Anderson coal	10.7	6.9	1.08	0.46	1.07	0.230	0.048	0.018	0.21	0.055	0.35	0.020
ERP00358	E-217302	81402D	Wyoming	Converse	Ft. Union Formation	Anderson coal	9.4	7.0	1.18	0.46	1.12	0.241	0.047	0.020	0.23	0.056	0.35	<0.015
ERP00358	E-217303	81402E	Wyoming	Converse	Ft. Union Formation	Anderson coal	9.7	7.0	1.04	0.46	1.06	0.233	0.045	0.018	0.25	0.051	0.41	<0.015
ERP00358	E-217304	81402F	Wyoming	Converse	Ft. Union Formation	Anderson coal	11.4	7.4	1.17	0.49	1.10	0.237	0.049	0.020	0.27	0.055	0.41	0.025
ERP00358	E-217305	81402GHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	8.6	7.3	1.37	0.67	0.80	0.191	0.082	0.029	0.32	0.046	0.23	<0.015
ERP00358	E-217306	81402HHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	10.3	6.6	1.11	0.60	0.79	0.183	0.080	0.023	0.27	0.042	0.24	0.016
ERP00358	E-217307	81402IHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	9.4	6.6	1.10	0.58	0.78	0.183	0.077	0.020	0.34	0.040	0.24	0.045
ERP00358	E-217308	81402JHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	10.2	6.3	1.06	0.56	0.75	0.179	0.073	0.017	0.27	0.039	0.25	<0.015
ERP00358	E-217309	81402KHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	8.8	6.7	1.12	0.61	0.81	0.188	0.083	0.023	0.29	0.042	0.24	0.018
ERP00358	E-217310	81402LHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	10.6	7.1	1.23	0.65	0.84	0.198	0.081	0.029	0.30	0.040	0.23	<0.015
ERP00358	E-217311	81402C3UPPER	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	9.7	9.7	1.55	0.92	0.99	0.168	0.091	0.044	0.49	0.058	0.91	<0.015
ERP00358	E-217312	81402UPPER44	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	10.6	9.1	1.40	0.82	1.08	0.174	0.093	0.033	0.43	0.056	0.99	0.016
ERP00358	E-217313	81402C1-2	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	9.1	6.4	0.88	0.50	0.91	0.169	0.084	0.006	0.28	0.051	0.41	<0.015
ERP00358	E-217314	81402MIDDLE	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	10.7	6.1	0.73	0.48	0.98	0.176	0.086	0.003	0.28	0.053	0.38	<0.015
ERP00358	E-217315	546 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	23.9	5.7	0.74	0.49	0.88	0.141	0.069	0.006	0.20	0.049	0.38	0.028
ERP00358	E-217316	637 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	22.0	6.3	0.92	0.60	0.85	0.140	0.063	0.012	0.24	0.053	0.38	0.018
Rocky Mountain Province																		
ERP00404	E-224222	717JB1	Wyoming	Sweetwater	Ft. Union Formation		8.3	10.0	2.04	0.69	0.50	0.144	0.328	0.053	0.33	0.038	0.63	<0.015
ERP00404	E-224223	717JB2	Wyoming	Sweetwater	Ft. Union Formation		7.0	9.0	1.84	0.56	0.58	0.195	0.199	0.024	0.28	0.038	0.53	<0.015
ERP00404	E-224224	717JB3	Wyoming	Sweetwater	Ft. Union Formation		9.2	5.8	0.79	0.28	0.58	0.217	0.022	0.008	0.32	0.021	0.58	<0.015
ERP00404	E-224225	717JB4	Wyoming	Sweetwater	Ft. Union Formation		6.2	11.2	2.92	0.74	0.36	0.090	0.253	0.025	0.28	0.071	0.72	<0.015
ERP00404	E-224226	717JB5	Wyoming	Sweetwater	Ft. Union Formation		6.0	9.9	2.48	0.73	0.27	0.064	0.282	0.030	0.34	0.061	0.72	<0.015
ERP00404	E-224227	717155A	Wyoming	Lincoln	Adaville Formation		5.9	3.1	0.49	0.19	0.27	0.095	0.096	0.006	0.06	0.010	0.72	<0.015
ERP00404	E-224228	717155B	Wyoming	Lincoln	Adaville Formation		6.0	4.7	0.82	0.56	0.28	0.093	0.084	0.006	0.06	0.021	0.69	<0.015
ERP00404	E-224229	717155C	Wyoming	Lincoln	Adaville Formation		6.0	3.7	0.53	0.37	0.31	0.104	0.091	0.005	0.05	0.013	0.69	<0.015
ERP00404	E-224230	717155D	Wyoming	Lincoln	Adaville Formation		6.1	3.4	0.58	0.24	0.28	0.095	0.086	0.008	0.08	0.012	0.77	<0.015

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00357	E-217268	7-16B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0247	<0.12	1.1	38	282	0.2	0.03	0.05	1.9	3.7	0.08	15.5	1.6
ERP00357	E-217269	7-17A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0214	<0.12	1.1	37	254	0.2	0.03	0.06	1.9	3.7	0.08	14.8	1.6
ERP00357	E-217270	7-17B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0206	<0.12	1.2	37	262	0.2	0.03	0.06	2.0	3.7	0.06	14.5	1.6
ERP00357	E-217271	7-17C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0213	<0.12	1.1	36	276	0.3	0.03	0.08	2.0	3.9	0.08	15.1	1.6
ERP00357	E-217272	605A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0210	<0.11	0.8	34	285	0.2	0.03	0.05	1.7	3.7	0.10	14.0	1.5
ERP00357	E-217273	609B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0191	<0.11	0.6	33	287	0.1	0.03	0.04	1.6	3.4	0.10	12.7	1.4
ERP00357	E-217274	613B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0210	<0.12	0.8	36	289	0.2	0.03	0.07	1.7	4.2	0.10	14.3	1.5
ERP00357	E-217275	614A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0232	<0.11	0.9	35	296	0.2	0.03	0.06	1.7	3.4	0.08	14.2	1.5
ERP00357	E-217276	615	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0227	<0.13	1.0	35	291	0.2	0.03	0.07	1.7	5.3	0.17	15.2	1.7
ERP00357	E-217277	616	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0219	<0.11	0.9	35	286	0.2	0.03	0.04	1.8	3.8	0.12	12.9	1.6
ERP00357	E-217278	618	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0195	<0.11	0.8	33	283	0.2	0.03	0.05	1.7	3.9	0.12	14.6	1.5
ERP00357	E-217279	619	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0220	<0.12	1.0	34	264	0.2	0.03	0.05	1.7	4.2	0.12	14.5	1.5
ERP00357	E-217280	633	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0309	<0.14	1.3	37	319	0.3	0.03	0.08	2.2	5.5	0.23	27.3	2.1
ERP00357	E-217281	633B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0318	<0.14	1.2	38	327	0.3	0.04	0.09	2.1	5.3	0.22	18.0	2.2
ERP00357	E-217282	633C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0314	<0.13	1.3	36	298	0.2	0.04	0.08	2.1	5.2	0.22	15.4	2.1
ERP00357	E-217283	7-15C dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0235	<0.12	1.0	40	301	0.2	0.03	0.07	1.9	3.6	0.07	17.0	1.6
ERP00357	E-217284	609B dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0196	<0.11	0.6	36	290	0.2	0.02	0.04	1.6	3.4	0.09	12.5	1.5
ERP00358	E-217285	634	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0323	<0.13	1.3	38	263	0.2	0.02	0.09	1.9	4.5	0.15	11.2	1.9
ERP00358	E-217286	634B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0313	<0.13	1.2	40	285	0.2	0.03	0.07	2.0	4.8	0.16	11.2	2.0
ERP00358	E-217287	634C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0303	<0.13	1.3	38	278	0.2	0.02	0.09	2.0	4.3	0.14	10.5	1.9
ERP00358	E-217288	634D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0307	<0.13	1.3	38	275	0.3	0.02	0.08	1.9	4.4	0.15	10.7	1.9
ERP00358	E-217289	636	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0310	<0.13	1.2	36	289	0.2	0.02	0.07	1.9	4.6	0.18	11.0	2.0
ERP00358	E-217290	637	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0313	<0.13	1.5	37	312	0.2	0.03	0.09	2.0	4.7	0.16	11.7	2.2
ERP00358	E-217291	638	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0296	<0.13	1.5	36	306	0.2	0.02	0.09	1.9	4.6	0.16	11.5	2.1
ERP00358	E-217292	638B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0328	<0.13	1.3	39	317	0.2	0.03	0.08	1.9	4.5	0.16	12.0	2.1
ERP00358	E-217293	638C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0300	<0.13	1.5	37	299	0.2	0.03	0.07	1.9	4.5	0.16	12.9	2.0
ERP00358	E-217294	545	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0268	<0.12	1.1	39	298	0.2	0.02	0.08	1.7	3.6	0.08	10.9	1.7
ERP00358	E-217295	546	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0270	<0.12	1.1	39	286	0.2	0.02	0.07	1.8	3.4	0.08	10.9	1.7
ERP00358	E-217296	550	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0275	<0.12	1.1	42	290	0.2	0.02	0.06	1.6	3.3	0.07	10.0	1.7
ERP00358	E-217297	551	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0241	<0.12	1.2	39	269	0.2	0.02	0.07	1.6	3.3	0.09	10.5	1.7
ERP00358	E-217298	552	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0299	<0.12	1.3	39	277	0.2	0.02	0.07	1.7	3.6	0.09	10.9	1.9
ERP00358	E-217299	81402A	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0185	<0.15	1.5	31	377	0.2	0.01	0.04	2.1	4.2	0.19	9.2	2.2
ERP00358	E-217300	81402B	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0171	<0.14	0.8	32	261	0.1	0.01	0.03	2.0	3.3	0.11	8.4	1.8
ERP00358	E-217301	81402C	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0256	<0.14	0.8	30	249	0.2	0.07	0.03	2.0	3.6	0.13	9.0	1.8
ERP00358	E-217302	81402D	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0232	<0.15	0.6	31	278	0.2	0.04	0.03	2.0	3.6	0.12	8.9	1.7
ERP00358	E-217303	81402E	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0281	<0.14	0.6	29	403	0.2	0.04	0.03	2.0	3.6	0.12	8.5	1.9
ERP00358	E-217304	81402F	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.0277	<0.15	0.6	30	562	0.2	0.04	0.04	2.2	3.9	0.15	9.7	2.1
ERP00358	E-217305	81402GHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0783	0.15	0.9	35	518	0.4	0.05	0.12	2.5	4.7	0.22	9.4	2.0
ERP00358	E-217306	81402HHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0778	0.14	0.8	35	512	0.4	0.04	0.12	2.5	4.4	0.17	9.5	1.9
ERP00358	E-217307	81402IHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0714	0.16	0.7	35	487	0.4	0.04	0.09	2.4	3.7	0.15	8.2	1.8
ERP00358	E-217308	81402JHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0670	0.15	0.7	34	444	0.4	0.04	0.11	2.2	3.7	0.14	7.9	1.8
ERP00358	E-217309	81402KHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0774	0.16	0.8	36	511	0.4	0.04	0.09	2.5	4.1	0.15	8.9	1.9
ERP00358	E-217310	81402LHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.0769	0.15	0.8	36	529	0.4	0.04	0.10	2.4	4.4	0.19	9.1	2.0
ERP00358	E-217311	81402C3UPPER	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0238	<0.20	4.5	48	318	0.4	0.05	0.24	3.4	8.2	0.41	13.2	2.8
ERP00358	E-217312	81402UPPER44	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0235	<0.19	5.2	50	338	0.4	0.05	0.21	3.5	7.3	0.34	13.7	2.6
ERP00358	E-217313	81402C1-2	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0269	<0.13	1.2	43	322	0.2	0.03	0.07	2.0	3.8	0.08	10.6	1.8
ERP00358	E-217314	81402MIDDLE	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0294	<0.13	1.2	44	329	0.2	0.04	0.06	1.9	3.7	0.06	10.8	1.8
ERP00358	E-217315	546 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0281	<0.12	1.1	40	303	0.2	0.03	0.07	1.7	3.5	0.08	10.4	1.7
ERP00358	E-217316	637 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.0295	0.13	1.3	38	284	0.3	0.05	0.08	2.0	4.6	0.17	11.9	2.1
Rocky Mountain Province																			
ERP00404	E-224222	717JB1	Wyoming	Sweetwater	Ft. Union Formation		0.0018	<0.20	1.4	201	352	0.7	0.07	0.06	1.3	5.7	0.21	7.5	1.9
ERP00404	E-224223	717JB2	Wyoming	Sweetwater	Ft. Union Formation		0.0020	<0.18	1.1	235	294	0.5	0.07	0.05	1.2	4.3	0.08	7.4	1.6
ERP00404	E-224224	717JB3	Wyoming	Sweetwater	Ft. Union Formation		0.0016	<0.12	0.7	260	294	0.1	0.05	0.03	0.9	3.1	0.03	6.3	0.8
ERP00404	E-224225	717JB4	Wyoming	Sweetwater	Ft. Union Formation		0.0060	<0.23	0.9	197	491	0.3	0.11	0.07	1.7	7.5	0.09	15.1	2.1
ERP00404	E-224226	717JB5	Wyoming	Sweetwater	Ft. Union Formation		0.0200	<0.20	2.8	148	448	0.3	0.11	0.08	1.7	6.7	0.31	11.6	2.2
ERP00404	E-224227	717155A	Wyoming	Lincoln	Adaville Formation		0.0004	<0.06	0.5	83	71	0.1	0.02	0.03	0.4	1.5	0.02	1.9	0.4
ERP00404	E-224228	717155B	Wyoming	Lincoln	Adaville Formation		0.0025	<0.09	0.4	83	90	0.2	0.03	0.03	0.6	1.6	0.01	1.9	1.4
ERP00404	E-224229	717155C	Wyoming	Lincoln	Adaville Formation		0.0039	<0.07	0.5	90	68	0.2	0.03	0.02	0.5	1.6	0.01	1.9	0.8
ERP00404	E-224230	717155D	Wyoming	Lincoln	Adaville Formation		0.0008	<0.07	0.4	86	86	0.1	0.03	0.03	0.5	1.6	0.03	2.0	0.6

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00357	E-217268	7-16B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.10	5.6	14.8	0.3	0.9	2.1	1.4	0.8	0.2	1.3	1.1	5.5
ERP00357	E-217269	7-17A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.10	5.3	16.0	0.3	1.0	2.3	1.9	0.8	0.2	1.3	1.1	0.7
ERP00357	E-217270	7-17B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.14	5.5	15.8	0.3	0.9	2.7	2.0	0.7	0.2	1.3	1.0	1.2
ERP00357	E-217271	7-17C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.10	5.6	15.5	0.3	1.0	2.2	1.0	0.8	0.2	1.4	1.0	0.5
ERP00357	E-217272	605A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	4.3	5.1	0.3	1.1	1.2	1.2	1.0	0.2	1.2	0.6	0.5
ERP00357	E-217273	609B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	4.3	7.1	0.3	0.8	1.0	1.4	1.0	0.1	1.1	0.5	1.8
ERP00357	E-217274	613B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.07	4.8	15.5	0.3	1.0	1.8	1.2	1.0	0.1	1.2	0.9	0.6
ERP00357	E-217275	614A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	4.8	13.8	0.3	1.0	1.7	1.3	0.8	0.1	1.2	0.8	0.4
ERP00357	E-217276	615	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.13	3.8	5.3	0.4	1.0	1.8	1.5	1.7	0.2	1.4	0.8	0.6
ERP00357	E-217277	616	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.08	4.3	6.1	0.3	0.9	1.7	1.0	1.2	0.1	1.2	0.6	0.5
ERP00357	E-217278	618	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.09	4.3	5.1	0.3	0.8	1.6	1.9	1.1	0.1	1.2	0.6	0.4
ERP00357	E-217279	619	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	4.6	5.2	0.4	0.8	2.0	1.4	1.1	0.1	1.3	0.8	0.4
ERP00357	E-217280	633	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.11	5.5	7.8	0.5	1.4	2.5	2.6	2.3	0.2	1.6	0.9	0.6
ERP00357	E-217281	633B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.11	5.4	8.0	0.5	1.2	2.2	2.3	2.2	0.2	1.6	1.1	0.6
ERP00357	E-217282	633C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.11	5.1	7.5	0.5	1.3	2.2	2.0	2.2	0.2	1.5	1.1	0.9
ERP00357	E-217283	7-15C dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.3	0.11	5.6	16.3	0.3	0.9	2.1	1.2	0.7	0.2	1.4	0.9	0.4
ERP00357	E-217284	609B dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.09	4.2	7.3	0.3	0.9	1.1	0.9	1.0	0.1	1.1	0.7	0.6
ERP00358	E-217285	634	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.14	4.7	10.8	0.5	1.0	3.2	2.6	1.7	0.2	1.7	0.9	0.3
ERP00358	E-217286	634B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.07	4.7	10.5	0.4	1.0	3.0	2.1	1.8	0.2	1.7	0.8	0.3
ERP00358	E-217287	634C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.09	4.7	10.4	0.4	0.9	3.1	2.2	1.6	0.2	1.6	1.0	0.3
ERP00358	E-217288	634D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.09	4.8	10.4	0.4	1.0	3.0	2.1	1.7	0.2	1.6	0.9	0.3
ERP00358	E-217289	636	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.09	4.8	8.3	0.5	1.1	2.8	2.1	2.1	0.2	1.6	1.2	0.3
ERP00358	E-217290	637	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	4.7	9.0	0.5	1.1	3.2	2.5	1.8	0.2	1.7	1.0	0.3
ERP00358	E-217291	638	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.09	4.8	9.5	0.5	1.1	2.9	2.1	1.9	0.2	1.6	1.4	0.3
ERP00358	E-217292	638B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	4.9	9.6	0.5	1.0	2.8	2.5	1.8	0.2	1.7	0.7	0.3
ERP00358	E-217293	638C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	4.8	9.2	0.5	1.0	3.0	2.8	1.8	0.2	1.6	1.0	1.6
ERP00358	E-217294	545	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.06	5.4	31.0	0.4	0.9	2.7	1.8	0.8	0.1	1.5	0.7	0.4
ERP00358	E-217295	546	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.13	5.3	30.7	0.3	0.9	2.8	1.6	0.9	0.1	1.5	0.7	0.9
ERP00358	E-217296	550	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.1	0.07	5.3	30.4	0.3	0.9	2.6	1.7	0.8	0.1	1.4	0.8	0.3
ERP00358	E-217297	551	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	5.4	30.6	0.3	0.8	2.4	1.7	1.0	0.1	1.4	0.9	0.2
ERP00358	E-217298	552	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.09	5.4	23.8	0.4	0.9	2.5	1.9	1.0	0.1	1.5	1.0	0.3
ERP00358	E-217299	81402A	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.4	0.05	5.7	7.7	0.4	1.0	3.2	2.3	2.4	1.2	1.4	0.5	0.5
ERP00358	E-217300	81402B	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.04	4.9	6.2	0.3	0.9	2.9	1.6	1.4	0.1	1.2	0.3	0.6
ERP00358	E-217301	81402C	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.04	5.0	5.8	0.5	1.2	2.7	1.7	1.5	0.2	1.3	0.3	0.7
ERP00358	E-217302	81402D	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.2	0.04	4.9	7.6	0.4	1.0	2.7	1.7	1.5	0.1	1.2	0.3	0.5
ERP00358	E-217303	81402E	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.3	0.04	4.2	6.6	0.3	1.0	3.0	1.7	1.5	0.1	1.2	0.3	1.5
ERP00358	E-217304	81402F	Wyoming	Converse	Ft. Union Formation	Anderson coal	0.3	0.06	5.4	7.0	0.4	1.2	2.9	1.6	1.8	0.2	1.3	0.3	0.4
ERP00358	E-217305	81402GHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.04	3.8	11.9	0.5	1.5	4.7	3.3	2.4	0.2	1.6	0.3	0.4
ERP00358	E-217306	81402HHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.04	3.3	8.7	0.4	1.3	4.7	3.1	2.1	0.2	1.5	nd	0.4
ERP00358	E-217307	81402IHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	<0.02	3.2	15.8	0.4	1.5	4.2	3.0	1.7	0.2	1.3	0.4	0.4
ERP00358	E-217308	81402JHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.03	3.2	8.8	0.4	1.4	4.0	3.0	1.7	0.1	1.3	0.3	0.5
ERP00358	E-217309	81402KHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.03	3.4	10.4	0.4	1.5	4.6	3.0	1.9	0.1	1.4	0.0	0.5
ERP00358	E-217310	81402LHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	0.2	0.03	3.6	10.6	0.4	1.4	4.7	3.1	2.5	0.1	1.4	0.3	1.1
ERP00358	E-217311	81402C3UPPER	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.4	0.12	6.4	13.4	1.5	1.2	10.4	3.3	4.7	0.4	2.6	1.6	0.4
ERP00358	E-217312	81402UPPER44	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.4	0.14	5.9	11.7	1.3	0.9	10.4	2.8	3.9	0.3	2.4	2.3	0.3
ERP00358	E-217313	81402C1-2	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.12	5.2	8.4	0.4	1.0	3.5	1.5	1.0	0.1	1.6	0.6	0.3
ERP00358	E-217314	81402MIDDLE	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.10	4.9	8.5	0.5	1.0	3.4	1.6	0.7	0.1	1.5	0.8	2.4
ERP00358	E-217315	546 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.15	5.4	30.8	0.4	0.9	2.8	1.7	0.8	0.2	1.4	0.9	0.3
ERP00358	E-217316	637 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	0.2	0.08	4.7	8.8	0.5	0.9	3.1	2.2	1.8	0.2	1.7	1.2	0.3
Rocky Mountain Province																			
ERP00404	E-224222	717JB1	Wyoming	Sweetwater	Ft. Union Formation		1.0	0.05	7.4	32.2	2.0	1.1	3.5	1.7	2.3	0.5	1.3	0.0	0.7
ERP00404	E-224223	717JB2	Wyoming	Sweetwater	Ft. Union Formation		0.8	0.04	7.0	17.5	1.6	0.9	2.7	1.8	0.9	0.4	1.0	0.3	1.4
ERP00404	E-224224	717JB3	Wyoming	Sweetwater	Ft. Union Formation		0.1	0.03	2.4	33.0	1.0	0.4	1.6	0.5	0.2	0.1	0.5	0.6	0.4
ERP00404	E-224225	717JB4	Wyoming	Sweetwater	Ft. Union Formation		0.5	0.11	14.3	28.7	1.4	1.4	2.8	2.6	1.0	0.3	1.4	0.8	2.1
ERP00404	E-224226	717JB5	Wyoming	Sweetwater	Ft. Union Formation		0.5	0.07	10.5	14.3	1.6	1.2	3.3	2.4	1.7	0.3	1.3	1.1	2.2
ERP00404	E-224227	717155A	Wyoming	Lincoln	Adaville Formation		0.1	<0.02	1.9	12.9	0.2	0.2	0.9	0.2	0.2	0.0	0.2	0.5	0.9
ERP00404	E-224228	717155B	Wyoming	Lincoln	Adaville Formation		0.2	<0.02	4.1	12.5	0.2	0.8	0.9	1.0	0.2	0.1	0.5	0.5	0.5
ERP00404	E-224229	717155C	Wyoming	Lincoln	Adaville Formation		0.1	<0.02	3.7	13.8	0.2	0.4	0.9	0.8	0.1	0.1	0.4	0.4	0.8
ERP00404	E-224230	717155D	Wyoming	Lincoln	Adaville Formation		0.2	<0.02	2.3	16.3	0.2	0.3	1.3	0.5	0.3	0.1	0.3	0.6	0.4

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00357	E-217268	7-16B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	209	0.08	1.5	0.02	0.5	12.6	3.2	6.6	12.3
ERP00357	E-217269	7-17A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	205	0.08	1.5	0.03	0.5	13.0	3.4	7.4	12.5
ERP00357	E-217270	7-17B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	208	0.08	1.5	0.03	0.5	12.6	3.4	6.2	12.5
ERP00357	E-217271	7-17C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	206	0.08	1.7	0.03	0.5	12.7	3.3	7.9	12.7
ERP00357	E-217272	605A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	183	0.08	1.5	0.02	0.5	11.6	2.6	5.9	11.6
ERP00357	E-217273	609B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	182	0.07	1.3	0.02	0.4	10.9	2.4	5.7	10.8
ERP00357	E-217274	613B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	195	0.07	1.5	0.02	0.5	11.6	3.0	8.2	11.7
ERP00357	E-217275	614A	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	199	0.07	1.4	0.02	0.5	11.2	2.9	7.2	11.9
ERP00357	E-217276	615	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	184	0.08	1.9	0.03	0.5	13.3	3.0	8.2	12.8
ERP00357	E-217277	616	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	185	0.07	1.4	0.02	0.5	11.9	2.8	5.8	12.4
ERP00357	E-217278	618	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	180	0.07	1.6	0.03	0.5	11.8	2.7	7.1	11.8
ERP00357	E-217279	619	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	194	0.07	1.6	0.03	0.5	12.9	3.1	6.7	13.2
ERP00357	E-217280	633	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	214	0.09	1.8	0.05	0.7	17.3	3.4	14.4	15.0
ERP00357	E-217281	633B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	213	0.09	2.0	0.05	0.7	17.1	3.1	12.7	14.4
ERP00357	E-217282	633C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	211	0.09	2.0	0.05	0.7	16.5	3.2	7.8	16.2
ERP00357	E-217283	7-15C dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	210	0.09	1.7	0.02	0.5	12.3	3.4	6.9	14.9
ERP00357	E-217284	609B dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	180	0.07	1.5	0.02	0.4	11.0	2.4	5.5	12.4
ERP00358	E-217285	634	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	241	0.07	1.9	0.04	0.6	14.9	3.6	12.3	15.0
ERP00358	E-217286	634B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	226	0.07	2.0	0.04	0.6	15.0	3.3	8.4	14.8
ERP00358	E-217287	634C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	229	0.07	2.0	0.04	0.6	14.7	3.4	8.3	13.3
ERP00358	E-217288	634D	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	225	0.07	1.8	0.03	0.6	14.7	3.3	8.8	13.9
ERP00358	E-217289	636	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	230	0.06	1.8	0.04	0.6	14.8	3.2	9.4	15.0
ERP00358	E-217290	637	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	227	0.07	1.9	0.05	0.6	15.1	3.2	9.7	15.6
ERP00358	E-217291	638	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	221	0.07	1.9	0.04	0.6	14.4	3.0	9.0	15.0
ERP00358	E-217292	638B	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	229	0.07	2.1	0.04	0.6	14.5	3.1	9.4	16.2
ERP00358	E-217293	638C	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	226	0.07	1.9	0.04	0.6	14.5	3.1	8.8	15.3
ERP00358	E-217294	545	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	238	0.07	2.0	0.02	0.5	12.2	3.7	6.9	13.8
ERP00358	E-217295	546	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	230	0.07	1.8	0.02	0.5	12.2	3.5	7.5	12.1
ERP00358	E-217296	550	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	222	0.07	1.7	0.02	0.4	11.6	3.4	6.6	13.3
ERP00358	E-217297	551	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	214	0.07	1.8	0.02	0.4	11.6	3.3	6.9	12.9
ERP00358	E-217298	552	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	230	0.07	1.7	0.02	0.5	12.5	3.4	7.4	13.6
ERP00358	E-217299	81402A	Wyoming	Converse	Ft. Union Formation	Anderson coal	207	0.06	1.7	0.05	0.4	11.2	2.9	10.9	13.6
ERP00358	E-217300	81402B	Wyoming	Converse	Ft. Union Formation	Anderson coal	208	0.06	1.6	0.02	0.4	10.2	2.6	9.2	12.3
ERP00358	E-217301	81402C	Wyoming	Converse	Ft. Union Formation	Anderson coal	225	0.09	2.0	0.02	0.5	10.8	2.6	9.7	15.3
ERP00358	E-217302	81402D	Wyoming	Converse	Ft. Union Formation	Anderson coal	210	0.06	1.7	0.02	0.4	10.7	2.5	9.2	16.8
ERP00358	E-217303	81402E	Wyoming	Converse	Ft. Union Formation	Anderson coal	217	0.06	1.6	0.04	0.4	10.6	2.6	9.2	15.9
ERP00358	E-217304	81402F	Wyoming	Converse	Ft. Union Formation	Anderson coal	242	0.06	2.0	0.03	0.5	11.6	2.8	12.0	16.8
ERP00358	E-217305	81402GHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	302	0.07	3.1	0.04	0.8	12.3	4.5	16.5	12.8
ERP00358	E-217306	81402HHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	301	0.06	2.6	0.03	0.7	11.9	4.4	16.5	11.1
ERP00358	E-217307	81402IHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	277	0.07	2.3	0.03	0.7	10.1	4.2	13.5	10.6
ERP00358	E-217308	81402JHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	254	0.06	2.4	0.03	0.7	10.3	4.0	12.4	9.9
ERP00358	E-217309	81402KHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	307	0.06	2.9	0.04	0.8	11.1	4.6	14.9	10.4
ERP00358	E-217310	81402LHC	Wyoming	Converse	Ft. Union Formation	Canyon coal	291	0.06	2.3	0.04	0.8	10.8	4.4	15.6	11.3
ERP00358	E-217311	81402C3UPPER	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	192	0.08	2.9	0.14	0.9	25.3	5.9	35.0	18.2
ERP00358	E-217312	81402UPPER44	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	184	0.08	2.5	0.12	0.8	23.2	5.9	30.8	18.0
ERP00358	E-217313	81402C1-2	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	179	0.08	2.0	0.05	0.5	12.8	3.4	10.7	15.6
ERP00358	E-217314	81402MIDDLE	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	183	0.07	1.7	0.04	0.5	12.4	3.5	10.4	15.5
ERP00358	E-217315	546 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	233	0.08	1.7	0.02	0.5	12.1	3.6	7.2	12.8
ERP00358	E-217316	637 dup	Wyoming	Campbell	Ft. Union Formation	Wyodak coal zone	220	0.09	1.8	0.04	0.6	15.1	3.2	7.9	14.1
Rocky Mountain Province															
ERP00404	E-224222	717JB1	Wyoming	Sweetwater	Ft. Union Formation		137	0.08	2.0	0.20	0.8	8.5	3.6	8.1	25.3
ERP00404	E-224223	717JB2	Wyoming	Sweetwater	Ft. Union Formation		182	0.07	1.6	0.15	0.6	6.8	2.8	6.0	23.2
ERP00404	E-224224	717JB3	Wyoming	Sweetwater	Ft. Union Formation		186	0.04	0.7	0.14	0.3	5.0	1.5	4.8	14.0
ERP00404	E-224225	717JB4	Wyoming	Sweetwater	Ft. Union Formation		137	0.10	2.3	0.22	0.9	12.0	3.0	5.7	47.9
ERP00404	E-224226	717JB5	Wyoming	Sweetwater	Ft. Union Formation		119	0.08	2.0	0.36	0.8	9.8	2.6	6.3	38.5
ERP00404	E-224227	717155A	Wyoming	Lincoln	Adaville Formation		104	0.02	0.3	0.01	0.1	1.9	0.7	2.9	6.8
ERP00404	E-224228	717155B	Wyoming	Lincoln	Adaville Formation		122	0.02	0.7	0.01	0.3	2.9	1.3	3.1	12.8
ERP00404	E-224229	717155C	Wyoming	Lincoln	Adaville Formation		133	0.02	0.5	0.01	0.2	2.3	1.1	3.1	9.4
ERP00404	E-224230	717155D	Wyoming	Lincoln	Adaville Formation		115	0.02	0.4	0.01	0.1	2.1	0.9	3.4	10.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00404	E-224231	717365A	Wyoming	Lincoln	Adaville Formation		7.0	4.9	1.12	0.48	0.07	0.014	0.001	0.017	0.42	0.017	2.09	<0.015
ERP00404	E-224232	717365B	Wyoming	Lincoln	Adaville Formation		5.4	7.0	2.20	0.53	0.07	0.019	0.001	0.044	0.42	0.022	1.96	<0.015
ERP00150	E-186364	19117-SF-1	Colorado	Fremont	Vermejo Formation		6.0	9.2	2.48	0.70	0.55	0.026	0.116	0.015	0.26	0.039	0.67	<0.015
ERP00150	E-186365	19118-SF-2	Colorado	Fremont	Vermejo Formation		5.0	13.9	2.83	0.91	1.15	0.060	0.155	0.039	1.55	0.048	2.07	<0.015
ERP00150	E-186366	19119-SF-3	Colorado	Fremont	Vermejo Formation		4.7	28.9	8.62	3.01	0.58	0.141	0.236	0.264	1.15	0.159	0.78	<0.015
ERP00150	E-186367	19120-SF-4	Colorado	Fremont	Vermejo Formation		6.2	8.6	2.20	0.64	0.58	0.033	0.115	0.021	0.33	0.038	0.96	<0.015
ERP00150	E-186368	19324-NH-1	Colorado	Montrose	Dakota Sandstone		5.1	13.0	2.59	0.85	1.18	0.061	0.154	0.039	1.27	0.041	1.86	<0.015
ERP00150	E-186369	19326-NH-2	Colorado	Montrose	Dakota Sandstone		1.5	36.3	10.40	5.30	0.29	0.204	0.035	0.693	0.71	0.218	0.58	<0.015
ERP00150	E-186370	19328-NH-3	Colorado	Montrose	Dakota Sandstone		1.5	40.7	11.30	5.62	0.17	0.120	0.045	0.284	1.25	0.151	1.14	<0.015
ERP00150	E-186371	19330-NH-4	Colorado	Montrose	Dakota Sandstone		1.3	13.3	3.50	2.29	0.09	0.017	0.020	0.024	0.10	0.144	0.49	<0.015
ERP00150	E-186372	19332-KC-1	Colorado	La Plata	Menefee Formation		1.7	7.2	1.88	1.09	0.04	0.023	0.020	0.022	0.39	0.073	0.90	<0.015
ERP00150	E-186373	19334-KC-2	Colorado	La Plata	Menefee Formation		1.6	4.7	0.94	0.77	0.23	0.011	0.009	0.003	0.21	0.039	0.82	<0.015
ERP00150	E-186374	19336-KC-3	Colorado	La Plata	Menefee Formation		1.7	6.4	1.60	0.97	0.03	0.012	0.029	0.016	0.55	0.061	1.31	<0.015
ERP00150	E-186375	19338-T-1	Colorado	Routt	Williams Fork Formation		4.5	8.7	1.74	1.13	0.34	0.074	0.090	0.048	0.21	0.042	0.53	<0.015
ERP00150	E-186376	19340-T-2	Colorado	Routt	Williams Fork Formation		3.8	8.0	1.66	1.27	0.54	0.125	0.083	0.051	0.19	0.053	0.43	<0.015
ERP00150	E-186377	19342-W-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	8.0	8.5	2.03	0.99	0.42	0.092	0.018	0.057	0.20	0.038	0.50	<0.015
ERP00150	E-186378	19344-S2W-A	Colorado	Routt	Williams Fork Formation		8.4	14.0	3.87	1.56	0.34	0.127	0.102	0.139	0.23	0.059	0.35	<0.015
ERP00150	E-186379	19347-Y-1	Colorado	Routt	Williams Fork Formation Mesaverde Fm.,		7.6	13.6	3.39	1.69	0.50	0.107	0.030	0.147	0.24	0.067	0.47	<0.015
ERP00150	E-186380	20473-SC-1	Colorado	Delta	Bowie Shale Member		1.9	8.5	2.14	1.02	0.20	0.087	0.259	0.070	0.40	0.040	0.83	<0.015
ERP00150	E-186381	20474-TREA-H	Colorado	Moffat	Williams Fork Formation		11.3	4.7	0.59	0.43	0.63	0.065	0.010	0.004	0.18	0.021	0.50	<0.015
ERP00150	E-186382	20475-TR-H-M	Colorado	Moffat	Williams Fork Formation		12.0	8.5	1.68	0.89	0.64	0.138	0.022	0.066	0.27	0.040	0.51	<0.015
ERP00150	E-186383	20476-DS1-RM	Colorado	Rio Blanco	Mesaverde Formation		8.6	16.2	4.17	2.07	0.58	0.166	0.144	0.085	0.30	0.083	0.39	<0.015
ERP00150	E-186384	20477-DS-1-S	Colorado	Rio Blanco	Mesaverde Formation		8.8	10.5	2.39	1.29	0.48	0.146	0.125	0.034	0.29	0.059	0.43	<0.015
ERP00150	E-186385	20478-MC1-RM	Colorado	Garfield	Mesaverde Formation Mesaverde Fm.,		3.8	11.8	3.50	1.79	0.09	0.031	0.042	0.051	0.09	0.085	0.57	0.036
ERP00150	E-186386	20479-BW1-CH	Colorado	Delta	Bowie Shale Member Mesaverde Fm.,		2.9	3.8	0.61	0.59	0.29	0.028	0.031	0.003	0.21	0.025	0.37	<0.015
ERP00150	E-186387	20480-BW1-S	Colorado	Delta	Bowie Shale Member		2.8	6.1	1.17	0.97	0.24	0.041	0.072	0.009	0.31	0.051	0.39	0.018
ERP00188	E-190603	TR-DR1-QU	Colorado	Moffat	Williams Fork Formation		30.8	6.0	1.22	0.61	0.41	0.087	0.010	0.024	0.18	0.030	0.48	<0.015
ERP00188	E-190604	TR-DR2-QM	Colorado	Moffat	Williams Fork Formation		9.1	7.1	1.37	0.91	0.46	0.090	0.007	0.026	0.19	0.040	0.37	<0.015
ERP00188	E-190605	Trapper-ROM	Colorado	Moffat	Williams Fork Formation		12.0	6.7	1.35	0.64	0.55	0.117	0.013	0.023	0.19	0.033	0.53	<0.015
ERP00188	E-190606	CWO-W-CH	Colorado	Moffat	Williams Fork Formation		9.4	8.8	1.86	1.16	0.45	0.080	0.034	0.088	0.16	0.042	0.39	<0.015
ERP00188	E-190607	CWO-ROM	Colorado	Moffat	Williams Fork Formation		10.2	6.4	1.30	0.83	0.28	0.043	0.076	0.023	0.13	0.035	0.37	<0.015
ERP00188	E-190608	1-WE-Sales	Colorado	Gunnison	Mesaverde Formation		4.6	8.0	1.87	1.10	0.13	0.077	0.142	0.035	0.30	0.041	0.51	<0.015
ERP00188	E-190609	San1-KC	Colorado	La Plata	Menefee Formation		2.2	7.3	1.89	1.00	0.04	0.022	0.141	0.037	0.31	0.066	0.80	<0.015
ERP00188	E-190610	San2-NH	Colorado	Montrose	Dakota Sandstone Mesaverde Fm.,		1.9	21.4	6.00	3.21	0.08	0.063	0.073	0.165	0.66	0.128	1.05	<0.015
ERP00188	E-190611	San3-BW2	Colorado	Delta	Bowie Shale Member		3.4	7.3	1.69	0.94	0.20	0.057	0.006	0.067	0.37	0.043	0.43	<0.015
ERP00188	E-190612	San4-WE	Colorado	Gunnison	Mesaverde Formation Mesaverde Fm.,		3.1	7.2	1.56	1.11	0.20	0.056	0.051	0.024	0.28	0.043	0.55	0.018
ERP00188	E-190613	San5-SB	Colorado	Delta	Bowie Shale Member		2.2	9.8	2.53	1.11	0.23	0.124	0.204	0.047	0.39	0.046	0.65	<0.015
ERP00188	E-190614	San6-MC	Colorado	Garfield	Mesaverde Formation		3.9	10.9	2.89	1.77	0.13	0.031	0.251	0.034	0.15	0.085	0.60	<0.015
ERP00188	E-190615	Sen2W-01-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	7.2	17.2	5.19	1.61	0.42	0.135	0.045	0.200	0.28	0.072	0.37	<0.015
ERP00188	E-190616	Y-01-ROM	Colorado	Routt	Williams Fork Formation		7.7	8.1	1.72	1.06	0.37	0.073	0.066	0.053	0.18	0.042	0.48	<0.015
ERP00188	E-190617	FC-01-ROM	Colorado	Routt	Williams Fork Formation		4.9	10.3	2.48	1.36	0.35	0.087	0.084	0.103	0.27	0.054	0.55	<0.015
ERP00276	E-203760	20451	Colorado	Gunnison	Mesaverde Formation		0.5	5.6	1.19	0.71	0.11	0.041	0.096	0.038	0.20	0.027	0.60	0.028
ERP00276	E-203761	WEM MCC	Colorado	Gunnison	Mesaverde Formation		0.7	5.2	1.10	0.70	0.11	0.041	0.085	0.029	0.23	0.027	0.68	0.033
ERP00276	E-203762	DES-01-01	Colorado	Rio Blanco	Mesaverde Formation		1.1	14.2	3.79	1.61	0.40	0.154	0.085	0.107	0.39	0.055	0.31	0.021
ERP00276	E-203763	DES-02-01	Colorado	Rio Blanco	Mesaverde Formation		1.1	11.9	3.14	1.42	0.25	0.122	0.074	0.088	0.22	0.048	0.28	0.016
ERP00276	E-203764	DES-03-01	Colorado	Rio Blanco	Mesaverde Formation		0.7	7.0	1.55	0.86	0.28	0.089	0.088	0.024	0.17	0.038	0.35	0.017
ERP00276	E-203765	CWO-01-01	Colorado	Moffat	Williams Fork Formation, C seam		1.1	1.3	0.15	0.13	0.11	0.012	0.033	0.002	0.04	0.005	0.30	0.019
ERP00276	E-203766	CWO-02-01	Colorado	Moffat	Williams Fork Formation, D seam		1.0	2.8	0.52	0.44	0.12	0.022	0.037	0.006	0.06	0.015	0.31	0.035
ERP00276	E-203767	CWO-03-01	Colorado	Moffat	Williams Fork Formation, F seam		1.5	2.7	0.47	0.31	0.13	0.024	0.030	0.008	0.10	0.014	0.51	0.050
ERP00276	E-203768	CWO-04-01	Colorado	Moffat	Williams Fork Formation, X seam		0.9	4.3	0.79	0.48	0.23	0.036	0.140	0.016	0.13	0.021	0.25	0.026
ERP00276	E-203769	CWO-05-01	Colorado	Moffat	Williams Fork Formation, B seam		0.9	1.8	0.36	0.15	0.11	0.028	0.036	0.021	0.07	0.007	0.41	0.022

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00404	E-224231	717365A	Wyoming	Lincoln	Adaville Formation		0.0025	<0.10	0.6	73	210	0.6	0.03	0.22	3.6	3.0	0.13	2.9	1.3
ERP00404	E-224232	717365B	Wyoming	Lincoln	Adaville Formation		0.0024	<0.15	0.8	89	195	0.9	0.04	0.20	2.9	4.8	0.37	2.9	2.2
ERP00150	E-186364	19117-SF-1	Colorado	Fremont	Vermejo Formation		0.0008	<0.19	0.9	28	146	1.8	0.10	0.02	4.9	3.1	0.09	4.6	1.5
ERP00150	E-186365	19118-SF-2	Colorado	Fremont	Vermejo Formation		0.0049	<0.28	6.5	32	190	1.0	0.10	0.06	4.4	6.6	0.28	4.7	2.0
ERP00150	E-186366	19119-SF-3	Colorado	Fremont	Vermejo Formation		0.0025	<0.58	1.2	<6	234	<0.3	0.21	0.03	5.6	10.2	1.71	11.3	6.9
ERP00150	E-186367	19120-SF-4	Colorado	Fremont	Vermejo Formation		0.0008	<0.18	1.3	30	153	0.7	0.09	0.04	3.7	3.1	0.13	4.8	1.5
ERP00150	E-186368	19324-NH-1	Colorado	Montrose	Dakota Sandstone		0.0011	<0.26	8.2	26	152	1.0	0.09	0.06	4.3	5.9	0.18	3.9	1.7
ERP00150	E-186369	19326-NH-2	Colorado	Montrose	Dakota Sandstone		0.0032	<0.73	4.0	37	135	1.4	0.51	0.22	6.3	19.2	4.25	8.2	11.3
ERP00150	E-186370	19328-NH-3	Colorado	Montrose	Dakota Sandstone		0.0036	<0.82	3.2	21	757	2.0	0.41	0.04	1.5	7.2	0.77	2.8	13.6
ERP00150	E-186371	19330-NH-4	Colorado	Montrose	Dakota Sandstone		0.0012	<0.27	0.5	22	15	0.5	0.68	0.01	2.1	4.7	0.12	8.8	5.0
ERP00150	E-186372	19332-KC-1	Colorado	La Plata	Menefee Formation		0.0022	<0.15	1.7	97	26	0.4	0.13	0.07	2.5	3.4	0.19	5.1	3.0
ERP00150	E-186373	19334-KC-2	Colorado	La Plata	Menefee Formation		0.1000	<0.09	0.3	121	45	0.2	0.06	0.05	1.2	1.6	0.02	2.3	2.0
ERP00150	E-186374	19336-KC-3	Colorado	La Plata	Menefee Formation		0.0050	<0.13	6.8	101	22	0.9	0.13	0.13	1.4	3.4	0.17	4.3	2.6
ERP00150	E-186375	19338-T-1	Colorado	Routt	Williams Fork Formation		0.0494	<0.18	1.0	153	249	0.2	0.15	0.10	1.3	2.4	0.19	3.5	2.9
ERP00150	E-186376	19340-T-2	Colorado	Routt	Williams Fork Formation		0.0663	<0.16	0.7	174	386	0.1	0.16	0.11	0.9	2.0	0.18	3.8	2.7
ERP00150	E-186377	19342-W-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	0.0853	<0.17	0.7	222	301	0.3	0.13	0.09	1.4	2.2	0.17	3.5	2.6
ERP00150	E-186378	19344-S2W-A	Colorado	Routt	Williams Fork Formation		0.0562	<0.28	1.2	211	274	<0.1	0.12	0.15	1.7	4.8	0.69	3.3	3.6
ERP00150	E-186379	19347-Y-1	Colorado	Routt	Williams Fork Formation Mesaverde Fm.,		0.1660	<0.28	1.6	175	370	0.7	0.16	0.16	2.4	5.4	0.76	3.6	4.0
ERP00150	E-186380	20473-SC-1	Colorado	Delta	Bowie Shale Member		0.0219	<0.17	7.3	196	189	1.1	0.22	0.16	1.7	5.0	0.83	7.3	3.7
ERP00150	E-186381	20474-TREA-H	Colorado	Moffat	Williams Fork Formation		0.0349	<0.09	0.6	180	130	<0.1	0.08	0.01	0.7	1.6	0.01	1.7	1.2
ERP00150	E-186382	20475-TR-H-M	Colorado	Moffat	Williams Fork Formation		0.0964	<0.17	1.7	150	544	1.0	0.07	0.04	3.3	4.5	0.46	4.8	1.9
ERP00150	E-186383	20476-DS1-RM	Colorado	Rio Blanco	Mesaverde Formation		0.0990	<0.33	1.1	105	512	0.5	0.24	0.11	1.8	7.1	0.44	3.6	4.7
ERP00150	E-186384	20477-DS-1-S	Colorado	Rio Blanco	Mesaverde Formation		0.0779	<0.21	0.9	113	429	0.5	0.19	0.06	1.4	4.5	0.20	3.3	3.3
ERP00150	E-186385	20478-MC1-RM	Colorado	Garfield	Mesaverde Formation Mesaverde Fm.,		0.0278	<0.24	0.5	125	102	0.5	0.20	0.06	2.1	6.0	0.44	8.1	4.7
ERP00150	E-186386	20479-BW1-CH	Colorado	Delta	Bowie Shale Member Mesaverde Fm.,		0.0614	<0.08	0.3	195	141	0.1	0.10	0.02	1.1	1.8	0.02	3.6	1.4
ERP00150	E-186387	20480-BW1-S	Colorado	Delta	Bowie Shale Member		0.0237	<0.13	0.7	285	303	0.5	0.20	0.04	2.4	3.3	0.07	7.9	2.8
ERP00188	E-190603	TR-DR1-QU	Colorado	Moffat	Williams Fork Formation		0.0254	<0.12	1.7	122	301	0.7	0.07	0.04	2.6	3.6	0.19	5.4	2.3
ERP00188	E-190604	TR-DR2-QM	Colorado	Moffat	Williams Fork Formation		0.0204	<0.15	1.5	108	288	0.3	0.08	0.04	1.3	2.6	0.16	3.0	2.2
ERP00188	E-190605	Trapper-ROM	Colorado	Moffat	Williams Fork Formation		0.0216	<0.14	1.0	126	368	0.5	0.07	0.04	1.4	3.9	0.13	4.7	1.6
ERP00188	E-190606	CWO-W-CH	Colorado	Moffat	Williams Fork Formation		0.0998	<0.18	0.9	75	443	1.1	0.08	0.05	1.8	3.9	0.55	3.8	2.8
ERP00188	E-190607	CWO-ROM	Colorado	Moffat	Williams Fork Formation		0.0335	<0.13	0.4	65	326	0.5	0.08	0.03	0.9	2.6	0.17	2.7	2.1
ERP00188	E-190608	1-WE-Sales	Colorado	Gunnison	Mesaverde Formation		0.0126	<0.16	0.5	207	314	0.2	0.11	0.08	1.3	1.8	0.16	4.1	2.9
ERP00188	E-190609	San1-KC	Colorado	La Plata	Menefee Formation		0.0111	<0.15	0.4	73	25	0.2	0.10	0.06	1.2	1.8	0.15	4.1	2.7
ERP00188	E-190610	San2-NH	Colorado	Montrose	Dakota Sandstone Mesaverde Fm.,		0.0019	<0.43	2.8	43	127	1.4	0.30	0.17	6.9	11.1	0.73	13.7	8.7
ERP00188	E-190611	San3-BW2	Colorado	Delta	Bowie Shale Member		0.0198	<0.15	0.9	147	160	0.6	0.12	0.02	1.1	2.5	0.26	2.0	2.8
ERP00188	E-190612	San4-WE	Colorado	Gunnison	Mesaverde Formation Mesaverde Fm.,		0.0534	<0.15	0.7	240	249	0.3	0.12	0.07	1.9	4.3	0.42	6.2	2.4
ERP00188	E-190613	San5-SB	Colorado	Delta	Bowie Shale Member		0.0235	<0.20	0.5	200	247	0.3	0.17	0.12	1.9	2.9	0.17	7.2	3.8
ERP00188	E-190614	San6-MC	Colorado	Garfield	Mesaverde Formation		0.0428	<0.22	4.1	110	133	0.2	0.17	0.09	1.7	2.7	0.29	5.7	2.5
ERP00188	E-190615	Sen2W-01-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	0.0503	<0.35	0.6	179	329	1.0	0.29	0.13	3.0	7.7	0.45	11.5	6.7
ERP00188	E-190616	Y-01-ROM	Colorado	Routt	Williams Fork Formation		0.0460	<0.17	0.5	156	267	<0.8	0.05	0.06	0.8	2.9	0.37	1.9	1.7
ERP00188	E-190617	FC-01-ROM	Colorado	Routt	Williams Fork Formation		0.0422	<0.21	1.3	128	254	0.3	0.12	0.11	1.4	3.7	0.43	4.0	3.1
ERP00276	E-203760	20451	Colorado	Gunnison	Mesaverde Formation		0.0144	<0.12	1.1	108	129	0.3	0.05	0.04	1.0	1.7	0.20	3.4	1.6
ERP00276	E-203761	WEM MCC	Colorado	Gunnison	Mesaverde Formation		0.0143	<0.11	1.1	118	138	0.3	0.05	0.06	1.0	1.4	0.18	3.6	1.6
ERP00276	E-203762	DES-01-01	Colorado	Rio Blanco	Mesaverde Formation		0.0260	<0.29	0.6	40	204	0.5	0.03	0.05	1.6	6.5	0.48	3.4	2.8
ERP00276	E-203763	DES-02-01	Colorado	Rio Blanco	Mesaverde Formation		0.0119	<0.24	0.4	30	155	0.5	0.03	0.04	1.3	4.9	0.61	2.6	2.5
ERP00276	E-203764	DES-03-01	Colorado	Rio Blanco	Mesaverde Formation		0.0269	<0.14	0.4	50	221	0.6	0.04	0.02	1.3	3.1	0.15	3.2	1.9
ERP00276	E-203765	CWO-01-01	Colorado	Moffat	Williams Fork Formation, C seam		0.0182	<0.03	0.1	19	125	0.1	0.01	0.00	0.2	0.4	0.01	0.7	0.3
ERP00276	E-203766	CWO-02-01	Colorado	Moffat	Williams Fork Formation, D seam		0.0122	<0.06	0.2	29	149	0.2	0.03	0.02	0.5	1.0	0.02	2.1	0.8
ERP00276	E-203767	CWO-03-01	Colorado	Moffat	Williams Fork Formation, F seam		0.0110	<0.05	0.3	32	156	0.2	0.03	0.01	0.5	1.5	0.05	1.9	0.6
ERP00276	E-203768	CWO-04-01	Colorado	Moffat	Williams Fork Formation, X seam		0.0225	<0.09	0.4	56	261	0.2	0.03	0.03	0.9	2.0	0.14	2.7	0.9
ERP00276	E-203769	CWO-05-01	Colorado	Moffat	Williams Fork Formation, B seam		0.0017	<0.04	0.2	21	106	0.2	0.01	0.01	0.5	1.0	0.09	1.1	0.3

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00404	E-224231	717365A	Wyoming	Lincoln	Adaville Formation		2.0	0.04	2.0	11.7	0.2	0.5	11.6	0.6	1.2	0.1	0.6	0.7	1.0
ERP00404	E-224232	717365B	Wyoming	Lincoln	Adaville Formation		2.6	0.04	2.0	13.2	0.2	0.7	11.1	1.4	2.7	0.1	0.7	1.0	1.8
ERP00150	E-186364	19117-SF-1	Colorado	Fremont	Vermejo Formation		0.7	<0.02	3.0	99.4	0.4	0.7	0.7	2.8	0.9	0.1	1.3	1.4	0.3
ERP00150	E-186365	19118-SF-2	Colorado	Fremont	Vermejo Formation		0.5	0.18	2.6	342.0	0.6	0.8	3.6	2.7	3.1	0.1	1.5	1.3	<0.4
ERP00150	E-186366	19119-SF-3	Colorado	Fremont	Vermejo Formation		1.3	0.53	6.6	169.0	0.5	3.0	<1.2	11.5	17.6	0.2	3.9	1.4	<0.9
ERP00150	E-186367	19120-SF-4	Colorado	Fremont	Vermejo Formation		0.8	0.03	2.0	104.0	0.4	0.6	0.6	2.2	1.3	0.1	1.0	1.4	0.6
ERP00150	E-186368	19324-NH-1	Colorado	Montrose	Dakota Sandstone		0.7	0.09	2.5	321.0	0.5	0.6	3.4	2.7	2.0	0.1	1.3	1.2	<0.4
ERP00150	E-186369	19326-NH-2	Colorado	Montrose	Dakota Sandstone		3.8	0.02	31.6	24.8	1.1	7.2	4.9	14.7	41.0	0.9	5.1	2.4	2.2
ERP00150	E-186370	19328-NH-3	Colorado	Montrose	Dakota Sandstone		3.4	0.07	45.6	17.3	1.6	8.8	6.8	14.9	11.3	0.9	3.5	0.9	2.2
ERP00150	E-186371	19330-NH-4	Colorado	Montrose	Dakota Sandstone		1.6	<0.02	12.4	7.0	0.8	4.2	1.0	9.8	1.3	0.4	2.7	3.0	2.0
ERP00150	E-186372	19332-KC-1	Colorado	La Plata	Menefee Formation		1.9	0.03	9.9	3.2	0.3	2.1	3.6	5.6	1.4	0.3	1.5	1.8	0.5
ERP00150	E-186373	19334-KC-2	Colorado	La Plata	Menefee Formation		1.5	0.02	8.9	1.7	0.2	0.9	2.1	2.7	0.1	0.1	1.0	1.1	0.2
ERP00150	E-186374	19336-KC-3	Colorado	La Plata	Menefee Formation		3.9	0.12	10.1	1.8	0.5	1.8	2.8	5.6	1.2	0.3	1.6	3.0	0.4
ERP00150	E-186375	19338-T-1	Colorado	Routt	Williams Fork Formation		0.5	<0.02	8.6	6.0	0.5	1.9	1.6	5.1	2.1	0.2	1.1	0.9	0.5
ERP00150	E-186376	19340-T-2	Colorado	Routt	Williams Fork Formation		0.4	<0.02	9.5	3.6	0.4	1.4	<0.3	4.3	2.0	0.1	1.0	1.0	0.5
ERP00150	E-186377	19342-W-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	0.4	<0.02	5.3	11.8	0.6	1.9	1.2	4.6	2.3	0.2	1.0	0.6	0.4
ERP00150	E-186378	19344-S2W-A	Colorado	Routt	Williams Fork Formation		0.6	<0.02	8.7	9.0	0.5	2.1	2.4	6.3	7.7	0.2	1.3	0.6	0.5
ERP00150	E-186379	19347-Y-1	Colorado	Routt	Williams Fork Formation Mesaverde Fm.,		2.0	0.03	10.5	30.2	0.6	3.2	2.0	7.7	7.8	0.3	1.7	1.1	0.9
ERP00150	E-186380	20473-SC-1	Colorado	Delta	Bowie Shale Member		4.5	0.09	6.9	8.8	0.8	1.8	0.8	6.0	5.7	0.7	1.5	1.0	0.8
ERP00150	E-186381	20474-TREA-H	Colorado	Moffat	Williams Fork Formation		0.2	0.11	3.1	28.4	0.3	0.6	<0.2	1.3	0.2	0.2	0.5	0.3	0.3
ERP00150	E-186382	20475-TR-H-M	Colorado	Moffat	Williams Fork Formation		0.3	<0.02	4.3	10.8	0.5	1.1	3.9	2.9	4.5	0.4	1.8	0.2	0.2
ERP00150	E-186383	20476-DS1-RM	Colorado	Rio Blanco	Mesaverde Formation		0.9	0.02	8.9	18.3	0.6	3.4	1.0	11.9	4.8	0.4	2.1	1.0	0.8
ERP00150	E-186384	20477-DS-1-S	Colorado	Rio Blanco	Mesaverde Formation		0.9	0.02	6.9	17.9	0.6	2.8	<0.4	6.2	1.9	0.3	1.5	0.9	0.5
ERP00150	E-186385	20478-MC1-RM	Colorado	Garfield	Mesaverde Formation Mesaverde Fm.,		1.4	<0.02	13.5	4.5	0.9	2.6	4.9	7.2	3.1	0.5	2.0	1.5	0.7
ERP00150	E-186386	20479-BW1-CH	Colorado	Delta	Bowie Shale Member Mesaverde Fm.,		0.4	<0.02	5.6	2.8	0.3	0.5	0.7	2.3	0.1	0.1	0.6	0.3	0.2
ERP00150	E-186387	20480-BW1-S	Colorado	Delta	Bowie Shale Member		1.2	<0.02	6.8	3.3	0.6	1.3	3.7	4.1	0.6	0.4	1.3	0.3	0.4
ERP00188	E-190603	TR-DR1-QU	Colorado	Moffat	Williams Fork Formation		1.9	<0.02	3.0	16.8	0.6	0.8	7.7	2.0	1.4	0.8	1.2	0.4	0.4
ERP00188	E-190604	TR-DR2-QM	Colorado	Moffat	Williams Fork Formation		0.4	<0.02	9.0	19.0	0.5	1.5	0.3	2.8	1.5	0.3	1.1	0.7	0.5
ERP00188	E-190605	Trapper-ROM	Colorado	Moffat	Williams Fork Formation		0.3	<0.02	4.2	9.9	0.4	0.9	1.2	1.6	1.2	0.3	1.3	0.4	0.4
ERP00188	E-190606	CWO-W-CH	Colorado	Moffat	Williams Fork Formation		1.0	<0.02	8.5	11.4	0.3	1.7	1.3	3.3	5.6	0.5	1.7	0.6	0.7
ERP00188	E-190607	CWO-ROM	Colorado	Moffat	Williams Fork Formation		0.5	<0.02	5.6	6.8	0.3	1.2	0.4	1.9	1.4	0.3	1.0	0.4	0.6
ERP00188	E-190608	1-WE-Sales	Colorado	Gunnison	Mesaverde Formation		0.4	<0.02	6.4	4.9	0.5	1.4	1.3	4.5	1.3	0.2	0.9	0.8	0.5
ERP00188	E-190609	San1-KC	Colorado	La Plata	Menefee Formation		0.4	0.08	5.8	4.3	0.5	1.3	1.2	3.9	1.2	0.2	0.8	1.9	9.1
ERP00188	E-190610	San2-NH	Colorado	Montrose	Dakota Sandstone Mesaverde Fm.,		5.0	0.10	33.2	48.8	0.9	5.3	14.6	13.7	6.8	1.1	4.6	2.2	1.8
ERP00188	E-190611	San3-BW2	Colorado	Delta	Bowie Shale Member		1.1	<0.02	10.7	4.6	0.3	1.7	2.1	3.7	2.6	0.3	1.1	0.7	0.7
ERP00188	E-190612	San4-WE	Colorado	Gunnison	Mesaverde Formation Mesaverde Fm.,		0.9	<0.02	6.8	5.9	0.4	1.2	3.6	3.7	4.0	0.4	1.3	1.0	0.5
ERP00188	E-190613	San5-SB	Colorado	Delta	Bowie Shale Member		0.5	0.04	10.0	3.8	0.5	1.8	1.3	5.6	1.2	0.2	1.3	1.1	0.8
ERP00188	E-190614	San6-MC	Colorado	Garfield	Mesaverde Formation		0.9	0.03	5.9	8.5	0.5	1.4	0.5	4.6	2.2	0.3	0.9	1.6	0.7
ERP00188	E-190615	Sen2W-01-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	1.5	0.02	21.8	6.1	1.0	3.8	3.0	10.4	2.9	0.5	3.1	0.5	1.5
ERP00188	E-190616	Y-01-ROM	Colorado	Routt	Williams Fork Formation		0.3	<0.02	4.7	9.9	0.2	1.0	0.4	2.7	4.2	0.1	0.7	1.0	0.3
ERP00188	E-190617	FC-01-ROM	Colorado	Routt	Williams Fork Formation		0.7	<0.02	11.5	6.3	0.4	2.0	1.0	5.1	4.5	0.2	1.4	1.0	0.7
ERP00276	E-203760	20451	Colorado	Gunnison	Mesaverde Formation		0.2	0.05	5.0	4.3	0.3	0.7	1.2	2.4	1.8	0.2	0.8	1.1	0.4
ERP00276	E-203761	WEM MCC	Colorado	Gunnison	Mesaverde Formation		0.3	0.08	4.9	4.1	0.3	0.8	1.1	2.5	1.4	0.2	0.7	1.3	0.4
ERP00276	E-203762	DES-01-01	Colorado	Rio Blanco	Mesaverde Formation		0.4	0.05	7.8	44.6	0.3	1.7	3.6	4.7	5.3	0.2	1.6	1.4	0.7
ERP00276	E-203763	DES-02-01	Colorado	Rio Blanco	Mesaverde Formation		0.5	0.05	6.2	8.1	0.3	1.6	1.6	4.0	4.8	0.2	1.4	1.5	0.6
ERP00276	E-203764	DES-03-01	Colorado	Rio Blanco	Mesaverde Formation		0.5	0.03	5.4	6.4	0.4	1.8	2.0	2.8	1.2	0.2	1.4	2.1	0.5
ERP00276	E-203765	CWO-01-01	Colorado	Moffat	Williams Fork Formation, C seam		0.1	<0.02	1.1	3.0	0.1	0.2	0.4	0.3	0.1	0.0	0.2	0.5	0.1
ERP00276	E-203766	CWO-02-01	Colorado	Moffat	Williams Fork Formation, D seam		0.2	<0.02	2.6	3.6	0.1	0.4	0.7	0.9	0.2	0.1	0.4	0.3	0.2
ERP00276	E-203767	CWO-03-01	Colorado	Moffat	Williams Fork Formation, F seam		0.1	0.03	2.4	13.4	0.1	0.4	0.8	0.7	0.4	0.1	0.5	0.6	0.2
ERP00276	E-203768	CWO-04-01	Colorado	Moffat	Williams Fork Formation, X seam		0.3	<0.02	3.0	6.2	0.2	0.5	1.4	0.9	1.0	0.2	0.7	0.6	0.3
ERP00276	E-203769	CWO-05-01	Colorado	Moffat	Williams Fork Formation, B seam		0.2	<0.02	0.9	9.3	0.2	0.1	1.3	0.3	1.0	0.1	0.3	0.4	0.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00404	E-224231	717365A	Wyoming	Lincoln	Adaville Formation		12	0.02	0.7	0.09	0.3	3.7	6.3	17.2	11.2
ERP00404	E-224232	717365B	Wyoming	Lincoln	Adaville Formation		13	0.02	1.0	0.11	0.4	6.0	6.5	16.5	12.7
ERP00150	E-186364	19117-SF-1	Colorado	Fremont	Vermejo Formation		177	0.09	0.8	0.04	0.5	10.4	14.6	7.5	14.0
ERP00150	E-186365	19118-SF-2	Colorado	Fremont	Vermejo Formation		203	0.09	<1.2	0.50	0.4	12.5	12.3	17.0	14.3
ERP00150	E-186366	19119-SF-3	Colorado	Fremont	Vermejo Formation		253	0.12	<2.4	0.25	1.1	35.8	7.0	22.3	38.4
ERP00150	E-186367	19120-SF-4	Colorado	Fremont	Vermejo Formation		170	0.08	<0.7	0.11	0.4	10.4	7.1	8.9	11.7
ERP00150	E-186368	19324-NH-1	Colorado	Montrose	Dakota Sandstone		205	0.07	<1.1	0.51	0.4	11.0	11.9	18.7	11.2
ERP00150	E-186369	19326-NH-2	Colorado	Montrose	Dakota Sandstone		101	0.17	7.7	0.31	3.5	36.7	8.3	30.4	102.0
ERP00150	E-186370	19328-NH-3	Colorado	Montrose	Dakota Sandstone		464	0.13	4.8	0.30	3.6	13.7	15.6	21.5	95.6
ERP00150	E-186371	19330-NH-4	Colorado	Montrose	Dakota Sandstone		20	0.15	6.4	<0.01	2.2	13.8	4.7	9.0	64.8
ERP00150	E-186372	19332-KC-1	Colorado	La Plata	Menefee Formation		43	0.07	1.7	0.12	0.7	7.1	3.4	7.6	32.5
ERP00150	E-186373	19334-KC-2	Colorado	La Plata	Menefee Formation		150	0.05	0.8	0.07	0.4	4.2	4.6	7.6	14.5
ERP00150	E-186374	19336-KC-3	Colorado	La Plata	Menefee Formation		42	0.08	1.2	0.68	0.7	6.7	3.7	13.4	28.8
ERP00150	E-186375	19338-T-1	Colorado	Routt	Williams Fork Formation		260	0.05	1.5	0.08	0.9	5.9	3.7	7.9	24.9
ERP00150	E-186376	19340-T-2	Colorado	Routt	Williams Fork Formation		347	0.08	2.0	0.04	0.8	5.0	3.2	7.8	11.8
ERP00150	E-186377	19342-W-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	238	0.05	1.3	0.03	0.9	5.4	4.5	10.3	17.7
ERP00150	E-186378	19344-S2W-A	Colorado	Routt	Williams Fork Formation		223	0.06	<1.2	0.09	1.0	9.8	4.7	16.8	42.3
ERP00150	E-186379	19347-Y-1	Colorado	Routt	Williams Fork Formation Mesaverde Fm.,		515	0.08	2.8	0.07	1.3	11.9	6.4	18.5	21.9
ERP00150	E-186380	20473-SC-1	Colorado	Delta	Bowie Shale Member		307	0.11	1.7	0.34	1.0	11.9	3.6	14.1	20.3
ERP00150	E-186381	20474-TREA-H	Colorado	Moffat	Williams Fork Formation		174	0.03	0.9	0.02	0.5	4.3	1.3	6.2	9.6
ERP00150	E-186382	20475-TR-H-M	Colorado	Moffat	Williams Fork Formation		454	0.04	1.0	0.06	0.8	12.7	7.3	14.6	11.0
ERP00150	E-186383	20476-DS1-RM	Colorado	Rio Blanco	Mesaverde Formation		397	0.12	4.0	0.10	1.7	12.7	6.2	11.8	41.6
ERP00150	E-186384	20477-DS-1-S	Colorado	Rio Blanco	Mesaverde Formation		323	0.09	1.9	0.08	1.3	9.1	5.1	8.4	36.4
ERP00150	E-186385	20478-MC1-RM	Colorado	Garfield	Mesaverde Formation Mesaverde Fm.,		133	0.11	1.3	0.06	1.2	17.2	2.9	7.6	42.0
ERP00150	E-186386	20479-BW1-CH	Colorado	Delta	Bowie Shale Member Mesaverde Fm.,		105	0.05	0.5	0.05	0.3	5.1	1.4	5.2	5.6
ERP00150	E-186387	20480-BW1-S	Colorado	Delta	Bowie Shale Member		217	0.10	1.2	0.09	0.7	11.2	2.5	6.7	21.4
ERP00188	E-190603	TR-DR1-QU	Colorado	Moffat	Williams Fork Formation		100	0.04	1.1	0.43	1.8	12.6	4.3	9.8	17.2
ERP00188	E-190604	TR-DR2-QM	Colorado	Moffat	Williams Fork Formation		113	0.04	2.5	0.03	1.4	7.9	4.2	9.4	18.6
ERP00188	E-190605	Trapper-ROM	Colorado	Moffat	Williams Fork Formation		277	0.04	1.1	<0.01	1.3	11.4	5.0	10.8	13.4
ERP00188	E-190606	CWO-W-CH	Colorado	Moffat	Williams Fork Formation		206	0.05	3.3	<0.01	1.3	9.7	6.4	13.0	33.9
ERP00188	E-190607	CWO-ROM	Colorado	Moffat	Williams Fork Formation		118	0.04	2.2	<0.01	0.9	6.3	3.3	6.0	18.8
ERP00188	E-190608	1-WE-Sales	Colorado	Gunnison	Mesaverde Formation		234	0.07	1.8	<0.01	0.7	6.5	2.3	6.7	22.6
ERP00188	E-190609	San1-KC	Colorado	La Plata	Menefee Formation		227	0.06	1.8	<0.01	0.7	6.3	2.3	6.6	29.8
ERP00188	E-190610	San2-NH	Colorado	Montrose	Dakota Sandstone Mesaverde Fm.,		140	0.20	6.3	0.39	2.1	24.8	10.6	26.8	75.3
ERP00188	E-190611	San3-BW2	Colorado	Delta	Bowie Shale Member		46	0.06	2.4	0.02	1.0	5.7	3.4	5.2	18.6
ERP00188	E-190612	San4-WE	Colorado	Gunnison	Mesaverde Formation Mesaverde Fm.,		107	0.07	1.6	0.01	0.7	11.2	2.8	8.9	22.2
ERP00188	E-190613	San5-SB	Colorado	Delta	Bowie Shale Member		428	0.09	2.6	<0.01	0.9	9.5	3.6	10.0	23.7
ERP00188	E-190614	San6-MC	Colorado	Garfield	Mesaverde Formation		241	0.09	1.9	0.20	0.7	6.9	2.4	9.5	40.1
ERP00188	E-190615	Sen2W-01-ROM	Colorado	Routt	Williams Fork Formation	Wadge coal	375	0.22	4.1	0.10	1.7	24.8	5.5	15.7	50.9
ERP00188	E-190616	Y-01-ROM	Colorado	Routt	Williams Fork Formation		78	0.03	1.3	0.04	0.5	5.9	1.9	7.4	30.4
ERP00188	E-190617	FC-01-ROM	Colorado	Routt	Williams Fork Formation		255	0.07	2.6	0.10	0.9	8.4	4.2	10.4	34.8
ERP00276	E-203760	20451	Colorado	Gunnison	Mesaverde Formation		167	0.03	1.2	0.08	0.5	5.3	1.9	4.4	12.7
ERP00276	E-203761	WEM MCC	Colorado	Gunnison	Mesaverde Formation		155	0.03	1.1	0.10	0.5	5.2	1.9	4.5	12.1
ERP00276	E-203762	DES-01-01	Colorado	Rio Blanco	Mesaverde Formation		130	0.04	3.1	0.08	1.1	10.5	4.5	8.5	30.1
ERP00276	E-203763	DES-02-01	Colorado	Rio Blanco	Mesaverde Formation		83	0.03	2.7	0.07	1.0	9.5	3.7	5.3	23.1
ERP00276	E-203764	DES-03-01	Colorado	Rio Blanco	Mesaverde Formation		143	0.03	2.3	0.05	1.0	7.1	4.1	3.1	23.3
ERP00276	E-203765	CWO-01-01	Colorado	Moffat	Williams Fork Formation, C seam		50	0.01	0.4	0.01	0.2	0.9	0.8	1.0	3.9
ERP00276	E-203766	CWO-02-01	Colorado	Moffat	Williams Fork Formation, D seam		49	0.01	1.1	0.01	0.4	2.4	1.2	1.3	7.6
ERP00276	E-203767	CWO-03-01	Colorado	Moffat	Williams Fork Formation, F seam		48	0.01	0.6	0.04	0.3	3.5	1.5	1.1	6.6
ERP00276	E-203768	CWO-04-01	Colorado	Moffat	Williams Fork Formation, X seam		106	0.02	1.1	0.05	0.3	4.7	1.6	2.8	10.7
ERP00276	E-203769	CWO-05-01	Colorado	Moffat	Williams Fork Formation, B seam		22	0.01	0.3	0.02	0.1	2.3	0.9	2.8	3.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00276	E-203770	CWO-06-01	Colorado	Moffat	Williams Fork Formation, X bed		1.2	3.1	0.49	0.37	0.20	0.030	0.129	0.007	0.12	0.015	0.24	0.016
ERP00276	E-203771	CWO-07-01	Colorado	Moffat	Williams Fork Formation, F bed		1.2	2.3	0.31	0.27	0.19	0.026	0.038	0.004	0.08	0.012	0.51	0.020
ERP00276	E-203772	TRDR-RCHAN	Colorado	Moffat	Williams Fork Formation		1.9	3.2	0.54	0.21	0.22	0.054	0.008	0.022	0.16	0.009	0.63	0.026
ERP00276	E-203773	TRDR-QROM	Colorado	Moffat	Williams Fork Formation		1.7	4.1	0.69	0.48	0.32	0.077	0.019	0.015	0.13	0.020	0.34	0.016
ERP00276	E-203774	LOR-M-01-02	Colorado	Las Animas	Raton Formation		0.3	7.0	1.31	0.81	0.54	0.080	0.015	0.087	0.25	0.041	0.58	0.030
ERP00276	E-203775	LOR-NA-01-02	Colorado	Las Animas	Raton Formation		0.3	7.6	1.34	0.95	0.54	0.087	0.018	0.069	0.32	0.046	0.58	0.021
ERP00276	E-203776	WEM MCC2	Colorado	Gunnison	Mesaverde Formation		0.8	4.7	1.07	0.68	0.12	0.040	0.077	0.030	0.23	0.025	0.72	0.029
Interior Province																		
EA52	E-000990	96-C-1H	Oklahoma	Rogers	Senora Formation	Iron Post coal		6.5	0.27	0.19	0.24	0.016	0.012	0.029	3.36	0.011		0.281
EA52	E-000991	96-C-3H	Oklahoma	Nowata	Senora Formation	Iron Post coal		6.9	0.52	0.26	0.94	0.022	0.017	0.049	1.83	0.015		0.275
EA52	E-000992	96-C-4H	Oklahoma	Craig	Senora Formation	Croweburg coal		7.9	1.07	0.50	1.36	0.048	0.019	0.111	0.83	0.028		0.155
ERP00113	E-177446	OKLA-1	Oklahoma	Okmulgee	Senora Formation	Mineral coal	2.3	8.0	0.55	0.32	1.15	0.068	0.026	0.053	1.70	0.015		0.306
ERP00141	E-186010	OPL1143	Oklahoma	Haskell	McAlester Formation	Stiger coal	0.4	9.4	0.49	0.41	0.90	0.057	0.011	0.044	3.32	0.020		0.051
ERP00141	E-186011	OPL1144	Oklahoma	LeFlore	Hartshorne Sandstone	Lower Hartshorne coal	0.4	10.8	0.85	0.53	1.16	0.638	0.088	0.083	1.74	0.025		0.026
ERP00449	E-242780	OPL-1183	Oklahoma	Nowata	Senora Formation	Iron Post coal	1.5	5.9	0.60	0.26	0.81	0.021	0.022	0.043	1.44	0.015	3.91	0.351
ERP00449	E-242781	OPL-1184	Oklahoma	Craig	Senora Formation	Croweburg coal	12.1	6.9	1.35	0.63	1.11	0.056	0.023	0.144	0.19	0.035	0.44	0.051
EA05	E-000037	C34943	Illinois	Vermilion	Carbondale Formation	Danville Coal Member		18.0	3.70	1.81	0.93	0.104	0.118	0.299	2.90	0.098		0.115
EB71	E-003207	C33863	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	6.2	13.9	2.08	1.03	0.45	0.101	0.051	0.300	3.01	0.053		<0.015
EB71	E-003208	C33864	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	9.7	10.1	2.22	1.34	0.14	0.059	0.063	0.210	0.45	0.085		<0.015
EB71	E-003209	C33865	Illinois	Douglas	Carbondale Formation	Springfield Coal Member	2.3	19.9	2.98	1.26	0.61	0.061	0.068	0.281	4.87	0.076		<0.015
ERP00048	E-138332	C36488	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	9.7	7.5	1.04	0.66	0.05	0.031	0.008	0.143	1.36	0.036		0.023
ERP00048	E-138333	C36489	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	9.5	8.2	1.43	0.83	0.04	0.036	0.007	0.163	2.39	0.044		0.023
ERP00048	E-138334	C36490	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	10.2	6.8	1.15	0.62	0.05	0.027	0.007	0.124	1.58	0.035		0.021
ERP00048	E-138335	C36491	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	2.2	12.2	2.27	1.27	0.16	0.055	0.011	0.223	2.92	0.065		0.128
ERP00048	E-138336	C36492	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	2.3	12.2	2.72	1.39	0.11	0.049	0.015	0.223	2.41	0.072		0.101
ERP00048	E-138337	C36493	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	2.0	12.1	2.36	1.24	0.23	0.095	0.016	0.211	1.93	0.066		0.195
ERP00048	E-138338	C36494	Illinois	Jackson	Carbondale Formation	Herrin Coal Member	7.5	9.4	1.85	0.94	0.61	0.074	0.013	0.133	1.34	0.049		0.062
EB71	E-003186	98126-1	Indiana	Posey	Dugger Formation	Danville Coal Member	2.6	11.4	1.81	0.91	0.53	0.060	0.064	0.189	2.31	0.056		0.070
EB71	E-003187	98126-2	Indiana	Posey	Dugger Formation	Hymera Coal Member	2.3	22.9	4.39	1.94	0.59	0.108	0.131	0.399	4.16	0.135		0.066
EB71	E-003188	98126-3	Indiana	Posey	Dugger Formation	Herrin Coal Member	2.6	10.1	1.79	0.91	0.31	0.041	0.058	0.159	1.98	0.058		0.083
EB71	E-003189	98126-4	Indiana	Posey	Petersburg Formation	Springfield Coal Member	2.3	16.0	1.72	0.79	0.55	0.031	0.039	0.120	5.48	0.051		0.092
EB71	E-003190	98126-5	Indiana	Posey	Petersburg Formation	Houchin Creek Coal Member	2.3	15.6	3.43	1.40	0.21	0.079	0.089	0.311	2.29	0.080		0.096
EB71	E-003191	98126-6	Indiana	Posey	Petersburg Formation	Survant Coal Member	3.0	12.1	2.60	1.47	0.22	0.073	0.077	0.261	1.27	0.064		0.146
EB71	E-003192	98126-7	Indiana	Posey	Petersburg Formation	Colchester Coal Member	1.5	24.1	3.15	1.40	1.07	0.079	0.068	0.220	6.24	0.052		0.077
EB71	E-003193	98126-8	Indiana	Posey	Staunton Formation	Seeleyville Coal Member	2.2	12.1	1.07	0.54	0.47	0.033	0.041	0.100	3.98	0.029		0.134
EB71	E-003194	98126-9	Indiana	Posey	Staunton Formation	Davis Coal Member	1.9	15.4	1.37	0.82	0.66	0.037	0.038	0.120	5.60	0.050		0.099
EB71	E-003195	98126-10	Indiana	Posey	Staunton Formation	Holland Coal Member	2.1	20.9	3.13	1.55	0.19	0.107	0.110	0.451	6.14	0.089		0.081
EB71	E-003196	98126-11	Indiana	Posey	Staunton Formation	Buffaloville Coal Member	1.7	8.9	0.46	0.26	0.50	0.018	0.026	0.008	3.36	0.016		0.091
EB71	E-003197	98126-12	Indiana	Posey	Brazil Formation	Lower Block Coal Member	2.2	14.3	2.81	1.66	0.26	0.045	0.088	0.249	2.10	0.103		0.125
EB71	E-003198	98126-13	Indiana	Posey	uncorrelated	uncorrelated coal	2.6	11.2	2.15	1.13	0.36	0.074	0.080	0.260	1.49	0.065		0.047
EB71	E-003199	98126-14	Indiana	Posey	uncorrelated	uncorrelated coal	3.0	9.3	1.52	0.84	0.09	0.036	0.048	0.131	2.08	0.049		0.069
EB71	E-003200	98126-15	Indiana	Posey	uncorrelated	uncorrelated coal	2.6	20.2	1.98	0.98	1.33	0.054	0.055	0.184	5.65	0.061		0.090
EB71	E-003201	98126-16	Indiana	Posey	uncorrelated	uncorrelated coal	2.3	17.7	3.23	1.31	0.89	0.084	0.095	0.338	1.98	0.071		0.121
EB71	E-003202	98126-17	Indiana	Posey	uncorrelated	uncorrelated coal	1.9	14.6	1.71	1.16	0.19	0.033	0.063	0.145	5.00	0.057		0.124
EB71	E-003203	98126-18	Indiana	Posey	uncorrelated	uncorrelated coal	2.4	11.0	1.70	1.05	0.04	0.038	0.098	0.174	2.15	0.063		0.159
EB71	E-003204	98126-19	Indiana	Posey	uncorrelated	uncorrelated coal	3.3	7.1	1.49	0.90	0.06	0.029	0.111	0.130	0.46	0.051		0.249
EB71	E-003205	98126-20	Indiana	Posey	uncorrelated	uncorrelated coal	2.2	13.1	1.71	0.90	0.65	0.039	0.073	0.163	2.93	0.059		0.174
EB71	E-003206	98126-21	Indiana	Posey	uncorrelated	uncorrelated coal	1.6	17.9	2.43	1.14	0.42	0.046	0.064	0.193	5.01	0.076		0.134
ERP00238	E-200392	980813B1	Indiana	Clay	Brazil Formation	Upper Block Coal Member	2.7	2.2	0.51	0.32	0.02	0.008	0.015	0.023	0.20	0.018	0.69	0.032
ERP00238	E-200393	980813B2	Indiana	Clay	Brazil Formation	Upper Block Coal Member	2.8	6.7	1.57	0.83	0.45	0.021	0.021	0.085	0.18	0.056	0.61	0.032
ERP00238	E-200394	980813B3	Indiana	Clay	Brazil Formation	Upper Block Coal Member	2.4	7.8	1.99	1.17	0.11	0.027	0.023	0.072	0.29	0.067	0.67	0.025
ERP00238	E-200395	981130A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.8	4.9	0.81	0.47	0.02	0.011	0.015	0.055	1.34	0.032	2.13	0.033
ERP00238	E-200396	981130A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.4	7.1	1.66	0.89	0.02	0.022	0.024	0.122	0.89	0.060	1.67	0.030
ERP00238	E-200397	981130A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.0	4.0	0.89	0.51	0.02	0.005	0.012	0.017	0.60	0.029	1.35	0.042
ERP00238	E-200398	981130A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.1	5.6	1.06	0.86	0.03	0.011	0.016	0.032	0.83	0.047	1.56	0.016
ERP00238	E-200399	981207A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.5	4.4	0.71	0.42	0.19	0.015	0.029	0.056	1.02	0.024	1.68	0.049
ERP00238	E-200400	981207A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.4	7.8	2.16	1.02	0.14	0.026	0.041	0.134	0.28	0.072	0.69	0.028

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00276	E-203770	CWO-06-01	Colorado	Moffat	Williams Fork Formation, X bed		0.0284	<0.06	0.3	49	208	0.1	0.02	0.01	0.6	1.2	0.03	2.0	0.6
ERP00276	E-203771	CWO-07-01	Colorado	Moffat	Williams Fork Formation, F bed		0.0191	<0.05	0.1	47	196	0.3	0.03	0.01	0.6	0.8	0.02	2.0	0.5
ERP00276	E-203772	TRDR-RCHAN	Colorado	Moffat	Williams Fork Formation		0.0106	<0.06	0.4	78	358	0.4	0.01	0.01	0.6	1.4	0.11	1.7	0.4
ERP00276	E-203773	TRDR-QROM	Colorado	Moffat	Williams Fork Formation		0.0250	<0.08	0.4	82	224	0.2	0.02	0.02	0.7	1.5	0.07	2.5	0.9
ERP00276	E-203774	LOR-M-01-02	Colorado	Las Animas	Raton Formation		0.0641	<0.14	1.0	6	145	0.7	0.11	0.02	2.6	4.1	0.41	6.0	1.8
ERP00276	E-203775	LOR-NA-01-02	Colorado	Las Animas	Raton Formation		0.0730	<0.16	0.5	7	166	0.6	0.09	0.08	2.1	6.5	0.38	14.2	2.2
ERP00276	E-203776	WEM MCC2	Colorado	Gunnison	Mesaverde Formation		0.0135	<0.09	1.2	102	126	0.3	0.06	0.05	0.8	1.2	0.17	3.1	1.6
Interior Province																			
EA52	E-000990	96-C-1H	Oklahoma	Rogers	Senora Formation	Iron Post coal	0.0017	<0.13	6.5	61	8	3.8	<0.13	0.20	1.2	2.0	0.27	5.0	2.5
EA52	E-000991	96-C-3H	Oklahoma	Nowata	Senora Formation	Iron Post coal	0.0039	<0.14	3.8	65	10	3.0	<0.14	0.28	1.4	4.8	0.37	6.9	3.8
EA52	E-000992	96-C-4H	Oklahoma	Craig	Senora Formation	Croweburg coal	0.0035	<0.16	2.4	55	20	2.3	<0.16	0.16	5.5	5.3	0.62	7.5	3.2
ERP00113	E-177446	OKLA-1	Oklahoma	Okmulgee	Senora Formation	Mineral coal	0.0133	<0.08	25.3	70	31	0.8	0.03	0.05	3.4	9.5	0.24	6.6	1.3
ERP00141	E-186010	OPL1143	Oklahoma	Haskell	McAlester Formation	Stiger coal	0.0098	<0.19	42.4	4	29	0.2	0.03	0.04	6.1	10.4	0.38	3.1	0.9
ERP00141	E-186011	OPL1144	Oklahoma	LeFlore	Hartshorne Sandstone	Lower Hartshorne coal	0.0099	<0.22	28.7	14	35	0.3	0.05	0.05	3.8	10.1	0.34	5.9	1.2
ERP00449	E-242780	OPL-1183	Oklahoma	Nowata	Senora Formation	Iron Post coal	0.0162	<0.12	2.1	44	10	3.1	0.03	0.09	1.2	4.3	0.29	10.4	1.8
ERP00449	E-242781	OPL-1184	Oklahoma	Craig	Senora Formation	Croweburg coal	0.0030	<0.14	1.4	31	30	2.1	0.03	0.01	8.7	7.3	0.60	8.7	2.6
EA05	E-000037	C34943	Illinois	Vermilion	Carbondale Formation	Danville Coal Member	0.0063	<0.36	27.0	171	54	2.9	<0.36	0.18	5.2	17.8	2.16	8.8	6.5
EB71	E-003207	C33863	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	0.0073	0.42	125.0	68	47	2.9	<0.28	<0.12	9.2	13.9	1.53	22.2	4.9
EB71	E-003208	C33864	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	0.0145	0.30	5.3	84	43	2.8	<0.21	1.52	8.7	17.2	1.72	21.2	5.6
EB71	E-003209	C33865	Illinois	Douglas	Carbondale Formation	Springfield Coal Member	0.0669	0.84	73.6	72	48	1.8	<0.40	0.90	19.3	29.9	1.35	35.8	4.2
ERP00048	E-138332	C36488	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	0.0144	0.08	26.2	97	38	2.6	0.05	0.51	6.3	9.2	0.73	8.1	2.5
ERP00048	E-138333	C36489	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	0.0100	0.13	33.5	100	34	2.5	0.08	0.02	6.8	9.1	0.82	10.6	2.5
ERP00048	E-138334	C36490	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	0.0196	0.11	29.6	107	22	2.5	0.04	4.23	5.6	8.5	0.72	7.1	3.0
ERP00048	E-138335	C36491	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	0.0224	0.13	6.6	41	57	2.0	0.07	1.60	8.0	27.7	1.31	5.3	3.4
ERP00048	E-138336	C36492	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	0.0208	0.13	5.6	39	69	2.2	0.09	5.42	7.3	24.5	1.44	7.6	3.5
ERP00048	E-138337	C36493	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	0.0048	<0.13	6.5	33	258	1.5	0.08	8.35	9.0	16.1	1.32	7.9	3.8
ERP00048	E-138338	C36494	Illinois	Jackson	Carbondale Formation	Herrin Coal Member	0.0025	<0.09	6.8	111	37	1.0	0.06	0.24	5.6	9.7	0.87	4.0	2.3
EB71	E-003186	98126-1	Indiana	Posey	Dugger Formation	Danville Coal Member	0.0179	0.34	39.9	105	38	2.5	<0.23	0.34	4.6	17.1	1.25	8.1	3.7
EB71	E-003187	98126-2	Indiana	Posey	Dugger Formation	Hymera Coal Member	0.0650	0.99	151.0	85	89	2.5	<0.46	2.52	18.1	43.5	2.29	41.2	9.4
EB71	E-003188	98126-3	Indiana	Posey	Dugger Formation	Herrin Coal Member	0.0062	<0.21	4.0	111	36	1.6	<0.21	0.20	4.0	17.2	1.21	7.8	3.2
EB71	E-003189	98126-4	Indiana	Posey	Petersburg Formation	Springfield Coal Member	0.0077	<0.32	24.0	67	26	1.6	<0.32	0.32	4.5	15.5	0.93	3.2	2.1
EB71	E-003190	98126-5	Indiana	Posey	Petersburg Formation	Houchin Creek Coal Member	0.0082	<0.32	20.3	120	48	2.7	<0.32	0.16	6.2	17.2	2.03	10.9	3.6
EB71	E-003191	98126-6	Indiana	Posey	Petersburg Formation	Survant Coal Member	0.0581	0.36	10.9	98	121	2.8	<0.25	0.36	11.5	19.4	2.54	31.5	5.2
EB71	E-003192	98126-7	Indiana	Posey	Petersburg Formation	Colchester Coal Member	0.0231	0.72	36.2	99	99	3.1	<0.49	21.00	14.0	31.3	1.66	36.2	5.1
EB71	E-003193	98126-8	Indiana	Posey	Staunton Formation	Seeleyville Coal Member	0.0164	<0.25	18.2	86	18	3.0	<0.25	0.12	2.7	12.0	0.73	5.9	2.5
EB71	E-003194	98126-9	Indiana	Posey	Staunton Formation	Davis Coal Member	0.0094	<0.31	3.1	74	23	1.5	<0.31	2.00	2.9	15.4	0.88	6.5	2.2
EB71	E-003195	98126-10	Indiana	Posey	Staunton Formation	Holland Coal Member	0.0119	<0.42	10.2	92	52	5.4	<0.42	<0.17	14.2	20.9	2.01	18.6	7.7
EB71	E-003196	98126-11	Indiana	Posey	Staunton Formation	Buffaloville Coal Member	0.0047	<0.18	35.6	45	6	4.7	<0.18	2.67	7.2	7.9	0.04	6.9	2.6
EB71	E-003197	98126-12	Indiana	Posey	Brazil Formation	Lower Block Coal Member	0.0081	0.43	45.8	69	46	5.0	<0.29	<0.12	15.7	21.5	2.29	25.7	7.3
EB71	E-003198	98126-13	Indiana	Posey	uncorrelated	uncorrelated coal	0.0078	<0.23	14.6	134	39	2.8	<0.23	0.22	5.2	14.6	1.57	11.2	4.6
EB71	E-003199	98126-14	Indiana	Posey	uncorrelated	uncorrelated coal	0.0057	<0.19	4.9	87	25	2.0	<0.19	0.09	4.4	13.0	1.12	7.1	3.1
EB71	E-003200	98126-15	Indiana	Posey	uncorrelated	uncorrelated coal	0.0150	<0.41	34.3	63	49	1.6	<0.41	0.81	4.2	24.2	1.17	4.0	2.6
EB71	E-003201	98126-16	Indiana	Posey	uncorrelated	uncorrelated coal	0.0054	<0.36	14.0	81	43	2.1	<0.36	0.18	5.3	17.7	2.30	8.7	3.9
EB71	E-003202	98126-17	Indiana	Posey	uncorrelated	uncorrelated coal	0.0166	<0.30	58.4	85	45	6.4	<0.30	0.29	24.8	19.0	1.39	10.5	7.3
EB71	E-003203	98126-18	Indiana	Posey	uncorrelated	uncorrelated coal	0.0086	0.33	37.4	78	36	6.6	<0.22	0.22	13.2	22.0	1.43	17.6	5.8
EB71	E-003204	98126-19	Indiana	Posey	uncorrelated	uncorrelated coal	0.0186	0.14	4.3	59	33	2.4	<0.15	0.21	3.0	10.7	1.21	5.5	3.4
EB71	E-003205	98126-20	Indiana	Posey	uncorrelated	uncorrelated coal	0.0057	<0.27	3.9	58	28	1.8	<0.27	0.13	3.0	14.4	1.00	5.2	3.1
EB71	E-003206	98126-21	Indiana	Posey	uncorrelated	uncorrelated coal	0.0148	0.54	25.1	63	50	3.4	<0.36	1.70	11.6	23.3	1.11	25.1	5.7
ERP00238	E-200392	980813B1	Indiana	Clay	Brazil Formation	Upper Block Coal Member	0.0032	<0.04	1.2	165	8	2.6	0.02	0.01	6.9	4.0	0.07	3.2	4.6
ERP00238	E-200393	980813B2	Indiana	Clay	Brazil Formation	Upper Block Coal Member	0.1373	<0.14	1.4	90	32	2.1	0.04	1.49	6.5	6.0	0.51	13.0	4.0
ERP00238	E-200394	980813B3	Indiana	Clay	Brazil Formation	Upper Block Coal Member	0.0719	<0.16	1.6	102	105	3.7	0.07	0.09	12.7	15.8	0.38	23.9	6.1
ERP00238	E-200395	981130A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0016	0.15	22.6	126	12	3.4	0.02	0.02	19.1	10.9	0.40	12.6	4.3
ERP00238	E-200396	981130A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0043	0.22	13.8	94	25	2.7	0.04	0.02	18.7	9.4	0.73	17.3	4.2
ERP00238	E-200397	981130A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0153	0.10	7.8	85	19	3.0	0.02	0.01	13.0	5.6	0.08	15.0	3.0
ERP00238	E-200398	981130A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0465	0.22	21.2	102	59	3.3	0.05	0.04	14.7	18.1	0.20	24.8	5.4
ERP00238	E-200399	981207A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0016	0.11	2.9	143	15	3.5	0.03	0.08	12.3	7.1	0.33	6.1	6.7
ERP00238	E-200400	981207A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0027	<0.16	1.4	80	28	2.7	0.04	0.03	11.9	11.5	1.00	18.2	3.9

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00276	E-203770	CWO-06-01	Colorado	Moffat	Williams Fork Formation, X bed		0.1	<0.02	2.5	5.5	0.2	0.4	0.9	0.5	0.3	0.1	0.4	0.4	0.2
ERP00276	E-203771	CWO-07-01	Colorado	Moffat	Williams Fork Formation, F bed		0.1	<0.02	2.0	4.6	0.1	0.3	1.6	0.4	0.2	0.0	0.5	0.4	0.2
ERP00276	E-203772	TRDR-RCHAN	Colorado	Moffat	Williams Fork Formation		0.1	<0.02	1.4	15.3	0.1	0.3	1.0	0.3	1.1	0.1	0.8	0.4	0.1
ERP00276	E-203773	TRDR-QROM	Colorado	Moffat	Williams Fork Formation		0.1	<0.02	3.6	11.0	0.3	0.5	1.3	1.1	0.7	0.2	0.7	0.5	0.2
ERP00276	E-203774	LOR-M-01-02	Colorado	Las Animas	Raton Formation		0.4	0.04	4.9	9.2	0.8	0.7	3.7	2.3	5.1	0.2	2.0	1.8	0.7
ERP00276	E-203775	LOR-NA-01-02	Colorado	Las Animas	Raton Formation		0.5	0.03	7.6	10.4	0.9	1.1	3.4	2.3	4.4	0.2	2.9	1.9	0.6
ERP00276	E-203776	WEM MCC2	Colorado	Gunnison	Mesaverde Formation		0.3	0.08	4.1	3.8	0.3	0.7	0.9	2.4	1.4	0.2	0.6	1.1	0.4
Interior Province																			
EA52	E-000990	96-C-1H	Oklahoma	Rogers	Senora Formation	Iron Post coal	24.7	0.31	1.5	18.2	5.3	<0.5	1.4	84.5	2.6	0.6	0.8	1.3	<0.7
EA52	E-000991	96-C-3H	Oklahoma	Nowata	Senora Formation	Iron Post coal	10.4	0.09	1.7	44.2	9.0	0.7	4.1	22.8	4.6	0.1	1.2	1.7	<0.7
EA52	E-000992	96-C-4H	Oklahoma	Craig	Senora Formation	Croweburg coal	34.8	0.04	2.9	119.0	2.7	0.8	28.4	11.9	10.3	2.6	1.9	0.5	<0.8
ERP00113	E-177446	OKLA-1	Oklahoma	Okmulgee	Senora Formation	Mineral coal	10.9	0.07	3.4	293.0	1.4	0.5	2.5	7.0	3.4	0.8	1.3	1.1	0.3
ERP00141	E-186010	OPL1143	Oklahoma	Haskell	McAlester Formation	Stiger coal	0.2	0.72	2.2	95.9	0.8	0.4	7.1	1.1	4.2	0.1	0.6	<0.1	1.1
ERP00141	E-186011	OPL1144	Oklahoma	LeFlore	Hartshorne Sandstone	Lower Hartshorne coal	0.3	0.03	4.8	299.0	0.6	0.5	9.3	2.1	5.0	0.1	1.2	0.6	0.4
ERP00449	E-242780	OPL-1183	Oklahoma	Nowata	Senora Formation	Iron Post coal	18.0	0.10	4.6	33.6	3.4	0.4	3.8	20.4	3.0	0.2	1.3	2.5	0.3
ERP00449	E-242781	OPL-1184	Oklahoma	Craig	Senora Formation	Croweburg coal	20.9	0.02	6.8	65.2	0.3	1.0	41.6	3.3	9.5	6.4	2.0	0.3	0.5
EA05	E-000037	C34943	Illinois	Vermilion	Carbondale Formation	Danville Coal Member	13.9	0.30	28.8	112.0	1.8	3.6	23.4	90.0	21.6	1.2	5.9	1.8	3.6
EB71	E-003207	C33863	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	43.1	0.11	12.8	73.7	1.5	2.8	32.0	264.0	19.5	7.4	3.9	1.8	<1.4
EB71	E-003208	C33864	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	14.1	0.02	48.5	21.2	2.7	3.0	31.3	16.2	16.2	4.6	3.9	1.3	<1.1
EB71	E-003209	C33865	Illinois	Douglas	Carbondale Formation	Springfield Coal Member	12.5	0.32	8.4	119.0	12.7	2.0	57.7	378.0	19.9	4.2	3.6	12.2	<2.0
ERP00048	E-138332	C36488	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	25.4	0.13	4.4	9.2	0.8	1.8	26.0	40.3	9.2	1.6	2.0	1.0	4.2
ERP00048	E-138333	C36489	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	22.7	0.10	5.8	7.5	0.8	1.8	25.0	>57.4	9.8	1.9	1.8	1.3	3.0
ERP00048	E-138334	C36490	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	28.4	0.13	3.3	5.4	0.9	1.7	26.0	30.5	8.7	2.0	1.9	1.0	2.6
ERP00048	E-138335	C36491	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	9.0	0.22	13.5	13.7	15.0	2.8	26.1	>85.4	14.8	0.4	2.9	2.9	4.1
ERP00048	E-138336	C36492	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	10.8	0.14	12.2	14.2	13.1	3.2	30.9	>85.4	15.6	0.3	2.8	3.2	11.8
ERP00048	E-138337	C36493	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	11.8	0.19	14.5	39.9	7.9	2.8	28.2	56.0	15.4	0.5	3.4	2.0	7.6
ERP00048	E-138338	C36494	Illinois	Jackson	Carbondale Formation	Herrin Coal Member	4.2	0.12	11.8	67.6	1.4	2.2	15.9	27.3	9.5	0.3	2.3	1.9	2.1
EB71	E-003186	98126-1	Indiana	Posey	Dugger Formation	Danville Coal Member	10.6	0.16	6.2	94.6	13.7	3.4	19.4	22.8	17.1	1.1	3.7	2.0	<1.2
EB71	E-003187	98126-2	Indiana	Posey	Dugger Formation	Hymera Coal Member	45.8	0.13	25.2	71.0	18.3	9.2	103.0	167.0	32.1	14.2	9.4	5.6	<2.3
EB71	E-003188	98126-3	Indiana	Posey	Dugger Formation	Herrin Coal Member	5.6	0.10	6.8	35.4	9.1	2.0	9.0	4.3	15.2	0.8	2.9	1.7	1.0
EB71	E-003189	98126-4	Indiana	Posey	Petersburg Formation	Springfield Coal Member	11.2	0.49	9.6	67.2	11.0	1.6	13.8	24.0	10.9	1.9	2.2	2.8	<1.6
EB71	E-003190	98126-5	Indiana	Posey	Petersburg Formation	Houchin Creek Coal Member	9.8	0.11	8.6	26.5	20.3	3.1	13.7	11.7	25.0	4.2	2.8	4.5	<1.6
EB71	E-003191	98126-6	Indiana	Posey	Petersburg Formation	Survant Coal Member	13.3	0.10	16.9	35.1	2.3	3.6	26.6	8.2	24.2	1.1	5.7	5.5	<1.3
EB71	E-003192	98126-7	Indiana	Posey	Petersburg Formation	Colchester Coal Member	26.5	0.14	15.2	313.0	45.8	4.8	38.6	48.2	18.6	7.2	6.0	11.6	<2.5
EB71	E-003193	98126-8	Indiana	Posey	Staunton Formation	Seeleyville Coal Member	10.3	0.06	3.6	44.8	4.5	1.2	8.0	84.7	10.0	<0.2	1.9	2.0	<1.3
EB71	E-003194	98126-9	Indiana	Posey	Staunton Formation	Davis Coal Member	4.3	0.12	9.9	83.2	4.6	1.5	6.0	7.1	10.6	<0.3	1.9	2.9	<1.6
EB71	E-003195	98126-10	Indiana	Posey	Staunton Formation	Holland Coal Member	33.4	0.24	8.4	60.6	2.1	4.2	35.5	439.0	35.5	1.0	6.5	1.4	<2.1
EB71	E-003196	98126-11	Indiana	Posey	Staunton Formation	Buffaloville Coal Member	15.1	0.18	2.2	26.7	1.0	<0.7	51.6	107.0	0.6	1.7	1.5	5.1	<0.9
EB71	E-003197	98126-12	Indiana	Posey	Brazil Formation	Lower Block Coal Member	27.2	0.14	27.2	44.3	1.7	2.9	38.6	143.0	21.5	1.3	5.3	9.0	<1.5
EB71	E-003198	98126-13	Indiana	Posey	uncorrelated	uncorrelated coal	19.0	0.09	12.3	53.8	2.1	3.4	12.3	5.0	23.5	0.3	4.1	1.1	<1.2
EB71	E-003199	98126-14	Indiana	Posey	uncorrelated	uncorrelated coal	2.4	0.12	6.4	23.3	8.7	1.9	11.2	4.3	12.1	0.5	2.3	1.2	0.9
EB71	E-003200	98126-15	Indiana	Posey	uncorrelated	uncorrelated coal	11.3	0.41	8.1	111.0	20.2	2.0	11.7	8.1	15.6	2.4	2.8	4.3	<2.1
EB71	E-003201	98126-16	Indiana	Posey	uncorrelated	uncorrelated coal	12.0	0.07	7.3	47.8	14.0	3.5	9.0	3.5	31.9	2.1	3.5	2.8	<1.8
EB71	E-003202	98126-17	Indiana	Posey	uncorrelated	uncorrelated coal	14.6	0.35	17.5	33.6	7.3	2.9	51.1	111.0	14.2	0.9	6.9	2.5	<1.5
EB71	E-003203	98126-18	Indiana	Posey	uncorrelated	uncorrelated coal	23.1	0.22	11.0	13.2	1.0	4.4	55.0	28.6	16.5	1.4	5.3	2.5	<1.1
EB71	E-003204	98126-19	Indiana	Posey	uncorrelated	uncorrelated coal	5.8	<0.02	11.4	5.1	2.7	2.1	10.7	6.1	12.8	0.5	2.4	2.0	<0.7
EB71	E-003205	98126-20	Indiana	Posey	uncorrelated	uncorrelated coal	1.4	0.08	10.3	47.2	4.5	2.6	5.5	2.6	13.1	<0.3	4.2	2.4	<1.4
EB71	E-003206	98126-21	Indiana	Posey	uncorrelated	uncorrelated coal	48.3	0.16	12.5	197.0	11.5	5.4	23.3	125.0	14.5	3.2	7.3	3.6	<1.8
ERP00238	E-200392	980813B1	Indiana	Clay	Brazil Formation	Upper Block Coal Member	28.4	0.02	1.9	4.6	0.2	0.4	81.0	4.5	1.1	3.3	2.9	1.2	0.2
ERP00238	E-200393	980813B2	Indiana	Clay	Brazil Formation	Upper Block Coal Member	7.8	0.18	7.0	33.8	0.2	1.1	38.3	13.7	5.5	1.6	2.1	2.3	0.5
ERP00238	E-200394	980813B3	Indiana	Clay	Brazil Formation	Upper Block Coal Member	12.6	0.03	8.7	37.8	0.3	1.7	65.3	26.1	5.4	2.1	6.2	3.5	0.8
ERP00238	E-200395	981130A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	11.4	0.14	2.7	10.7	0.3	0.6	90.2	29.4	4.1	1.5	2.7	5.5	0.4
ERP00238	E-200396	981130A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	4.8	0.12	4.8	5.9	0.4	1.0	64.8	28.0	8.5	1.2	2.0	6.6	0.5
ERP00238	E-200397	981130A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	4.9	0.10	3.7	2.3	0.3	0.5	44.4	16.9	1.1	1.0	2.3	4.1	0.3
ERP00238	E-200398	981130A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	9.2	0.14	6.9	5.7	0.4	1.2	81.8	54.1	3.0	2.0	6.0	6.3	0.7
ERP00238	E-200399	981207A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	42.0	0.07	2.7	11.4	0.2	0.8	104.0	16.6	4.4	4.8	3.2	1.3	0.4
ERP00238	E-200400	981207A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	10.0	0.02	7.4	12.4	0.2	1.4	51.4	17.3	10.5	1.5	2.4	2.6	0.6

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00276	E-203770	CWO-06-01	Colorado	Moffat	Williams Fork Formation, X bed		111	0.01	0.8	0.03	0.3	2.9	1.2	2.2	7.7
ERP00276	E-203771	CWO-07-01	Colorado	Moffat	Williams Fork Formation, F bed		63	0.01	0.6	0.01	0.2	2.4	1.8	1.3	6.3
ERP00276	E-203772	TRDR-RCHAN	Colorado	Moffat	Williams Fork Formation		41	0.01	0.3	0.02	0.1	3.3	1.8	1.9	5.9
ERP00276	E-203773	TRDR-QROM	Colorado	Moffat	Williams Fork Formation		100	0.02	1.1	0.02	0.6	4.4	1.9	2.1	9.7
ERP00276	E-203774	LOR-M-01-02	Colorado	Las Animas	Raton Formation		123	0.08	1.9	0.07	0.5	13.9	4.9	6.9	12.3
ERP00276	E-203775	LOR-NA-01-02	Colorado	Las Animas	Raton Formation		158	0.06	2.4	0.06	0.7	20.8	6.0	8.0	10.3
ERP00276	E-203776	WEM MCC2	Colorado	Gunnison	Mesaverde Formation		135	0.03	1.0	0.10	0.5	4.7	1.7	3.8	12.7
Interior Province															
EA52	E-000990	96-C-1H	Oklahoma	Rogers	Senora Formation	Iron Post coal	51	<0.13	0.7	1.56	0.3	2.4	4.1	21.5	
EA52	E-000991	96-C-3H	Oklahoma	Nowata	Senora Formation	Iron Post coal	59	<0.14	0.8	0.83	8.3	6.9	2.9	35.2	
EA52	E-000992	96-C-4H	Oklahoma	Craig	Senora Formation	Croweburg coal	43	<0.16	0.9	0.36	1.4	8.7	4.2	44.2	
ERP00113	E-177446	OKLA-1	Oklahoma	Okmulgee	Senora Formation	Mineral coal	41	0.02	0.8	0.46	0.4	12.8	3.8	22.3	6.2
ERP00141	E-186010	OPL1143	Oklahoma	Haskell	McAlester Formation	Stiger coal	60	0.02	<0.8	0.54	0.2	13.8	1.8	15.4	3.9
ERP00141	E-186011	OPL1144	Oklahoma	LeFlore	Hartshorne Sandstone	Lower Hartshorne coal	31	0.02	0.9	0.10	0.4	14.4	2.8	23.9	6.5
ERP00449	E-242780	OPL-1183	Oklahoma	Nowata	Senora Formation	Iron Post coal	66	0.02	0.7	0.57	2.2	10.9	5.2	15.8	3.9
ERP00449	E-242781	OPL-1184	Oklahoma	Craig	Senora Formation	Croweburg coal	39	0.02	1.4	0.13	0.4	16.0	3.6	15.3	9.0
EA05	E-000037	C34943	Illinois	Vermilion	Carbondale Formation	Danville Coal Member	25	<0.36	2.9	2.52	0.8	28.8	7.6	82.8	37.8
EB71	E-003207	C33863	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	18	<0.28	1.5	1.81	0.8	19.5	19.5	19.5	13.9
EB71	E-003208	C33864	Illinois	Douglas	Carbondale Formation	Herrin Coal Member	85	<0.21	2.5	0.30	1.3	32.3	32.3	192.0	21.2
EB71	E-003209	C33865	Illinois	Douglas	Carbondale Formation	Springfield Coal Member	121	<0.40	2.2	4.38	4.6	47.8	47.8	18.7	19.9
ERP00048	E-138332	C36488	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	27	0.02	1.3	0.42	0.5	11.9	5.1	135.0	7.0
ERP00048	E-138333	C36489	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	23	0.02	1.7	0.53	0.8	12.3	4.4	15.3	12.2
ERP00048	E-138334	C36490	Illinois	Jackson	Tradewater Formation	Murphysboro Coal Member	32	0.02	1.3	0.36	0.6	10.7	5.7	1010.0	10.7
ERP00048	E-138335	C36491	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	34	0.01	1.6	1.05	11.2	71.9	3.9	366.0	27.7
ERP00048	E-138336	C36492	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	47	<0.01	1.6	0.79	5.2	39.2	4.0	1480.0	33.2
ERP00048	E-138337	C36493	Illinois	Gallatin	Carbondale Formation	Herrin Coal Member	46	0.02	1.4	0.65	1.5	22.1	4.7	2230.0	21.8
ERP00048	E-138338	C36494	Illinois	Jackson	Carbondale Formation	Herrin Coal Member	20	0.03	1.5	0.45	0.5	13.5	3.7	63.8	16.5
EB71	E-003186	98126-1	Indiana	Posey	Dugger Formation	Danville Coal Member	35	<0.23	1.8	2.62	3.8	34.2	34.2	19.4	27.4
EB71	E-003187	98126-2	Indiana	Posey	Dugger Formation	Hymera Coal Member	44	<0.46	2.8	1.44	8.2	220.0	220.0	618.0	147.0
EB71	E-003188	98126-3	Indiana	Posey	Dugger Formation	Herrin Coal Member	11	<0.21	1.7	1.31	1.3	46.5	46.5	18.2	19.2
EB71	E-003189	98126-4	Indiana	Posey	Petersburg Formation	Springfield Coal Member	12	<0.32	1.8	6.72	1.6	19.2	19.2	22.4	16.0
EB71	E-003190	98126-5	Indiana	Posey	Petersburg Formation	Houchin Creek Coal Member	16	<0.32	2.0	1.87	9.5	21.8	21.8	21.8	18.7
EB71	E-003191	98126-6	Indiana	Posey	Petersburg Formation	Survant Coal Member	315	<0.25	2.9	0.51	1.3	50.8	50.8	54.5	27.8
EB71	E-003192	98126-7	Indiana	Posey	Petersburg Formation	Colchester Coal Member	53	<0.49	6.3	3.62	14.2	210.0	210.0	506.0	23.9
EB71	E-003193	98126-8	Indiana	Posey	Staunton Formation	Seeleyville Coal Member	15	<0.25	1.2	0.70	0.5	9.2	9.2	18.2	4.6
EB71	E-003194	98126-9	Indiana	Posey	Staunton Formation	Davis Coal Member	15	<0.31	<1.3	5.85	0.6	12.8	12.8	77.0	12.6
EB71	E-003195	98126-10	Indiana	Posey	Staunton Formation	Holland Coal Member	19	<0.42	1.9	2.51	2.0	37.6	37.6	20.9	29.3
EB71	E-003196	98126-11	Indiana	Posey	Staunton Formation	Buffaloville Coal Member	15	<0.18	0.7	0.71	0.2	4.7	4.7	668.0	1.7
EB71	E-003197	98126-12	Indiana	Posey	Brazil Formation	Lower Block Coal Member	23	<0.29	3.2	0.82	1.2	38.6	38.6	13.4	24.3
EB71	E-003198	98126-13	Indiana	Posey	uncorrelated	uncorrelated coal	20	<0.23	2.0	1.68	1.2	29.1	29.1	51.5	20.2
EB71	E-003199	98126-14	Indiana	Posey	uncorrelated	uncorrelated coal	11	<0.19	1.3	1.12	0.7	21.4	21.4	21.4	15.8
EB71	E-003200	98126-15	Indiana	Posey	uncorrelated	uncorrelated coal	15	<0.41	2.0	5.86	4.0	58.6	58.6	46.5	16.8
EB71	E-003201	98126-16	Indiana	Posey	uncorrelated	uncorrelated coal	20	<0.36	2.7	1.95	4.1	31.9	31.9	12.2	19.5
EB71	E-003202	98126-17	Indiana	Posey	uncorrelated	uncorrelated coal	58	<0.30	1.5	2.04	3.9	36.5	36.5	104.0	45.3
EB71	E-003203	98126-18	Indiana	Posey	uncorrelated	uncorrelated coal	42	<0.22	1.8	0.95	0.7	41.8	41.8	23.1	38.5
EB71	E-003204	98126-19	Indiana	Posey	uncorrelated	uncorrelated coal	38	<0.15	1.3	0.14	0.5	22.7	22.7	45.4	17.8
EB71	E-003205	98126-20	Indiana	Posey	uncorrelated	uncorrelated coal	16	<0.27	2.0	1.97	2.8	26.2	26.2	15.7	17.0
EB71	E-003206	98126-21	Indiana	Posey	uncorrelated	uncorrelated coal	34	<0.36	3.0	1.97	2.7	39.4	39.4	62.7	64.4
ERP00238	E-200392	980813B1	Indiana	Clay	Brazil Formation	Upper Block Coal Member	12	0.01	0.4	0.12	0.3	5.4	2.5	4.2	4.1
ERP00238	E-200393	980813B2	Indiana	Clay	Brazil Formation	Upper Block Coal Member	98	0.02	1.8	0.21	0.5	9.7	30.6	291.0	13.9
ERP00238	E-200394	980813B3	Indiana	Clay	Brazil Formation	Upper Block Coal Member	440	0.05	4.0	0.19	1.3	32.1	10.4	27.1	19.0
ERP00238	E-200395	981130A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	10	0.01	<0.4	0.92	0.3	13.2	3.1	8.0	8.7
ERP00238	E-200396	981130A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	16	0.02	0.8	0.56	0.4	12.8	3.2	6.3	16.8
ERP00238	E-200397	981130A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	134	0.02	1.6	0.24	0.3	8.8	3.2	3.3	8.9
ERP00238	E-200398	981130A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	361	0.05	4.3	0.73	1.0	45.4	4.7	24.8	19.6
ERP00238	E-200399	981207A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	13	0.02	0.7	0.92	0.4	9.9	4.0	36.9	7.7
ERP00238	E-200400	981207A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	15	0.02	1.9	0.28	0.5	16.4	5.1	11.5	18.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00238	E-200401	981207A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.2	5.0	0.78	0.51	0.10	0.010	0.036	0.034	1.27	0.022	2.02	0.028
ERP00238	E-200402	981207A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.1	4.8	1.08	0.78	0.04	0.009	0.031	0.025	0.37	0.048	0.79	0.020
ERP00238	E-200403	981207B1	Indiana	Greene	Brazil Formation	Upper Block Coal Member	2.5	6.3	1.49	0.79	0.09	0.017	0.009	0.074	0.67	0.046	1.26	0.025
ERP00238	E-200404	981207B2	Indiana	Greene	Brazil Formation	Upper Block Coal Member	2.1	17.7	4.35	3.16	0.20	0.070	0.026	0.227	0.55	0.182	1.08	0.016
ERP00238	E-200405	981207B4	Indiana	Greene	Brazil Formation	Upper Block Coal Member	2.1	14.7	2.17	1.92	0.67	0.047	0.021	0.146	2.69	0.066	3.30	0.027
ERP00238	E-200406	10803A1,0-63	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.9	9.1	0.82	0.49	0.03	0.018	0.006	0.051	3.98	0.026	5.93	0.048
ERP00238	E-200407	10803A1,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.4	8.0	0.74	0.47	0.03	0.017	0.005	0.047	3.58	0.028	4.87	0.035
ERP00238	E-200408	10803A2,63-94	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.4	7.1	0.39	0.33	0.03	0.008	0.004	0.009	3.54	0.013	5.18	0.027
ERP00238	E-200409	10803A2,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.4	3.8	0.34	0.30	0.03	0.009	0.003	0.006	1.60	0.013	3.13	0.034
ERP00238	E-200410	10803A3,94-131	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.1	10.3	1.87	1.56	0.04	0.034	0.012	0.173	1.73	0.077	3.25	0.023
ERP00238	E-200411	10803A3,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	2.4	9.9	1.88	1.54	0.03	0.034	0.011	0.172	1.45	0.077	3.00	0.037
ERP00238	E-200412	10803B1,0-28	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.3	6.6	0.81	0.77	0.13	0.012	0.007	0.037	1.85	0.018	2.96	0.045
ERP00238	E-200413	10803B1,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.3	4.6	0.67	0.68	0.09	0.011	0.006	0.033	0.80	0.017	1.89	0.050
ERP00238	E-200414	10803B2,28-53	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.1	4.7	0.26	0.24	0.16	0.006	0.004	0.018	2.07	0.010	3.56	0.025
ERP00238	E-200415	10803B2,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.3	2.8	0.22	0.21	0.10	0.005	0.004	0.017	0.98	0.010	2.01	0.031
ERP00238	E-200416	10803B3,53-73	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.2	4.8	0.53	0.45	0.06	0.011	0.004	0.048	1.60	0.019	2.77	0.030
ERP00238	E-200417	10803B3,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	2.1	3.5	0.52	0.43	0.05	0.012	0.005	0.054	0.76	0.021	1.92	0.044
ERP00238	E-200418	10724C1,0-33	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.3	4.7	0.90	0.51	0.28	0.021	0.009	0.081	0.53	0.032	1.49	0.034
ERP00238	E-200419	10724C1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.3	3.8	0.87	0.46	0.06	0.017	0.008	0.080	0.41	0.031	1.34	0.038
ERP00238	E-200420	10724C2,33-69	Indiana	Sullivan	Dugger Formation	Danville Coal Member	1.8	11.6	3.00	1.44	0.11	0.080	0.024	0.284	0.70	0.087	1.39	0.048
ERP00238	E-200421	10724C2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.3	10.9	2.86	1.37	0.04	0.076	0.022	0.276	0.62	0.087	1.32	0.035
ERP00238	E-200422	10724C3,69-96	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.2	13.0	3.41	1.60	0.06	0.102	0.027	0.331	0.95	0.093	1.50	0.040
ERP00238	E-200423	10724C3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.3	12.8	3.48	1.61	0.04	0.103	0.027	0.337	0.67	0.097	1.30	0.059
ERP00238	E-200424	10724C4,96-117	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.6	8.4	2.12	1.08	0.05	0.070	0.016	0.196	0.81	0.064	1.58	0.032
ERP00238	E-200425	10724C4,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.5	7.1	1.85	0.95	0.04	0.059	0.015	0.172	0.55	0.057	1.27	0.049
ERP00238	E-200426	981130A3D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	1.3	3.8	0.95	0.53	0.02	0.005	0.013	0.017	0.38	0.031	1.27	0.024
ERP00238	E-200427	10803A1,1.6D	Indiana	Parke	Brazil Formation	Minshall Coal Member	1.5	8.0	0.81	0.49	0.03	0.017	0.005	0.051	3.58	0.027	5.16	0.046
ERP00238	E-200428	10803B3,1.6D	Indiana	Parke	Brazil Formation	Upper Block Coal Member	1.4	3.5	0.56	0.45	0.05	0.013	0.005	0.056	0.79	0.022	1.91	0.043
ERP00239	E-200429	10724B1,0-34	Indiana	Sullivan	Dugger Formation	Danville Coal Member	1.9	5.4	1.19	0.67	0.14	0.029	0.014	0.108	0.57	0.039	1.33	0.041
ERP00239	E-200430	10724B1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.0	4.7	1.18	0.62	0.04	0.028	0.011	0.109	0.41	0.037	1.23	0.035
ERP00239	E-200431	10724B2,34-70	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.2	12.8	3.30	1.66	0.16	0.100	0.030	0.319	0.89	0.092	1.33	0.028
ERP00239	E-200432	10724B2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.1	12.0	3.23	1.63	0.06	0.101	0.029	0.329	0.51	0.094	1.07	0.031
ERP00239	E-200433	10724B3,70-93	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.4	8.9	2.28	1.16	0.05	0.075	0.021	0.214	0.78	0.064	1.33	0.040
ERP00239	E-200434	10724B3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	3.2	8.1	2.09	1.05	0.03	0.068	0.019	0.195	0.74	0.058	1.21	0.060
ERP00239	E-200435	107241,0-34	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.6	13.0	2.17	0.85	0.27	0.044	0.048	0.151	4.13	0.048	4.76	0.047
ERP00239	E-200436	107241,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.1	7.1	0.78	0.34	0.15	0.016	0.017	0.052	3.02	0.021	4.11	0.050
ERP00239	E-200437	107242,34-63	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.3	7.5	1.01	0.54	0.13	0.021	0.022	0.075	2.15	0.028	3.21	0.045
ERP00239	E-200438	107242,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.1	6.4	1.01	0.50	0.06	0.019	0.021	0.074	1.90	0.026	2.83	0.058
ERP00239	E-200439	107243,65-97	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.0	16.8	3.89	1.59	0.22	0.111	0.065	0.377	2.08	0.101	3.01	0.043
ERP00239	E-200440	107243,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	1.9	14.3	3.62	1.48	0.10	0.103	0.061	0.356	1.93	0.094	2.84	0.046
ERP00239	E-200441	11006A1,0-15	Indiana	Knox	Dugger Formation	Danville Coal Member	1.7	20.9	6.27	2.26	0.09	0.227	0.217	0.625	0.98	0.175	0.86	0.063
ERP00239	E-200442	11006A1,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	1.8	8.2	2.05	0.92	0.03	0.064	0.073	0.265	0.47	0.118	0.91	0.101
ERP00239	E-200443	11006A2,15-43	Indiana	Knox	Dugger Formation	Danville Coal Member	2.0	12.3	3.63	1.65	0.10	0.111	0.091	0.347	0.39	0.103	0.53	0.070
ERP00239	E-200444	11006A2,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	2.0	11.9	3.73	1.67	0.03	0.100	0.088	0.346	0.34	0.100	0.48	0.080
ERP00239	E-200445	11006A3,43-103	Indiana	Knox	Dugger Formation	Danville Coal Member	2.5	6.6	1.58	0.86	0.30	0.052	0.045	0.170	0.19	0.044	0.60	0.083
ERP00239	E-200446	11006A3,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	2.5	5.7	1.58	0.84	0.04	0.048	0.041	0.180	0.16	0.048	0.59	0.082
ERP00239	E-200447	11006A4,103-148	Indiana	Knox	Dugger Formation	Danville Coal Member	2.4	7.5	1.79	0.93	0.17	0.072	0.049	0.181	0.49	0.054	0.53	0.078
ERP00239	E-200448	11006A4, 1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	2.3	6.8	1.81	0.91	0.04	0.066	0.047	0.181	0.31	0.053	0.49	0.083
ERP00239	E-200449	11006AQ, MTRaw	Indiana	Knox	Dugger Formation	Danville Coal Member	1.8	33.6	8.36	3.88	0.82	0.486	0.194	0.948	1.83	0.222	0.53	0.057
ERP00239	E-200450	11006AQ, MT1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	2.0	10.0	2.71	1.34	0.07	0.097	0.082	0.299	0.39	0.078	0.56	0.103
ERP00239	E-200451	11027A1,0-22	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.1	3.0	0.51	0.43	0.23	0.006	0.020	0.015	0.21	0.012	0.84	0.030
ERP00239	E-200452	11027A1,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.2	1.9	0.38	0.35	0.03	0.003	0.017	0.008	0.12	0.009	0.79	0.029
ERP00239	E-200453	11027A2,22-42	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.3	3.0	0.36	0.31	0.50	0.006	0.021	0.009	0.20	0.008	0.79	0.022
ERP00239	E-200454	11027A2,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.3	1.3	0.27	0.24	0.01	0.003	0.016	0.008	0.10	0.008	0.76	0.036
ERP00239	E-200455	11027A3,44-68	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.2	6.9	1.39	1.09	0.37	0.037	0.038	0.172	0.29	0.050	1.06	0.054
ERP00239	E-200456	11027A3,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	2.2	5.0	1.14	0.90	0.03	0.028	0.037	0.145	0.22	0.039	0.97	0.021
ERP00239	E-200457	11106A1,0-24	Indiana	Spencer	Brazil Formation	unnamed coal	1.8	9.7	1.51	0.61	0.09	0.013	0.032	0.056	3.04	0.041	4.07	0.051
ERP00239	E-200458	11106A1,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	1.7	7.4	1.45	0.58	0.03	0.008	0.031	0.041	1.93	0.043	2.74	0.031
ERP00239	E-200459	11106A2,24-47	Indiana	Spencer	Brazil Formation	unnamed coal	1.8	3.9	0.51	0.38	0.11	0.004	0.023	0.005	1.16	0.008	1.96	0.028
ERP00239	E-200460	11106A2,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	1.8	3.3	0.59	0.35	0.05	0.003	0.027	0.004	0.98	0.010	1.64	0.059
ERP00239	E-200461	11106A3,47-57	Indiana	Spencer	Brazil Formation	unnamed coal	1.7	6.3	1.11	1.07	0.11	0.006	0.031	0.012	0.93	0.018	1.57	0.019

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00238	E-200401	981207A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0013	<0.10	1.1	92	10	2.3	0.03	1.96	9.2	4.5	0.21	14.2	3.5
ERP00238	E-200402	981207A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0229	<0.10	1.8	78	33	3.7	0.05	0.10	16.6	14.1	0.11	20.4	4.3
ERP00238	E-200403	981207B1	Indiana	Greene	Brazil Formation	Upper Block Coal Member	0.0029	<0.13	19.0	112	18	2.6	0.03	0.03	10.5	8.1	0.38	7.3	4.3
ERP00238	E-200404	981207B2	Indiana	Greene	Brazil Formation	Upper Block Coal Member	0.0435	0.39	15.9	103	116	3.7	0.21	0.03	8.6	38.6	1.75	49.9	9.0
ERP00238	E-200405	981207B4	Indiana	Greene	Brazil Formation	Upper Block Coal Member	0.1298	<0.30	35.0	106	82	3.2	0.18	2.68	24.8	31.0	1.03	23.8	8.0
ERP00238	E-200406	10803A1,0-63	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0061	<0.19	12.1	219	13	2.0	0.07	0.03	3.4	5.1	0.25	3.2	2.7
ERP00238	E-200407	10803A1,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0064	<0.16	9.8	214	10	2.1	0.04	0.03	3.4	5.4	0.26	2.8	2.9
ERP00238	E-200408	10803A2,63-94	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0083	<0.15	64.2	195	7	2.9	0.03	0.05	5.3	3.0	0.03	5.8	1.3
ERP00238	E-200409	10803A2,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0070	<0.08	21.2	201	7	3.1	0.04	0.03	4.7	2.9	0.02	4.7	1.4
ERP00238	E-200410	10803A3,94-131	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0335	<0.21	28.4	182	55	3.6	0.07	0.06	11.1	13.7	0.98	10.7	6.0
ERP00238	E-200411	10803A3,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0318	<0.20	25.1	210	51	3.7	0.06	0.07	11.5	15.4	1.13	10.1	6.7
ERP00238	E-200412	10803B1,0-28	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0476	<0.14	67.3	271	43	3.3	0.09	0.16	14.2	10.7	0.17	24.9	5.0
ERP00238	E-200413	10803B1,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0543	<0.09	24.6	291	43	3.4	0.06	0.10	12.9	10.4	0.15	18.7	4.3
ERP00238	E-200414	10803B2,28-53	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0306	<0.09	72.4	306	5	2.8	0.02	0.07	6.3	3.8	0.09	6.0	1.4
ERP00238	E-200415	10803B2,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0330	<0.06	36.4	322	5	2.8	0.02	0.06	5.6	3.9	0.08	4.2	1.4
ERP00238	E-200416	10803B3,53-73	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0119	<0.10	53.3	263	11	3.0	0.03	0.12	5.2	5.6	0.26	7.6	3.3
ERP00238	E-200417	10803B3,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0124	<0.07	31.0	254	10	3.2	0.03	0.08	4.8	5.7	0.29	7.0	3.6
ERP00238	E-200418	10724C1,0-33	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0013	<0.09	6.8	269	16	3.7	0.02	0.78	4.6	5.4	0.56	3.9	4.1
ERP00238	E-200419	10724C1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0004	<0.08	7.5	330	16	4.1	0.02	0.26	4.9	5.2	0.62	3.7	4.5
ERP00238	E-200420	10724C2,33-69	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0010	<0.24	4.3	209	38	3.4	0.06	0.04	5.6	14.4	1.79	5.2	4.9
ERP00238	E-200421	10724C2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	<0.0020	<0.22	4.0	232	46	3.5	0.06	0.05	5.4	15.4	1.92	4.6	5.1
ERP00238	E-200422	10724C3,69-96	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0011	<0.26	4.1	235	54	3.3	0.05	0.04	6.4	16.3	1.90	5.9	5.8
ERP00238	E-200423	10724C3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	<0.0020	<0.26	3.2	204	44	3.2	0.04	0.03	6.1	15.7	1.68	5.7	4.9
ERP00238	E-200424	10724C4,96-117	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0022	<0.17	3.2	248	30	3.3	0.10	0.29	7.1	11.8	1.19	15.6	5.8
ERP00238	E-200425	10724C4,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0022	<0.15	3.1	221	30	3.0	0.06	0.08	6.2	10.3	1.26	15.0	6.5
ERP00238	E-200426	981130A3D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0183	<0.08	6.8	89	16	2.8	0.03	0.01	11.9	5.2	0.08	13.2	2.8
ERP00238	E-200427	10803A1,1.6D	Indiana	Parke	Brazil Formation	Minshall Coal Member	0.0069	<0.16	9.5	214	10	2.2	0.03	0.03	3.5	5.6	0.28	2.9	3.1
ERP00238	E-200428	10803B3,1.6D	Indiana	Parke	Brazil Formation	Upper Block Coal Member	0.0137	<0.07	32.9	261	9	3.1	0.03	0.07	4.9	5.5	0.29	6.9	3.7
ERP00239	E-200429	10724B1,0-34	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0014	<0.11	4.9	231	24	4.6	0.03	0.05	6.5	7.6	0.66	4.8	2.9
ERP00239	E-200430	10724B1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0012	<0.09	3.6	254	23	4.8	0.03	0.06	6.7	7.5	0.73	4.4	3.0
ERP00239	E-200431	10724B2,34-70	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0028	<0.26	21.2	201	56	3.9	0.05	0.29	11.6	17.9	1.84	6.1	4.2
ERP00239	E-200432	10724B2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0021	<0.24	5.3	196	56	4.1	0.05	0.50	9.5	18.2	1.68	6.8	4.0
ERP00239	E-200433	10724B3,70-93	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0027	<0.18	5.4	198	39	3.9	0.04	0.18	12.5	12.6	1.25	10.8	5.4
ERP00239	E-200434	10724B3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0025	<0.17	3.9	194	34	4.1	0.04	0.08	13.4	12.7	1.20	10.6	5.4
ERP00239	E-200435	107241,0-34	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0045	<0.26	84.0	203	39	2.7	0.03	2.02	15.5	9.8	0.60	12.8	4.0
ERP00239	E-200436	107241,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0028	<0.15	58.7	225	15	2.6	0.02	0.26	10.7	5.6	0.26	6.1	3.5
ERP00239	E-200437	107242,34-63	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0023	<0.15	28.9	176	18	2.6	0.07	0.14	6.4	8.6	0.50	11.4	3.0
ERP00239	E-200438	107242,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0017	<0.13	23.6	173	16	2.7	0.04	0.10	6.3	8.7	0.40	10.7	2.7
ERP00239	E-200439	107243,65-97	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0073	<0.34	18.8	158	65	2.3	0.07	4.64	13.6	18.5	1.50	20.7	4.0
ERP00239	E-200440	107243,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0056	<0.29	16.3	166	61	2.4	0.06	0.26	13.7	16.4	1.23	19.3	3.4
ERP00239	E-200441	11006A1,0-15	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0100	<0.42	11.1	125	101	3.7	0.09	1.34	15.3	36.8	2.05	11.1	6.6
ERP00239	E-200442	11006A1,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0022	0.27	11.6	132	44	3.3	0.05	0.40	12.8	29.8	1.21	7.7	3.9
ERP00239	E-200443	11006A2,15-43	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0043	<0.25	1.7	127	59	3.2	0.06	2.41	7.9	20.0	1.62	7.9	4.0
ERP00239	E-200444	11006A2,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0036	<0.24	1.1	138	61	3.6	0.07	0.07	8.4	20.1	2.28	7.3	5.4
ERP00239	E-200445	11006A3,43-103	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0014	<0.14	<0.1	137	30	2.5	0.05	2.94	7.3	7.9	0.85	10.7	2.8
ERP00239	E-200446	11006A3,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0017	<0.12	<0.1	144	28	2.4	0.05	1.91	7.2	7.7	0.83	9.9	2.7
ERP00239	E-200447	11006A4,103-148	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0046	<0.15	<0.1	155	34	2.9	0.04	0.04	5.4	10.4	0.97	4.6	2.7
ERP00239	E-200448	11006A4, 1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0036	<0.14	<0.1	140	33	2.8	0.03	0.03	5.2	10.5	0.88	4.7	2.4
ERP00239	E-200449	11006AQ, MTRaw	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0205	<0.68	0.4	151	161	3.6	0.14	0.12	10.8	39.3	4.10	13.9	9.0
ERP00239	E-200450	11006AQ, MT1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0039	<0.20	1.6	119	49	3.5	0.05	0.10	7.3	14.9	1.65	7.4	4.1
ERP00239	E-200451	11027A1,0-22	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0056	<0.06	6.9	127	10	3.2	0.03	0.10	7.1	4.2	0.06	6.9	1.4
ERP00239	E-200452	11027A1,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0044	<0.04	4.2	134	8	3.0	0.03	0.06	6.1	4.0	0.02	5.5	1.2
ERP00239	E-200453	11027A2,22-42	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0011	<0.06	6.6	148	3	3.5	0.03	0.02	5.7	3.7	0.03	7.6	1.6
ERP00239	E-200454	11027A2,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0007	<0.03	3.6	137	3	3.0	0.02	0.02	4.7	2.8	0.02	6.0	1.3
ERP00239	E-200455	11027A3,44-68	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0187	<0.14	5.9	163	59	3.1	0.18	0.08	5.0	9.3	0.59	23.5	4.0
ERP00239	E-200456	11027A3,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	0.0155	<0.10	5.6	116	49	3.5	0.14	0.08	5.2	9.1	0.55	26.1	4.1
ERP00239	E-200457	11106A1,0-24	Indiana	Spencer	Brazil Formation	unnamed coal	0.0038	<0.20	146.0	73	14	2.2	0.06	0.07	5.5	7.0	0.23	15.1	2.0
ERP00239	E-200458	11106A1,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	0.0029	<0.15	88.1	63	12	2.2	0.05	0.03	4.2	6.2	0.16	10.1	2.1
ERP00239	E-200459	11106A2,24-47	Indiana	Spencer	Brazil Formation	unnamed coal	0.0015	<0.08	8.7	82	3	2.3	0.03	0.09	4.5	2.8	0.01	5.9	1.6
ERP00239	E-200460	11106A2,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	0.0012	<0.07	7.3	83	3	2.6	0.04	0.06	5.0	3.1	0.01	5.5	1.9
ERP00239	E-200461	11106A3,47-57	Indiana	Spencer	Brazil Formation	unnamed coal	0.0091	<0.13	5.6	81	15	4.5	0.10	0.27	10.7	13.7	0.09	31.1	3.0

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00238	E-200401	981207A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	16.7	0.29	3.6	8.1	0.2	0.4	52.5	19.0	2.5	1.8	1.6	4.1	0.4
ERP00238	E-200402	981207A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	12.0	0.04	7.5	7.2	0.2	1.0	76.8	28.2	1.7	1.5	6.1	4.9	0.6
ERP00238	E-200403	981207B1	Indiana	Greene	Brazil Formation	Upper Block Coal Member	9.4	0.12	5.8	10.8	0.9	1.0	39.2	40.3	4.4	1.5	2.0	5.5	0.5
ERP00238	E-200404	981207B2	Indiana	Greene	Brazil Formation	Upper Block Coal Member	4.7	0.11	74.3	12.6	1.6	4.7	29.6	43.9	15.8	0.9	10.0	10.3	2.5
ERP00238	E-200405	981207B4	Indiana	Greene	Brazil Formation	Upper Block Coal Member	10.9	0.42	30.4	35.4	2.3	1.6	82.0	45.0	12.0	2.5	10.6	30.4	1.1
ERP00238	E-200406	10803A1,0-63	Indiana	Parke	Brazil Formation	Minshall Coal Member	7.8	0.13	5.3	24.5	1.0	0.6	6.1	26.6	3.0	0.2	1.3	3.6	0.6
ERP00238	E-200407	10803A1,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	8.5	0.11	4.5	21.3	0.9	0.7	5.5	24.2	2.9	0.1	1.4	3.4	0.4
ERP00238	E-200408	10803A2,63-94	Indiana	Parke	Brazil Formation	Minshall Coal Member	7.0	0.18	3.9	12.2	0.9	0.3	8.5	44.1	0.5	0.1	0.5	2.4	0.3
ERP00238	E-200409	10803A2,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	9.9	0.11	2.6	10.9	0.6	0.3	8.0	22.6	0.3	0.1	0.7	2.5	0.3
ERP00238	E-200410	10803A3,94-131	Indiana	Parke	Brazil Formation	Minshall Coal Member	20.6	0.09	18.4	15.3	0.9	1.6	28.8	15.0	11.6	1.2	4.3	2.8	1.0
ERP00238	E-200411	10803A3,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	27.0	0.09	20.1	15.1	1.0	1.8	31.0	13.5	13.1	1.3	4.6	2.6	0.9
ERP00238	E-200412	10803B1,0-28	Indiana	Parke	Brazil Formation	Upper Block Coal Member	13.0	0.32	8.6	19.0	1.5	0.5	30.4	54.9	2.4	0.7	5.1	6.1	0.4
ERP00238	E-200413	10803B1,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	11.6	0.16	7.3	9.9	1.2	0.4	29.0	21.5	1.9	0.6	5.1	3.7	0.2
ERP00238	E-200414	10803B2,28-53	Indiana	Parke	Brazil Formation	Upper Block Coal Member	13.1	0.27	3.0	12.7	0.7	0.2	9.6	45.9	1.3	0.1	1.0	2.8	0.3
ERP00238	E-200415	10803B2,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	14.9	0.18	2.2	7.2	0.7	0.2	8.7	33.1	1.2	0.1	1.0	2.2	0.1
ERP00238	E-200416	10803B3,53-73	Indiana	Parke	Brazil Formation	Upper Block Coal Member	41.9	0.72	3.2	7.6	1.1	0.3	14.1	35.6	3.6	0.7	3.4	3.3	0.3
ERP00238	E-200417	10803B3,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	36.8	0.11	2.7	6.3	1.1	0.4	13.4	30.5	3.9	0.8	3.3	2.1	0.3
ERP00238	E-200418	10724C1,0-33	Indiana	Sullivan	Dugger Formation	Danville Coal Member	17.8	0.08	3.1	17.5	0.3	0.6	11.3	15.2	6.3	5.2	1.8	1.3	0.4
ERP00238	E-200419	10724C1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	22.3	0.07	1.9	7.7	0.4	0.7	11.0	10.4	7.0	5.9	1.9	1.1	0.4
ERP00238	E-200420	10724C2,33-69	Indiana	Sullivan	Dugger Formation	Danville Coal Member	9.3	0.05	8.5	19.7	0.5	2.1	17.3	15.9	25.1	2.0	2.6	0.5	1.3
ERP00238	E-200421	10724C2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	9.2	0.04	7.5	15.9	0.5	2.3	16.4	22.7	27.0	2.0	2.6	0.5	1.1
ERP00238	E-200422	10724C3,69-96	Indiana	Sullivan	Dugger Formation	Danville Coal Member	10.0	0.05	10.0	21.6	0.6	2.2	30.6	30.6	30.2	2.6	3.5	0.7	1.1
ERP00238	E-200423	10724C3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	8.7	0.38	9.8	21.1	0.5	1.9	28.7	18.4	26.1	2.1	3.4	0.7	1.0
ERP00238	E-200424	10724C4,96-117	Indiana	Sullivan	Dugger Formation	Danville Coal Member	22.0	0.12	6.9	13.8	1.0	1.5	45.5	5.6	17.4	4.6	4.6	0.4	1.0
ERP00238	E-200425	10724C4,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	26.1	0.04	5.1	12.3	1.0	1.7	41.7	6.5	18.2	5.2	4.2	0.4	0.9
ERP00238	E-200426	981130A3D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	3.8	0.09	3.9	2.2	0.3	0.5	40.3	15.1	1.1	0.9	2.2	4.6	0.3
ERP00238	E-200427	10803A1,1.6D	Indiana	Parke	Brazil Formation	Minshall Coal Member	11.9	0.11	4.8	21.6	0.9	0.8	5.9	23.6	3.1	0.1	1.4	3.4	0.4
ERP00238	E-200428	10803B3,1.6D	Indiana	Parke	Brazil Formation	Upper Block Coal Member	30.2	0.12	2.9	6.4	1.1	0.4	13.2	31.6	3.9	0.7	3.2	2.2	0.3
ERP00239	E-200429	10724B1,0-34	Indiana	Sullivan	Dugger Formation	Danville Coal Member	17.0	0.06	3.7	16.6	0.4	0.8	13.2	9.5	8.4	1.5	2.1	0.8	0.5
ERP00239	E-200430	10724B1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	18.6	0.06	2.9	9.9	0.3	0.8	12.5	9.8	9.1	1.4	2.0	0.8	0.5
ERP00239	E-200431	10724B2,34-70	Indiana	Sullivan	Dugger Formation	Danville Coal Member	7.2	0.04	12.0	27.1	0.9	2.1	20.4	12.0	26.9	0.7	3.5	1.2	1.3
ERP00239	E-200432	10724B2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	7.3	0.05	11.3	20.5	0.6	2.0	21.6	13.9	24.5	0.7	3.4	0.9	1.3
ERP00239	E-200433	10724B3,70-93	Indiana	Sullivan	Dugger Formation	Danville Coal Member	17.4	0.05	8.2	14.0	1.4	1.3	62.1	16.5	18.7	3.0	5.1	0.8	0.9
ERP00239	E-200434	10724B3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	17.1	0.04	6.6	11.8	1.3	1.3	67.2	13.2	17.7	3.1	5.2	1.0	0.8
ERP00239	E-200435	107241,0-34	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	17.8	0.49	6.6	35.1	3.5	1.5	75.5	85.3	9.8	3.3	3.4	6.1	0.7
ERP00239	E-200436	107241,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	23.7	0.30	3.4	19.6	2.2	1.0	50.1	62.1	3.4	3.3	2.6	3.9	0.3
ERP00239	E-200437	107242,34-63	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	18.8	0.15	4.0	18.9	2.5	0.7	32.5	38.3	7.1	3.1	1.8	2.7	0.6
ERP00239	E-200438	107242,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	19.4	0.17	3.3	10.0	2.3	0.6	32.5	32.4	5.7	2.8	1.7	2.3	0.4
ERP00239	E-200439	107243,65-97	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	24.0	0.08	8.2	63.5	2.4	2.1	59.5	12.9	25.2	3.9	4.8	2.9	1.1
ERP00239	E-200440	107243,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	27.3	0.09	7.2	31.7	2.3	1.8	64.1	11.3	20.9	4.0	4.5	2.4	1.0
ERP00239	E-200441	11006A1,0-15	Indiana	Knox	Dugger Formation	Danville Coal Member	41.0	0.04	10.2	58.7	1.7	7.0	67.7	26.8	34.9	5.1	7.3	1.4	2.2
ERP00239	E-200442	11006A1,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	34.0	0.04	4.1	17.1	1.7	5.8	60.9	21.5	17.3	4.7	4.9	1.2	1.5
ERP00239	E-200443	11006A2,15-43	Indiana	Knox	Dugger Formation	Danville Coal Member	19.3	0.03	9.4	21.0	4.1	3.0	36.8	14.8	23.4	3.0	4.1	1.3	1.2
ERP00239	E-200444	11006A2,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	28.8	<0.02	9.9	15.5	3.0	3.7	39.6	15.8	31.9	3.8	4.4	1.9	1.5
ERP00239	E-200445	11006A3,43-103	Indiana	Knox	Dugger Formation	Danville Coal Member	15.0	0.03	6.9	26.9	3.2	1.0	36.4	10.6	11.9	4.3	4.3	0.7	0.6
ERP00239	E-200446	11006A3,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	17.5	0.02	6.3	9.0	3.8	1.1	35.6	4.5	11.6	4.3	3.8	0.7	0.5
ERP00239	E-200447	11006A4,103-148	Indiana	Knox	Dugger Formation	Danville Coal Member	14.1	<0.02	5.5	87.0	2.1	1.1	16.1	10.4	14.7	1.0	2.2	0.5	0.9
ERP00239	E-200448	11006A4, 1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	11.8	0.04	5.0	39.4	1.6	1.0	15.6	3.9	13.5	0.8	2.0	0.4	1.6
ERP00239	E-200449	11006AQ, MTRaw	Indiana	Knox	Dugger Formation	Danville Coal Member	17.2	0.03	29.6	255.0	2.4	4.1	32.0	29.2	66.9	2.0	7.9	1.2	2.5
ERP00239	E-200450	11006AQ, MT1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	23.4	0.02	8.7	19.2	2.2	2.1	29.6	10.0	24.3	2.4	3.4	0.7	1.0
ERP00239	E-200451	11027A1,0-22	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	8.2	0.06	2.8	12.2	1.4	0.2	7.7	13.1	0.9	0.3	1.0	2.4	0.2
ERP00239	E-200452	11027A1,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	8.2	0.04	1.8	2.6	1.0	0.2	6.9	9.4	0.4	0.2	0.7	1.6	0.2
ERP00239	E-200453	11027A2,22-42	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	13.7	0.04	2.3	24.5	1.6	0.2	13.2	9.9	0.6	0.6	0.8	1.2	0.2
ERP00239	E-200454	11027A2,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	16.6	0.02	1.1	1.1	1.1	0.2	11.4	7.0	0.4	0.5	0.6	1.9	0.1
ERP00239	E-200455	11027A3,44-68	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	18.7	0.05	6.3	27.9	2.0	1.0	13.1	14.1	11.0	1.8	2.5	2.4	0.9
ERP00239	E-200456	11027A3,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	22.1	0.05	4.4	3.2	1.6	1.0	13.8	15.7	9.9	1.9	2.4	2.5	0.7
ERP00239	E-200457	11106A1,0-24	Indiana	Spencer	Brazil Formation	unnamed coal	14.1	0.21	6.6	8.2	0.8	0.7	31.1	53.0	3.5	1.2	1.9	5.5	0.4
ERP00239	E-200458	11106A1,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	16.9	0.11	5.3	5.3	0.7	0.9	21.5	46.3	2.6	1.2	1.8	5.2	0.5
ERP00239	E-200459	11106A2,24-47	Indiana	Spencer	Brazil Formation	unnamed coal	20.8	0.08	2.9	14.9	0.5	0.2	23.5	16.4	0.1	0.6	1.0	4.4	0.1
ERP00239	E-200460	11106A2,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	26.2	0.07	2.9	6.7	0.5	0.2	25.8	16.4	0.2	0.7	1.1	3.5	0.1
ERP00239	E-200461	11106A3,47-57	Indiana	Spencer	Brazil Formation	unnamed coal	16.8	0.05	10.7	9.0	0.4	0.5	49.4	42.5	0.8	1.4	4.3	6.3	0.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00238	E-200401	981207A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	8	0.02	<0.4	1.77	0.2	7.2	2.9	595.0	6.1
ERP00238	E-200402	981207A4	Indiana	Greene	Brazil Formation	Lower Block Coal Member	170	0.04	4.4	0.45	0.7	27.3	4.8	37.5	15.0
ERP00238	E-200403	981207B1	Indiana	Greene	Brazil Formation	Upper Block Coal Member	12	0.02	1.1	0.66	0.4	12.9	2.6	6.4	15.1
ERP00238	E-200404	981207B2	Indiana	Greene	Brazil Formation	Upper Block Coal Member	151	0.08	4.8	0.60	2.5	125.0	9.7	15.3	45.3
ERP00238	E-200405	981207B4	Indiana	Greene	Brazil Formation	Upper Block Coal Member	168	0.11	3.4	2.91	1.3	114.0	21.8	1020.0	21.9
ERP00238	E-200406	10803A1,0-63	Indiana	Parke	Brazil Formation	Minshall Coal Member	30	0.07	<0.7	0.72	0.5	8.3	3.4	8.3	8.7
ERP00238	E-200407	10803A1,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	27	0.03	<0.6	0.74	0.5	9.3	3.1	6.6	7.7
ERP00238	E-200408	10803A2,63-94	Indiana	Parke	Brazil Formation	Minshall Coal Member	14	0.03	<0.6	2.61	0.2	4.1	2.9	10.3	5.2
ERP00238	E-200409	10803A2,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	12	0.03	<0.3	0.49	0.2	4.1	3.0	6.3	5.9
ERP00238	E-200410	10803A3,94-131	Indiana	Parke	Brazil Formation	Minshall Coal Member	231	0.06	2.5	0.81	0.8	23.1	4.9	10.7	15.1
ERP00238	E-200411	10803A3,1.6	Indiana	Parke	Brazil Formation	Minshall Coal Member	237	0.05	2.6	0.55	0.9	25.3	5.0	12.9	14.5
ERP00238	E-200412	10803B1,0-28	Indiana	Parke	Brazil Formation	Upper Block Coal Member	265	0.08	3.7	2.40	1.6	26.7	10.0	42.6	7.0
ERP00238	E-200413	10803B1,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	297	0.07	4.0	0.58	1.4	24.4	10.8	27.5	6.3
ERP00238	E-200414	10803B2,28-53	Indiana	Parke	Brazil Formation	Upper Block Coal Member	17	0.02	<0.4	3.55	0.3	4.2	8.9	12.8	3.6
ERP00238	E-200415	10803B2,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	16	0.01	0.4	0.68	0.3	4.1	9.4	11.3	2.7
ERP00238	E-200416	10803B3,53-73	Indiana	Parke	Brazil Formation	Upper Block Coal Member	21	0.02	0.7	2.53	0.5	8.0	6.1	64.3	3.9
ERP00238	E-200417	10803B3,1.6	Indiana	Parke	Brazil Formation	Upper Block Coal Member	25	0.02	0.9	0.39	0.5	8.1	6.6	27.4	2.1
ERP00238	E-200418	10724C1,0-33	Indiana	Sullivan	Dugger Formation	Danville Coal Member	12	0.01	0.6	0.33	0.4	7.3	3.7	179.0	4.9
ERP00238	E-200419	10724C1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	9	0.01	0.5	0.21	0.4	7.0	3.7	68.4	5.7
ERP00238	E-200420	10724C2,33-69	Indiana	Sullivan	Dugger Formation	Danville Coal Member	15	0.02	1.7	0.44	1.0	20.2	4.6	14.5	11.6
ERP00238	E-200421	10724C2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	15	0.02	1.7	0.29	1.1	20.3	4.4	17.0	19.9
ERP00238	E-200422	10724C3,69-96	Indiana	Sullivan	Dugger Formation	Danville Coal Member	16	0.02	2.0	0.70	1.1	22.8	4.6	14.6	26.3
ERP00238	E-200423	10724C3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	15	0.02	2.2	0.27	0.9	21.8	4.3	14.7	19.2
ERP00238	E-200424	10724C4,96-117	Indiana	Sullivan	Dugger Formation	Danville Coal Member	12	0.11	0.9	0.65	0.8	23.8	3.7	122.0	16.0
ERP00238	E-200425	10724C4,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	11	0.04	1.2	0.38	0.9	20.5	3.3	29.0	19.8
ERP00238	E-200426	981130A3D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	133	0.02	1.7	0.20	0.2	8.1	3.0	2.9	6.4
ERP00238	E-200427	10803A1,1.6D	Indiana	Parke	Brazil Formation	Minshall Coal Member	30	0.02	<0.6	0.70	0.5	9.9	3.2	6.7	8.6
ERP00238	E-200428	10803B3,1.6D	Indiana	Parke	Brazil Formation	Upper Block Coal Member	26	0.02	0.8	0.40	0.5	8.0	6.6	24.2	2.4
ERP00239	E-200429	10724B1,0-34	Indiana	Sullivan	Dugger Formation	Danville Coal Member	14	0.02	1.0	0.34	0.3	9.8	4.4	15.8	11.0
ERP00239	E-200430	10724B1,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	11	0.01	0.9	0.25	0.3	9.4	4.5	22.1	9.7
ERP00239	E-200431	10724B2,34-70	Indiana	Sullivan	Dugger Formation	Danville Coal Member	18	0.02	2.6	0.50	0.7	22.4	5.2	49.3	27.6
ERP00239	E-200432	10724B2,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	17	0.02	2.3	0.30	0.7	23.2	5.1	258.0	26.6
ERP00239	E-200433	10724B3,70-93	Indiana	Sullivan	Dugger Formation	Danville Coal Member	14	0.02	1.9	0.77	0.7	18.4	4.5	129.0	23.6
ERP00239	E-200434	10724B3,1.5	Indiana	Sullivan	Dugger Formation	Danville Coal Member	16	0.02	1.7	0.55	0.7	19.2	4.6	132.0	21.5
ERP00239	E-200435	107241,0-34	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	17	0.03	<1.1	3.72	2.4	21.3	5.7	239.0	24.7
ERP00239	E-200436	107241,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	9	0.03	<0.6	1.91	1.7	13.2	4.4	31.4	10.7
ERP00239	E-200437	107242,34-63	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	10	0.06	<0.6	1.34	0.6	12.8	3.7	19.6	9.7
ERP00239	E-200438	107242,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	9	0.02	<0.5	1.09	0.5	11.6	3.6	18.0	8.8
ERP00239	E-200439	107243,65-97	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	27	0.04	1.8	0.64	0.9	28.1	3.8	363.0	41.7
ERP00239	E-200440	107243,1.5	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	19	0.04	<1.2	0.60	0.8	27.6	3.5	28.7	42.3
ERP00239	E-200441	11006A1,0-15	Indiana	Knox	Dugger Formation	Danville Coal Member	31	0.05	2.4	0.42	1.5	88.2	7.6	143.0	103.0
ERP00239	E-200442	11006A1,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	16	0.02	0.9	0.33	1.1	74.2	5.1	71.1	66.3
ERP00239	E-200443	11006A2,15-43	Indiana	Knox	Dugger Formation	Danville Coal Member	29	0.03	1.8	0.23	0.7	30.6	3.9	272.0	47.2
ERP00239	E-200444	11006A2,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	33	0.04	2.7	0.26	1.0	31.4	4.3	14.5	40.9
ERP00239	E-200445	11006A3,43-103	Indiana	Knox	Dugger Formation	Danville Coal Member	16	0.04	1.9	0.16	1.9	18.3	3.2	155.0	24.0
ERP00239	E-200446	11006A3,1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	13	0.04	1.8	0.11	1.7	15.5	2.7	97.5	19.6
ERP00239	E-200447	11006A4,103-148	Indiana	Knox	Dugger Formation	Danville Coal Member	30	0.02	1.8	0.12	0.5	13.2	3.2	10.4	18.1
ERP00239	E-200448	11006A4, 1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	26	0.02	1.5	0.09	0.5	13.0	2.8	9.3	15.9
ERP00239	E-200449	11006AQ, MTRaw	Indiana	Knox	Dugger Formation	Danville Coal Member	93	0.04	4.6	0.44	1.6	51.7	9.4	40.0	69.6
ERP00239	E-200450	11006AQ, MT1.6	Indiana	Knox	Dugger Formation	Danville Coal Member	28	0.03	2.0	0.20	0.9	24.4	3.9	18.9	34.4
ERP00239	E-200451	11027A1,0-22	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	46	0.02	0.9	0.32	0.2	6.9	4.0	18.2	4.8
ERP00239	E-200452	11027A1,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	36	0.02	0.8	0.18	0.2	5.8	3.0	11.5	2.9
ERP00239	E-200453	11027A2,22-42	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	6	0.02	0.5	0.28	0.3	5.9	3.6	7.0	3.1
ERP00239	E-200454	11027A2,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	4	0.02	0.3	0.12	0.2	4.8	2.5	5.3	2.6
ERP00239	E-200455	11027A3,44-68	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	141	0.15	3.1	0.33	1.4	28.6	6.2	24.6	13.7
ERP00239	E-200456	11027A3,1.6	Indiana	Spencer	Mansfield Formation	Mariah Hill Coal Member	148	0.11	2.9	0.28	1.4	30.4	5.7	23.0	11.2
ERP00239	E-200457	11106A1,0-24	Indiana	Spencer	Brazil Formation	unnamed coal	10	0.03	<0.8	0.72	0.5	13.3	3.7	18.1	14.6
ERP00239	E-200458	11106A1,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	10	0.03	0.7	0.45	0.5	11.4	3.6	6.0	12.4
ERP00239	E-200459	11106A2,24-47	Indiana	Spencer	Brazil Formation	unnamed coal	5	0.02	<0.3	0.21	0.2	8.0	3.2	20.9	4.7
ERP00239	E-200460	11106A2,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	6	0.02	<0.3	0.19	0.2	9.3	3.7	15.1	4.0
ERP00239	E-200461	11106A3,47-57	Indiana	Spencer	Brazil Formation	unnamed coal	73	0.04	5.0	0.14	1.1	49.3	6.2	101.0	6.4

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00239	E-200462	11106A3,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	1.6	5.6	1.08	1.03	0.03	0.006	0.033	0.013	0.55	0.021	1.23	0.025
ERP00239	E-200463	11106A4,57-77	Indiana	Spencer	Brazil Formation	unnamed coal	1.8	10.1	2.12	1.76	0.08	0.031	0.048	0.101	1.24	0.050	1.67	0.023
ERP00239	E-200464	11106A4,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	1.6	9.9	2.20	1.78	0.07	0.033	0.049	0.123	1.15	0.052	1.57	0.025
ERP00239	E-200465	11106A1,1.6D	Indiana	Spencer	Brazil Formation	unnamed coal	1.2	7.5	1.51	0.62	0.03	0.009	0.031	0.044	1.78	0.045	2.99	0.023
ERP00239	E-200466	10724B2,34-70D	Indiana	Sullivan	Dugger Formation	Danville Coal Member	2.0	13.0	3.07	1.58	0.20	0.102	0.028	0.335	0.91	0.094	1.47	0.034
ERP00239	E-200467	107242,1.5D	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	2.1	6.7	1.12	0.59	0.05	0.022	0.020	0.089	2.13	0.032	3.09	0.059
ERP00255	E-201895	10807A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	8.1	4.4	0.99	0.57	0.03	0.019	0.013	0.074	0.17	0.037	0.67	0.037
ERP00255	E-201896	10807A1,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.9	4.1	1.03	0.56	0.02	0.019	0.013	0.084	0.14	0.041	0.62	0.052
ERP00255	E-201897	10807A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	5.5	3.9	0.98	0.60	0.03	0.009	0.012	0.032	0.17	0.035	0.69	0.031
ERP00255	E-201898	10807A2,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	2.8	3.4	0.85	0.54	0.02	0.009	0.010	0.022	0.11	0.032	0.60	0.070
ERP00255	E-201899	10807A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	3.8	5.2	0.95	0.78	0.03	0.010	0.014	0.025	0.59	0.053	1.41	0.046
ERP00255	E-201900	10807A3,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	4.0	4.6	0.95	0.77	0.02	0.009	0.013	0.025	0.30	0.050	0.83	0.064
ERP00255	E-201901	10807B1	Indiana	Greene	Mansfield Formation	unnamed coal	7.3	5.0	0.73	0.44	0.03	0.016	0.027	0.071	1.16	0.026	2.28	0.021
ERP00255	E-201902	10807B1,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	6.6	4.0	0.58	0.37	0.02	0.012	0.027	0.057	1.08	0.024	2.08	0.048
ERP00255	E-201903	10807B2	Indiana	Greene	Mansfield Formation	unnamed coal	5.6	8.8	2.23	1.36	0.02	0.020	0.036	0.095	0.34	0.079	0.87	0.015
ERP00255	E-201904	10807B2,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	5.0	9.2	2.48	1.51	0.02	0.022	0.037	0.091	0.19	0.088	0.64	0.041
ERP00255	E-201905	10807B3	Indiana	Greene	Mansfield Formation	unnamed coal	7.6	5.0	1.02	0.76	0.03	0.017	0.027	0.054	0.51	0.033	1.12	0.031
ERP00255	E-201906	10807B3,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	6.3	4.3	0.96	0.76	0.02	0.014	0.030	0.058	0.18	0.034	0.82	0.036
ERP00255	E-201907	10807B4	Indiana	Greene	Mansfield Formation	unnamed coal	8.1	9.7	1.24	0.98	0.02	0.016	0.033	0.066	1.10	0.035	1.97	0.035
ERP00255	E-201908	10807B4,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	6.8	5.9	1.27	0.99	0.01	0.015	0.032	0.069	0.47	0.039	1.06	0.042
ERP00255	E-201909	CulleyMillB3	Indiana	Spencer		prepared coal	2.6	16.5	2.75	1.37	0.83	0.092	0.070	0.342	2.89	0.069	5.35	0.026
ERP00255	E-201910	CulleyMillC3	Indiana	Spencer		prepared coal	2.6	14.2	2.31	1.17	0.80	0.081	0.062	0.248	2.61	0.063	5.07	0.023
ERP00255	E-201911	CulleyMillE3	Indiana	Spencer		prepared coal	2.7	13.3	2.16	1.05	0.69	0.071	0.050	0.221	2.39	0.057	5.07	0.024
ERP00255	E-201912	CulleyMillB2	Indiana	Spencer		prepared coal	2.5	14.3	2.15	1.10	0.78	0.072	0.057	0.237	2.28	0.057	5.10	0.041
ERP00255	E-201913	CulleyMillA2	Indiana	Spencer		prepared coal	2.3	15.4	2.38	1.21	0.81	0.083	0.059	0.268	2.87	0.064	4.96	0.038
ERP00255	E-201914	GEboiler1	Indiana	Knox		prepared coal	3.3	9.9	2.40	1.14	0.10	0.078	0.074	0.248	0.40	0.078	0.53	0.100
ERP00255	E-201915	GEboiler2	Indiana	Knox		prepared coal	3.3	10.4	2.66	1.23	0.10	0.088	0.100	0.294	0.36	0.087	0.50	0.103
ERP00255	E-201916	AQProduct	Indiana	Knox		prepared coal	7.3	9.8	2.49	1.20	0.09	0.083	0.088	0.261	0.39	0.077	0.51	0.112
ERP00255	E-201917	11113A1	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	3.5	13.2	1.84	0.89	0.74	0.057	0.041	0.197	2.81	0.051	5.90	0.098
ERP00255	E-201918	11113A1,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.5	9.1	1.72	0.82	0.22	0.050	0.039	0.174	1.52	0.048	4.30	0.036
ERP00255	E-201919	11113A2	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	5.0	13.0	2.78	1.38	0.81	0.067	0.056	0.237	0.65	0.078	2.85	0.029
ERP00255	E-201920	11113A2,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.5	9.9	2.21	1.08	0.32	0.049	0.047	0.188	0.67	0.065	3.07	0.028
ERP00255	E-201921	11113A4	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	4.2	11.6	1.10	0.73	0.51	0.025	0.038	0.093	4.14	0.038	6.89	0.052
ERP00255	E-201922	11113A4,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.6	6.0	1.09	0.73	0.17	0.019	0.039	0.094	0.79	0.036	3.46	0.032
ERP00255	E-201923	11113A5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	3.7	15.5	1.69	0.98	0.14	0.049	0.046	0.206	5.40	0.051	8.03	0.045
ERP00255	E-201924	11113A5,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.7	7.5	1.52	0.94	0.04	0.042	0.046	0.181	0.97	0.050	3.77	0.039
ERP00255	E-201925	11113A6	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	6.2	14.3	3.14	1.50	0.15	0.095	0.067	0.344	1.58	0.094	4.28	0.039
ERP00255	E-201926	11113A6,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.6	11.7	2.64	1.28	0.04	0.078	0.060	0.291	1.32	0.084	4.03	0.049
ERP00255	E-201927	10807A2D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	5.4	3.9	0.94	0.59	0.03	0.009	0.012	0.025	0.17	0.035	0.65	0.034
ERP00255	E-201928	11113A4D	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	5.0	11.5	1.17	0.75	0.44	0.024	0.035	0.096	3.75	0.039	6.28	0.034
ERP00256	E-201929	GEboiler2-2	Indiana	Knox	N	fly ash	0.7	77.3	21.50	9.65	1.27	0.699	0.539	2.120	4.76	0.602	0.19	0.021
ERP00256	E-201930	GEboiler2-4	Indiana	Knox	N	fly ash	0.7	69.5	19.10	8.35	1.99	0.587	0.490	1.730	4.47	0.500	0.19	0.022
ERP00256	E-201931	GEboiler2-6	Indiana	Knox	N	fly ash	0.7	76.5	20.10	8.79	1.64	0.646	0.545	1.840	4.82	0.550	0.23	0.022
ERP00256	E-201932	GEboiler2-8	Indiana	Knox	N	fly ash	0.7	81.5	24.00	10.80	0.76	0.737	0.665	2.370	3.14	0.733	0.19	0.021
ERP00256	E-201933	GEboiler1-1	Indiana	Knox	N	fly ash	0.9	73.3	21.80	10.00	0.89	0.663	0.598	2.190	3.08	0.615	0.34	<0.015
ERP00256	E-201934	GEboiler1-3	Indiana	Knox	N	fly ash	0.9	74.1	20.40	9.41	0.90	0.626	0.550	2.090	2.90	0.577	0.35	0.028
ERP00256	E-201935	GEboiler1-5	Indiana	Knox	N	fly ash	1.0	64.4	16.40	7.67	2.76	0.544	0.373	1.550	4.32	0.386	0.30	0.053
ERP00256	E-201936	GEboiler1-7	Indiana	Knox	N	fly ash	0.9	72.5	19.60	8.98	1.35	0.612	0.538	2.050	3.60	0.522	0.32	0.027
ERP00256	E-201937	Geunit1-rph	Indiana	Knox	N	hopper ash	0.3	98.1	26.60	11.70	1.12	0.769	0.728	2.520	8.03	0.823	0.30	0.029
ERP00256	E-201938	CulleyUnit3E	Indiana	Spencer	N	fly ash	0.5	95.7	18.70	8.91	5.81	0.577	0.390	1.910	18.50	0.447	0.80	<0.015
ERP00256	E-201939	CulleyUnit3W	Indiana	Spencer	N	fly ash	0.4	95.9	18.20	8.63	6.44	0.573	0.349	1.910	20.60	0.431	0.66	0.017
ERP00256	E-201940	CulleyUnit2E	Indiana	Spencer	N	fly ash	0.4	96.1	20.00	9.97	5.91	0.695	0.421	2.230	19.40	0.507	0.70	<0.015
ERP00256	E-201941	Culley2+3FGD	Indiana	Spencer	N	gypsum	0.7	77.3	0.61	0.11	25.30	0.028	0.006	0.045	0.24	0.009	20.70	0.019
ERP00256	E-201942	GEboiler2-4D	Indiana	Knox	N	fly ash	0.7	76.8	19.60	8.33	2.47	0.648	0.507	1.720	6.07	0.460	0.20	0.023
ERP00277	E-203777	10803C1,0-30	Indiana	Clay	Brazil Formation	Lower Block Coal Member	8.1	2.5	0.39	0.27	0.01	0.006	0.004	0.015	0.46	0.013	0.90	0.023
ERP00277	E-203778	10803C1,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	3.8	1.7	0.41	0.28	0.01	0.006	0.003	0.016	0.04	0.018	0.52	0.107
ERP00277	E-203779	10803C2,30-52	Indiana	Clay	Brazil Formation	Lower Block Coal Member	5.9	3.1	0.58	0.37	0.02	0.007	0.005	0.031	0.61	0.020	1.35	0.063
ERP00277	E-203780	10803C2,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	3.1	2.8	0.70	0.44	0.01	0.008	0.004	0.037	0.14	0.025	0.59	0.092
ERP00277	E-203781	10803C3,52-86	Indiana	Clay	Brazil Formation	Lower Block Coal Member	5.4	7.1	1.89	0.98	0.02	0.022	0.010	0.100	0.48	0.072	0.96	0.045
ERP00277	E-203782	10803C3,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	2.8	6.2	1.59	0.89	0.02	0.016	0.009	0.087	0.19	0.067	0.62	0.086
ERP00277	E-203783	10803C4,86-110	Indiana	Clay	Brazil Formation	Lower Block Coal Member	4.6	11.0	0.92	0.69	0.02	0.011	0.006	0.022	4.26	0.042	6.79	0.079

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00239	E-200462	11106A3,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	0.0090	<0.12	4.2	90	16	4.9	0.09	0.05	10.9	15.0	0.09	29.5	3.2
ERP00239	E-200463	11106A4,57-77	Indiana	Spencer	Brazil Formation	unnamed coal	0.0176	<0.21	6.3	112	42	3.9	0.11	0.11	16.7	36.3	0.63	36.9	4.7
ERP00239	E-200464	11106A4,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	0.0134	<0.20	5.0	108	40	3.7	0.10	0.10	15.3	31.2	0.65	36.3	4.3
ERP00239	E-200465	11106A1,1.6D	Indiana	Spencer	Brazil Formation	unnamed coal	0.0026	<0.15	81.0	74	12	2.3	0.05	0.03	4.2	5.6	0.14	10.9	1.9
ERP00239	E-200466	10724B2,34-70D	Indiana	Sullivan	Dugger Formation	Danville Coal Member	0.0028	<0.26	30.0	187	55	3.5	0.04	0.21	11.3	14.7	1.52	5.9	3.4
ERP00239	E-200467	107242,1.5D	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	0.0021	<0.14	26.3	210	20	2.6	0.02	0.11	6.1	8.3	0.45	11.1	2.8
ERP00255	E-201895	10807A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0019	<0.09	1.8	102	23	2.8	0.02	0.09	11.9	7.7	0.59	12.6	3.8
ERP00255	E-201896	10807A1,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0018	<0.08	2.0	119	22	2.9	0.03	0.40	12.4	7.1	0.59	10.7	4.0
ERP00255	E-201897	10807A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0022	<0.08	2.0	88	12	3.4	0.04	0.02	15.1	6.6	0.16	22.5	3.8
ERP00255	E-201898	10807A2,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0022	<0.07	1.4	107	10	2.8	0.02	0.01	11.8	5.4	0.14	19.5	3.0
ERP00255	E-201899	10807A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0295	0.11	6.8	96	44	4.1	0.05	0.01	21.0	20.2	0.10	23.7	4.8
ERP00255	E-201900	10807A3,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0282	0.12	5.1	91	43	3.7	0.04	0.01	15.7	12.9	0.10	17.7	4.2
ERP00255	E-201901	10807B1	Indiana	Greene	Mansfield Formation	unnamed coal	0.0024	0.15	17.7	153	17	2.4	0.02	0.09	12.2	6.7	0.30	8.6	4.7
ERP00255	E-201902	10807B1,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	0.0016	0.15	14.5	162	13	2.4	0.02	0.06	12.5	6.1	0.26	5.6	4.9
ERP00255	E-201903	10807B2	Indiana	Greene	Mansfield Formation	unnamed coal	0.0046	0.18	5.3	82	27	2.9	0.07	0.01	6.7	14.9	0.47	15.8	3.0
ERP00255	E-201904	10807B2,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	0.0052	<0.19	2.3	86	29	3.0	0.09	0.01	6.3	16.7	0.47	13.8	3.1
ERP00255	E-201905	10807B3	Indiana	Greene	Mansfield Formation	unnamed coal	0.0041	<0.10	6.6	79	19	2.8	0.03	1.13	11.7	8.8	0.35	15.8	3.7
ERP00255	E-201906	10807B3,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	0.0038	<0.09	3.8	96	19	3.2	0.07	0.52	8.8	9.2	0.35	13.0	3.8
ERP00255	E-201907	10807B4	Indiana	Greene	Mansfield Formation	unnamed coal	0.0097	<0.20	36.9	133	32	3.6	0.07	0.28	22.8	18.9	0.45	41.7	5.2
ERP00255	E-201908	10807B4,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	0.0111	<0.12	14.8	107	34	3.6	0.03	0.15	15.7	17.2	0.45	32.5	5.2
ERP00255	E-201909	CulleyMillB3	Indiana	Spencer		prepared coal	0.0108	<0.33	12.0	142	54	1.3	0.06	0.88	5.0	26.7	1.25	16.3	3.3
ERP00255	E-201910	CulleyMillC3	Indiana	Spencer		prepared coal	0.0118	<0.29	11.1	143	46	1.3	0.05	1.09	4.6	19.6	1.04	14.6	2.9
ERP00255	E-201911	CulleyMillE3	Indiana	Spencer		prepared coal	0.0104	<0.27	10.1	138	41	1.3	0.05	1.28	4.3	17.6	0.93	13.0	2.8
ERP00255	E-201912	CulleyMillB2	Indiana	Spencer		prepared coal	0.0100	<0.29	8.1	133	45	1.2	0.05	1.03	4.3	20.2	1.04	16.3	2.8
ERP00255	E-201913	CulleyMillA2	Indiana	Spencer		prepared coal	0.0108	<0.31	8.7	133	50	1.3	0.05	0.77	4.7	22.0	1.11	15.7	2.9
ERP00255	E-201914	GEboiler1	Indiana	Knox		prepared coal	0.0043	<0.20	2.2	117	47	2.6	0.08	0.60	8.2	17.1	1.35	24.9	4.3
ERP00255	E-201915	GEboiler2	Indiana	Knox		prepared coal	0.0055	<0.21	2.0	113	51	2.4	0.04	0.43	9.8	18.9	1.30	14.4	4.3
ERP00255	E-201916	AQProduct	Indiana	Knox		prepared coal	0.0056	<0.20	1.6	112	49	2.7	0.05	0.58	8.2	14.5	1.39	11.2	4.2
ERP00255	E-201917	11113A1	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0035	<0.27	9.2	160	38	1.2	0.03	0.16	3.3	8.8	0.92	5.2	2.1
ERP00255	E-201918	11113A1,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0028	<0.19	6.4	165	31	1.2	0.04	0.10	2.9	9.0	1.16	5.9	2.6
ERP00255	E-201919	11113A2	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0028	<0.26	1.9	135	45	1.1	0.07	0.11	3.3	14.8	1.72	12.3	3.2
ERP00255	E-201920	11113A2,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0017	<0.20	2.2	139	33	1.1	0.09	0.09	3.2	13.5	1.28	12.6	2.9
ERP00255	E-201921	11113A4	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0041	<0.24	15.1	123	20	0.9	0.14	0.13	3.2	9.4	0.51	14.5	1.9
ERP00255	E-201922	11113A4,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0013	<0.12	2.4	130	16	1.1	0.05	0.13	2.4	10.1	0.48	12.8	2.1
ERP00255	E-201923	11113A5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0054	<0.31	16.6	155	35	0.9	0.08	1.16	5.9	13.6	0.84	18.8	2.4
ERP00255	E-201924	11113A5,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0023	<0.16	3.1	165	30	1.0	0.06	0.53	4.9	14.2	0.70	15.9	2.3
ERP00255	E-201925	11113A6	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0050	<0.29	5.5	146	56	1.7	0.07	0.26	5.8	19.4	1.44	13.7	3.8
ERP00255	E-201926	11113A6,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0026	<0.24	4.6	139	47	1.7	0.06	0.20	5.2	16.1	1.19	12.8	3.4
ERP00255	E-201927	10807A2D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	0.0024	<0.08	2.0	86	11	3.5	0.04	0.02	15.6	6.8	0.18	22.5	4.3
ERP00255	E-201928	11113A4D	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.0030	<0.23	13.6	122	19	0.9	0.06	0.14	3.1	9.3	0.50	13.3	1.7
ERP00256	E-201929	GEboiler2-2	Indiana	Knox	N	fly ash	0.0405	<1.60	16.5	603	394	16.0	0.77	3.48	46.4	111.0	9.35	70.0	23.6
ERP00256	E-201930	GEboiler2-4	Indiana	Knox	N	fly ash	0.0425	<1.40	10.7	549	342	12.2	0.38	3.20	36.9	95.9	8.34	62.4	18.6
ERP00256	E-201931	GEboiler2-6	Indiana	Knox	N	fly ash	0.0401	<1.60	13.3	565	353	14.7	0.39	5.58	45.1	106.0	9.33	76.5	23.7
ERP00256	E-201932	GEboiler2-8	Indiana	Knox	N	fly ash	0.0427	<1.70	17.6	663	443	19.6	0.67	4.16	58.3	118.0	11.50	77.3	31.5
ERP00256	E-201933	GEboiler1-1	Indiana	Knox	N	fly ash	0.0384	<1.50	12.8	507	396	18.0	0.43	3.81	50.4	114.0	9.97	67.4	26.0
ERP00256	E-201934	GEboiler1-3	Indiana	Knox	N	fly ash	0.0420	<1.50	13.9	567	387	18.6	0.45	3.11	52.0	118.0	10.20	64.6	27.9
ERP00256	E-201935	GEboiler1-5	Indiana	Knox	N	fly ash	0.0450	<1.30	6.0	407	294	9.0	0.14	6.70	28.3	72.8	6.63	51.7	14.4
ERP00256	E-201936	GEboiler1-7	Indiana	Knox	N	fly ash	0.0380	<1.50	12.1	464	363	16.2	0.35	4.06	46.3	107.0	9.64	68.9	25.2
ERP00256	E-201937	Geunit1-rph	Indiana	Knox	N	hopper ash	0.0557	<2.00	60.4	535	467	20.5	0.49	5.00	68.3	154.0	11.90	88.8	31.4
ERP00256	E-201938	CulleyUnit3E	Indiana	Spencer	N	fly ash	0.0752	<2.00	79.2	1110	341	8.8	0.35	6.79	28.7	135.0	8.04	80.4	18.3
ERP00256	E-201939	CulleyUnit3W	Indiana	Spencer	N	fly ash	0.0711	<2.00	50.5	1020	339	7.9	0.18	4.60	26.5	134.0	7.00	82.0	14.1
ERP00256	E-201940	CulleyUnit2E	Indiana	Spencer	N	fly ash	0.0713	<2.00	63.7	1250	391	8.8	0.39	5.96	26.6	146.0	8.94	96.1	19.7
ERP00256	E-201941	Culley2+3FGD	Indiana	Spencer	N	gypsum	0.0068	<1.60	<0.16	<16	17	<0.8	<0.08	0.08	<1.6	2.3	<0.08	4.5	0.2
ERP00256	E-201942	GEboiler2-4D	Indiana	Knox	N	fly ash	0.0503	<1.60	12.7	524	333	11.5	0.16	6.99	36.3	91.4	8.52	90.6	18.3
ERP00277	E-203777	10803C1,0-30	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0011	0.09	21.6	89	5	3.3	0.03	0.15	7.8	5.5	0.06	4.7	3.6
ERP00277	E-203778	10803C1,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0008	0.04	1.4	118	5	3.0	0.02	0.01	5.3	5.4	0.04	0.7	3.1
ERP00277	E-203779	10803C2,30-52	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0029	0.06	6.6	117	10	3.2	0.02	0.09	10.9	4.7	0.14	5.4	3.6
ERP00277	E-203780	10803C2,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0029	<0.06	2.7	132	11	3.1	0.01	0.03	9.0	4.7	0.14	1.6	3.4
ERP00277	E-203781	10803C3,52-86	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0080	<0.15	5.7	78	27	3.4	0.04	0.05	11.3	10.6	0.65	14.4	3.8
ERP00277	E-203782	10803C3,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0092	<0.13	3.8	90	25	3.3	0.05	0.04	10.0	10.3	0.55	12.5	3.4
ERP00277	E-203783	10803C4,86-110	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0355	<0.22	7.9	91	42	3.6	0.04	0.04	15.5	14.2	0.10	17.4	4.3

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00239	E-200462	11106A3,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	19.3	0.04	10.2	3.4	0.3	0.5	51.6	20.3	0.8	1.6	4.3	3.9	0.5
ERP00239	E-200463	11106A4,57-77	Indiana	Spencer	Brazil Formation	unnamed coal	31.3	0.06	20.2	9.9	0.5	1.3	74.1	23.5	7.5	3.5	8.7	5.1	1.0
ERP00239	E-200464	11106A4,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	25.7	0.06	21.4	7.5	0.6	1.2	68.4	19.9	7.7	3.2	8.6	4.2	0.9
ERP00239	E-200465	11106A1,1.6D	Indiana	Spencer	Brazil Formation	unnamed coal	14.9	0.13	5.5	5.6	0.6	0.7	21.5	42.5	2.2	1.1	1.8	5.2	0.4
ERP00239	E-200466	10724B2,34-70D	Indiana	Sullivan	Dugger Formation	Danville Coal Member	5.0	0.05	11.1	29.9	0.9	1.6	19.0	14.3	21.6	0.7	3.4	1.4	1.0
ERP00239	E-200467	107242,1.5D	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	20.7	0.19	3.6	11.4	2.4	0.7	32.1	37.1	6.1	3.0	1.7	2.5	0.3
ERP00255	E-201895	10807A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	10.3	0.03	2.9	5.6	0.2	0.9	81.7	18.9	6.4	1.8	1.7	2.5	0.5
ERP00255	E-201896	10807A1,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	11.8	0.35	2.6	3.3	0.2	0.9	83.4	12.9	6.6	2.0	2.2	2.2	0.5
ERP00255	E-201897	10807A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	11.5	<0.02	5.7	2.4	0.2	0.7	74.9	28.0	1.7	1.5	2.2	2.6	0.3
ERP00255	E-201898	10807A2,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	9.2	<0.02	4.9	1.4	0.1	0.6	60.2	16.9	1.5	1.2	1.7	5.1	0.3
ERP00255	E-201899	10807A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	11.8	0.13	7.3	3.3	0.2	1.3	93.1	43.9	1.5	2.0	7.5	6.2	1.0
ERP00255	E-201900	10807A3,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	9.6	0.07	7.0	2.6	0.2	1.3	76.1	25.4	1.5	1.8	6.9	3.8	0.9
ERP00255	E-201901	10807B1	Indiana	Greene	Mansfield Formation	unnamed coal	31.3	0.12	3.5	9.6	1.2	0.6	66.9	28.8	3.8	1.6	3.8	10.1	0.3
ERP00255	E-201902	10807B1,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	39.9	0.08	2.6	6.7	1.0	0.6	69.2	10.7	2.9	1.7	2.8	4.6	0.2
ERP00255	E-201903	10807B2	Indiana	Greene	Mansfield Formation	unnamed coal	5.4	0.02	17.9	2.8	0.6	1.3	23.2	13.8	4.5	0.4	3.1	4.0	0.6
ERP00255	E-201904	10807B2,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	5.1	<0.02	19.6	2.5	0.5	1.3	22.0	7.4	4.6	0.3	2.9	3.4	0.7
ERP00255	E-201905	10807B3	Indiana	Greene	Mansfield Formation	unnamed coal	10.6	0.49	6.3	3.4	0.9	0.7	21.1	24.0	3.6	0.5	2.1	6.0	0.5
ERP00255	E-201906	10807B3,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	10.9	0.13	6.8	2.6	0.7	0.7	21.0	8.4	3.8	0.5	3.4	2.9	0.6
ERP00255	E-201907	10807B4	Indiana	Greene	Mansfield Formation	unnamed coal	15.4	0.23	10.4	3.2	0.8	1.0	48.0	53.8	4.6	0.8	7.4	15.9	0.7
ERP00255	E-201908	10807B4,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	13.6	0.20	10.0	2.4	0.6	1.0	44.4	18.0	4.6	0.7	6.6	9.9	0.7
ERP00255	E-201909	CulleyMillB3	Indiana	Spencer		prepared coal	3.0	0.06	13.1	71.6	7.1	1.3	19.8	4.4	19.1	0.9	4.2	3.8	1.0
ERP00255	E-201910	CulleyMillC3	Indiana	Spencer		prepared coal	3.3	0.06	11.2	72.0	7.4	1.2	15.6	4.5	15.9	0.9	3.8	4.6	0.7
ERP00255	E-201911	CulleyMillE3	Indiana	Spencer		prepared coal	3.7	0.07	9.5	58.0	6.4	1.2	14.9	4.7	14.4	1.0	3.4	3.9	0.6
ERP00255	E-201912	CulleyMillB2	Indiana	Spencer		prepared coal	2.8	0.06	9.3	70.6	6.6	1.2	22.5	3.9	15.9	1.1	3.4	6.1	0.6
ERP00255	E-201913	CulleyMillA2	Indiana	Spencer		prepared coal	2.7	0.08	10.9	70.2	6.0	1.3	15.2	3.9	16.8	1.1	3.7	4.2	0.7
ERP00255	E-201914	GEboiler1	Indiana	Knox		prepared coal	20.6	<0.02	8.7	40.3	3.9	2.0	51.4	10.2	18.5	4.2	3.9	0.6	1.3
ERP00255	E-201915	GEboiler2	Indiana	Knox		prepared coal	18.7	<0.02	9.2	37.4	3.9	3.4	48.2	7.3	18.2	4.8	4.1	0.6	1.4
ERP00255	E-201916	AQProduct	Indiana	Knox		prepared coal	19.9	<0.02	8.9	42.0	4.3	1.9	33.7	6.8	19.0	4.1	4.6	0.7	1.0
ERP00255	E-201917	11113A1	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	3.6	0.13	6.2	79.5	5.3	1.0	8.5	2.4	13.2	3.0	2.4	4.7	0.4
ERP00255	E-201918	11113A1,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	3.4	0.07	4.7	32.9	5.4	1.2	7.7	3.0	16.1	3.2	2.2	4.5	0.7
ERP00255	E-201919	11113A2	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	1.0	0.03	8.5	71.8	2.4	1.7	7.7	3.8	16.1	1.5	4.0	2.4	0.7
ERP00255	E-201920	11113A2,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.5	0.06	6.1	36.1	2.5	1.5	7.6	3.5	12.3	1.7	3.2	2.5	0.5
ERP00255	E-201921	11113A4	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.2	0.17	7.3	48.6	3.7	0.8	7.8	3.5	6.1	1.6	3.3	3.9	0.9
ERP00255	E-201922	11113A4,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.2	0.09	5.2	23.4	2.7	1.0	7.8	3.3	5.6	1.3	3.6	2.5	0.5
ERP00255	E-201923	11113A5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.4	0.24	7.5	30.5	7.3	1.0	20.6	5.2	12.7	3.6	3.4	5.2	0.9
ERP00255	E-201924	11113A5,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.4	0.03	5.1	11.9	5.6	1.2	20.6	3.2	10.6	0.6	2.7	2.6	0.6
ERP00255	E-201925	11113A6	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	2.7	0.04	9.0	25.0	6.8	2.0	19.6	3.8	23.5	0.5	4.7	2.4	0.9
ERP00255	E-201926	11113A6,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	1.4	0.03	7.0	16.0	6.4	2.1	19.4	3.4	19.5	0.4	2.8	2.4	0.9
ERP00255	E-201927	10807A2D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	10.3	<0.02	5.5	2.2	0.2	0.8	75.1	22.8	1.8	1.6	2.1	2.7	0.4
ERP00255	E-201928	11113A4D	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	0.2	0.18	7.6	46.7	3.4	0.6	7.0	3.4	5.8	1.4	3.2	3.4	0.4
ERP00256	E-201929	GEboiler2-2	Indiana	Knox	N	fly ash	155.0	0.21	70.3	485.0	29.8	12.4	204.0	48.8	136.0	32.0	25.1	39.6	7.7
ERP00256	E-201930	GEboiler2-4	Indiana	Knox	N	fly ash	106.0	0.21	65.4	655.0	25.9	10.5	160.0	37.6	121.0	25.7	21.3	23.4	6.3
ERP00256	E-201931	GEboiler2-6	Indiana	Knox	N	fly ash	144.0	0.21	67.9	728.0	32.5	12.5	194.0	49.5	136.0	31.8	24.5	12.6	7.0
ERP00256	E-201932	GEboiler2-8	Indiana	Knox	N	fly ash	224.0	0.25	76.4	293.0	37.7	21.2	266.0	69.1	164.0	47.6	28.9	10.3	16.0
ERP00256	E-201933	GEboiler1-1	Indiana	Knox	N	fly ash	183.0	0.09	67.1	292.0	31.4	13.3	228.0	54.4	141.0	35.1	25.5	6.8	7.6
ERP00256	E-201934	GEboiler1-3	Indiana	Knox	N	fly ash	199.0	0.20	69.3	284.0	32.2	13.8	236.0	58.6	147.0	37.9	26.3	7.2	7.8
ERP00256	E-201935	GEboiler1-5	Indiana	Knox	N	fly ash	71.5	0.24	61.2	818.0	18.5	7.6	115.0	23.8	98.5	17.3	17.8	6.9	4.1
ERP00256	E-201936	GEboiler1-7	Indiana	Knox	N	fly ash	158.0	0.21	67.5	454.0	28.7	12.2	204.0	53.9	141.0	32.9	24.2	6.0	6.7
ERP00256	E-201937	Geunit1-rph	Indiana	Knox	N	hopper ash	210.0	<0.02	92.6	457.0	38.4	17.4	290.0	100.0	173.0	41.6	33.8	3.0	8.3
ERP00256	E-201938	CulleyUnit3E	Indiana	Spencer	N	fly ash	26.0	0.03	74.6	507.0	51.4	9.1	99.5	32.0	125.0	7.9	17.4	5.3	5.5
ERP00256	E-201939	CulleyUnit3W	Indiana	Spencer	N	fly ash	18.6	0.03	75.8	501.0	39.9	8.1	97.8	24.3	112.0	6.0	16.4	5.1	3.9
ERP00256	E-201940	CulleyUnit2E	Indiana	Spencer	N	fly ash	18.3	0.03	71.8	444.0	48.1	9.5	87.5	30.2	135.0	10.2	18.1	7.4	5.6
ERP00256	E-201941	Culley2+3FGD	Indiana	Spencer	N	gypsum	0.2	0.05	42.5	7.7	1.2	0.1	<3.1	<0.4	1.2	0.1	<3.1	0.8	<2.4
ERP00256	E-201942	GEboiler2-4D	Indiana	Knox	N	fly ash	99.8	0.19	67.2	952.0	25.7	9.3	149.0	38.5	124.0	24.3	22.0	8.2	5.1
ERP00277	E-203777	10803C1,0-30	Indiana	Clay	Brazil Formation	Lower Block Coal Member	41.7	0.39	2.4	1.7	3.9	0.4	91.9	24.7	0.9	2.6	3.1	3.3	0.3
ERP00277	E-203778	10803C1,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	17.5	<0.02	1.9	1.1	2.6	0.3	75.7	1.3	0.7	1.8	2.8	1.0	0.2
ERP00277	E-203779	10803C2,30-52	Indiana	Clay	Brazil Formation	Lower Block Coal Member	14.3	0.08	2.5	1.9	5.2	0.5	59.4	15.9	1.8	1.8	1.6	2.1	0.3
ERP00277	E-203780	10803C2,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	14.4	<0.02	2.7	1.8	4.2	0.5	54.5	3.5	1.8	1.5	1.6	1.3	0.3
ERP00277	E-203781	10803C3,52-86	Indiana	Clay	Brazil Formation	Lower Block Coal Member	7.7	0.05	7.2	3.7	3.5	1.2	49.5	20.3	7.5	1.1	3.3	3.9	0.7
ERP00277	E-203782	10803C3,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	7.6	0.03	6.9	2.2	3.0	1.1	45.3	7.4	6.2	0.9	3.3	2.6	0.7
ERP00277	E-203783	10803C4,86-110	Indiana	Clay	Brazil Formation	Lower Block Coal Member	7.3	0.31	7.3	4.1	8.1	0.6	62.5	23.1	1.3	1.2	6.6	3.3	0.6

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00239	E-200462	11106A3,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	64	0.04	4.8	0.11	1.2	54.3	5.9	13.3	6.9
ERP00239	E-200463	11106A4,57-77	Indiana	Spencer	Brazil Formation	unnamed coal	96	0.07	5.9	0.46	1.7	87.0	6.3	40.4	26.7
ERP00239	E-200464	11106A4,1.6	Indiana	Spencer	Brazil Formation	unnamed coal	86	0.07	5.9	0.34	1.6	87.7	6.1	33.7	29.7
ERP00239	E-200465	11106A1,1.6D	Indiana	Spencer	Brazil Formation	unnamed coal	9	0.03	<0.6	0.41	0.5	11.3	3.6	5.9	14.7
ERP00239	E-200466	10724B2,34-70D	Indiana	Sullivan	Dugger Formation	Danville Coal Member	18	0.02	2.4	0.52	0.6	19.9	5.0	39.1	29.0
ERP00239	E-200467	107242,1.5D	Indiana	Sullivan	Dugger Formation	Hymera Coal Member	9	0.02	<0.5	1.18	0.5	11.2	3.5	16.5	13.6
ERP00255	E-201895	10807A1	Indiana	Greene	Brazil Formation	Lower Block Coal Member	13	0.02	0.8	0.27	0.3	10.0	2.6	34.5	11.1
ERP00255	E-201896	10807A1,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	13	0.02	0.9	0.19	0.3	10.0	3.1	149.0	12.2
ERP00255	E-201897	10807A2	Indiana	Greene	Brazil Formation	Lower Block Coal Member	12	0.03	1.1	0.25	0.3	11.7	3.3	6.6	10.7
ERP00255	E-201898	10807A2,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	10	0.02	0.9	0.09	0.3	9.8	2.4	5.4	8.8
ERP00255	E-201899	10807A3	Indiana	Greene	Brazil Formation	Lower Block Coal Member	259	0.05	6.7	0.61	0.7	56.2	4.4	11.8	26.1
ERP00255	E-201900	10807A3,1.6	Indiana	Greene	Brazil Formation	Lower Block Coal Member	238	0.04	6.2	0.19	0.6	45.5	4.2	9.1	20.1
ERP00255	E-201901	10807B1	Indiana	Greene	Mansfield Formation	unnamed coal	13	0.01	0.5	0.81	0.3	11.7	4.2	32.7	9.2
ERP00255	E-201902	10807B1,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	9	0.01	0.3	0.47	0.3	10.0	3.5	27.3	8.0
ERP00255	E-201903	10807B2	Indiana	Greene	Mansfield Formation	unnamed coal	17	0.04	3.0	0.25	0.5	22.5	5.5	3.7	22.1
ERP00255	E-201904	10807B2,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	14	0.03	2.9	0.21	0.5	24.1	5.4	4.2	24.5
ERP00255	E-201905	10807B3	Indiana	Greene	Mansfield Formation	unnamed coal	15	0.03	1.6	0.41	0.4	15.2	3.5	490.0	10.6
ERP00255	E-201906	10807B3,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	19	0.06	2.1	0.15	0.4	17.8	4.8	279.0	9.9
ERP00255	E-201907	10807B4	Indiana	Greene	Mansfield Formation	unnamed coal	76	0.05	2.9	1.30	1.4	45.2	4.7	147.0	13.8
ERP00255	E-201908	10807B4,1.6	Indiana	Greene	Mansfield Formation	unnamed coal	72	0.04	3.1	0.34	1.3	46.6	4.0	84.4	13.9
ERP00255	E-201909	CulleyMillB3	Indiana	Spencer		prepared coal	40	0.05	2.8	1.88	2.8	46.2	7.4	59.6	20.6
ERP00255	E-201910	CulleyMillC3	Indiana	Spencer		prepared coal	40	0.04	2.4	1.66	2.9	48.6	6.9	47.9	18.2
ERP00255	E-201911	CulleyMillE3	Indiana	Spencer		prepared coal	37	0.04	1.9	1.64	2.5	41.5	6.2	49.5	18.1
ERP00255	E-201912	CulleyMillB2	Indiana	Spencer		prepared coal	36	0.04	2.0	1.70	3.0	43.6	6.0	49.8	17.7
ERP00255	E-201913	CulleyMillA2	Indiana	Spencer		prepared coal	39	0.04	2.1	1.86	2.9	41.4	6.4	51.7	18.9
ERP00255	E-201914	GEboiler1	Indiana	Knox		prepared coal	41	0.02	2.1	0.24	1.0	28.2	3.7	55.3	32.9
ERP00255	E-201915	GEboiler2	Indiana	Knox		prepared coal	44	0.19	2.2	0.17	1.0	36.6	4.5	46.3	36.2
ERP00255	E-201916	AQProduct	Indiana	Knox		prepared coal	46	0.03	2.1	0.20	1.0	29.2	3.9	64.7	32.5
ERP00255	E-201917	11113A1	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	23	0.08	1.1	2.77	0.6	12.9	4.6	14.0	18.7
ERP00255	E-201918	11113A1,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	16	0.08	1.3	2.25	0.7	12.8	3.6	8.1	15.7
ERP00255	E-201919	11113A2	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	31	0.04	3.3	0.53	1.0	25.4	6.3	12.3	22.5
ERP00255	E-201920	11113A2,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	19	0.06	2.3	0.69	0.9	23.3	4.9	9.0	18.6
ERP00255	E-201921	11113A4	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	17	0.12	1.4	2.68	1.4	19.3	7.2	14.4	11.9
ERP00255	E-201922	11113A4,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	14	0.07	2.3	0.37	1.5	21.5	6.7	10.8	11.1
ERP00255	E-201923	11113A5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	18	0.19	<1.3	5.47	2.0	28.2	6.7	166.0	19.5
ERP00255	E-201924	11113A5,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	15	0.06	2.1	0.59	1.9	29.8	6.0	103.0	16.4
ERP00255	E-201925	11113A6	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	26	0.05	2.8	0.97	1.7	28.7	7.1	60.1	28.9
ERP00255	E-201926	11113A6,1.5	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	18	0.05	1.7	0.81	1.7	26.6	4.9	55.5	27.5
ERP00255	E-201927	10807A2D	Indiana	Greene	Brazil Formation	Lower Block Coal Member	12	0.03	1.1	0.26	0.4	11.9	3.1	6.4	9.6
ERP00255	E-201928	11113A4D	Indiana	Warrick	Petersburg Formation	Springfield Coal Member	17	0.05	1.3	2.89	1.2	18.3	6.7	15.4	13.0
ERP00256	E-201929	GEboiler2-2	Indiana	Knox	N	fly ash	275	0.31	12.7	1.31	8.4	189.0	32.0	401.0	253.0
ERP00256	E-201930	GEboiler2-4	Indiana	Knox	N	fly ash	260	0.21	11.0	0.77	7.4	159.0	28.5	371.0	194.0
ERP00256	E-201931	GEboiler2-6	Indiana	Knox	N	fly ash	285	0.21	13.6	1.00	8.6	184.0	32.7	549.0	220.0
ERP00256	E-201932	GEboiler2-8	Indiana	Knox	N	fly ash	311	5.30	15.1	1.63	10.8	238.0	38.4	388.0	286.0
ERP00256	E-201933	GEboiler1-1	Indiana	Knox	N	fly ash	285	0.26	12.0	1.17	8.7	204.0	32.5	372.0	251.0
ERP00256	E-201934	GEboiler1-3	Indiana	Knox	N	fly ash	287	0.25	12.1	1.33	9.0	205.0	32.6	330.0	264.0
ERP00256	E-201935	GEboiler1-5	Indiana	Knox	N	fly ash	253	0.14	8.6	0.46	5.1	119.0	23.2	889.0	169.0
ERP00256	E-201936	GEboiler1-7	Indiana	Knox	N	fly ash	283	0.20	14.6	1.09	8.3	189.0	31.8	484.0	221.0
ERP00256	E-201937	Geunit1-rph	Indiana	Knox	N	hopper ash	384	0.35	18.8	3.53	12.2	269.0	46.2	466.0	310.0
ERP00256	E-201938	CulleyUnit3E	Indiana	Spencer	N	fly ash	207	0.35	12.5	12.20	21.6	297.0	43.1	304.0	155.0
ERP00256	E-201939	CulleyUnit3W	Indiana	Spencer	N	fly ash	205	0.28	13.8	8.82	20.8	283.0	42.9	222.0	139.0
ERP00256	E-201940	CulleyUnit2E	Indiana	Spencer	N	fly ash	200	0.34	16.9	11.40	23.4	275.0	42.9	337.0	160.0
ERP00256	E-201941	Culley2+3FGD	Indiana	Spencer	N	gypsum	382	<0.08	5.9	<0.08	0.4	1.7	6.8	30.3	31.0
ERP00256	E-201942	GEboiler2-4D	Indiana	Knox	N	fly ash	273	0.13	10.3	0.58	7.1	156.0	30.0	579.0	182.0
ERP00277	E-203777	10803C1,0-30	Indiana	Clay	Brazil Formation	Lower Block Coal Member	6	0.02	0.4	2.35	0.2	7.4	2.8	60.8	3.0
ERP00277	E-203778	10803C1,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	5	0.01	0.5	0.04	0.2	7.0	2.4	4.2	3.7
ERP00277	E-203779	10803C2,30-52	Indiana	Clay	Brazil Formation	Lower Block Coal Member	22	0.01	0.7	0.36	0.2	6.6	2.9	33.4	5.6
ERP00277	E-203780	10803C2,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	22	0.01	0.8	0.08	0.2	6.7	3.1	9.8	6.3
ERP00277	E-203781	10803C3,52-86	Indiana	Clay	Brazil Formation	Lower Block Coal Member	61	0.02	2.2	0.31	0.4	15.7	5.2	17.4	16.7
ERP00277	E-203782	10803C3,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	72	0.02	2.3	0.14	0.4	14.7	5.0	14.1	15.5
ERP00277	E-203783	10803C4,86-110	Indiana	Clay	Brazil Formation	Lower Block Coal Member	314	0.03	4.7	4.81	0.5	24.1	4.0	16.9	16.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00277	E-203784	10803C4,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	2.9	5.7	1.12	0.91	0.03	0.013	0.006	0.028	0.49	0.058	1.01	0.073
ERP00277	E-203785	10724D1,0-26	Indiana	Clay	Mansfield Formation	unnamed coal	6.6	2.7	0.33	0.24	0.02	0.007	0.010	0.012	0.85	0.015	1.95	0.047
ERP00277	E-203786	10724D1,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	2.8	2.3	0.30	0.23	0.03	0.007	0.011	0.013	0.61	0.016	1.45	0.040
ERP00277	E-203787	10724D2,26-48	Indiana	Clay	Mansfield Formation	unnamed coal	7.4	3.6	0.36	0.28	0.02	0.008	0.012	0.016	1.37	0.017	2.40	0.034
ERP00277	E-203788	10724D2,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	3.2	2.7	0.42	0.34	0.02	0.013	0.012	0.022	0.61	0.023	1.45	0.067
ERP00277	E-203789	10724D3,50-62	Indiana	Clay	Mansfield Formation	unnamed coal	6.5	5.6	0.55	0.43	0.02	0.020	0.014	0.045	1.68	0.024	3.18	0.034
ERP00277	E-203790	10724D3,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	2.7	4.1	0.61	0.45	0.03	0.024	0.015	0.058	0.59	0.027	1.52	0.041
ERP00277	E-203791	10803C1,0-30D	Indiana	Clay	Brazil Formation	Lower Block Coal Member	8.3	2.4	0.44	0.31	0.02	0.007	0.003	0.018	0.35	0.016	1.15	0.048
ERP00313	E-209604	205241 0-27	Indiana	Gibson	Dugger Formation	Hymera Coal Member	11.3	13.0	2.80	1.96	0.03	0.078	0.025	0.324	1.18	0.086	3.18	0.062
ERP00313	E-209605	205241 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	5.0	11.6	2.36	1.68	0.02	0.067	0.021	0.270	0.95	0.077	3.02	0.074
ERP00313	E-209606	205242 27-61	Indiana	Gibson	Dugger Formation	Hymera Coal Member	10.4	8.7	1.76	1.20	0.04	0.045	0.018	0.152	0.82	0.063	2.80	0.044
ERP00313	E-209607	205242 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	8.2	8.2	1.64	1.13	0.03	0.040	0.015	0.143	0.61	0.064	2.15	0.053
ERP00313	E-209608	205243 61-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	12.3	9.7	2.24	1.20	0.03	0.059	0.014	0.194	0.92	0.070	2.54	0.024
ERP00313	E-209609	205243 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	6.7	9.2	2.14	1.17	0.03	0.050	0.014	0.183	0.83	0.060	2.54	0.047
ERP00313	E-209610	20524FC 0-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	10.1	13.8	2.93	2.07	0.10	0.083	0.027	0.298	0.97	0.099	2.72	0.036
ERP00313	E-209611	20524FC Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	7.0	11.1	2.37	1.67	0.07	0.067	0.021	0.249	0.98	0.080	2.63	0.055
ERP00313	E-209612	205291 0-33	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	8.3	12.4	2.03	1.16	0.21	0.061	0.046	0.268	2.39	0.082	3.86	0.024
ERP00313	E-209613	205291 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	5.0	9.4	1.89	1.09	0.08	0.062	0.041	0.241	1.36	0.079	4.39	0.033
ERP00313	E-209614	205292 33-74	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	7.4	5.6	0.96	0.68	0.19	0.026	0.030	0.111	0.77	0.037	3.73	0.023
ERP00313	E-209615	205292 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	5.5	5.0	0.95	0.66	0.05	0.026	0.030	0.116	0.63	0.039	3.69	0.028
ERP00313	E-209616	205293 74-103	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	6.4	15.9	2.13	1.09	0.21	0.044	0.041	0.211	4.83	0.062	3.96	0.024
ERP00313	E-209617	205293 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	4.7	6.7	1.19	0.75	0.13	0.025	0.028	0.105	1.14	0.037	3.15	0.035
ERP00313	E-209618	205294 103-143	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	6.9	11.4	2.31	1.09	0.31	0.069	0.058	0.284	1.29	0.064	3.53	0.034
ERP00313	E-209619	205294 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.7	9.8	2.32	1.08	0.12	0.065	0.053	0.284	1.02	0.064	4.35	0.031
ERP00313	E-209620	20524FC FloatD	Indiana	Gibson	Dugger Formation	Hymera Coal Member	7.2	11.5	2.49	1.77	0.07	0.067	0.021	0.258	1.02	0.090	2.28	0.044
ERP00313	E-209621	205294 103-143D	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	6.3	11.4	2.41	1.12	0.35	0.069	0.058	0.293	1.48	0.065	3.43	0.030
ERP00426	E-229090	20031009-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.6	6.6	1.18	0.67	0.16	0.026	0.053	0.109	1.13	0.049	2.61	0.233
ERP00426	E-229091	20031009-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.9	5.6	0.98	0.54	0.12	0.025	0.062	0.096	1.05	0.047	2.18	0.343
ERP00426	E-229092	20031009-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.7	3.2	0.57	0.38	0.08	0.009	0.053	0.040	0.45	0.027	1.31	0.259
ERP00426	E-229093	20031009-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.8	2.9	0.51	0.34	0.04	0.010	0.054	0.036	0.49	0.026	1.33	0.460
ERP00426	E-229094	20031009-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.0	4.6	1.03	0.62	0.03	0.025	0.054	0.114	0.40	0.041	1.11	0.253
ERP00426	E-229095	20031009-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.9	4.7	1.06	0.64	0.03	0.027	0.053	0.126	0.35	0.045	1.06	0.414
ERP00426	E-229096	20031009-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.0	5.9	1.42	0.75	0.04	0.043	0.060	0.152	0.37	0.053	1.08	0.260
ERP00426	E-229097	20031009-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.0	6.3	1.55	0.80	0.03	0.049	0.066	0.165	0.39	0.057	1.08	0.524
ERP00426	E-229098	20030214-1	Indiana	Knox	Dugger Formation	Danville Coal Member	3.7	17.8	4.83	1.83	0.37	0.164	0.176	0.510	0.57	0.127		0.188
ERP00426	E-229099	20030214-2	Indiana	Knox	Dugger Formation	Danville Coal Member	3.1	14.6	3.78	1.74	0.32	0.106	0.099	0.410	0.28	0.110	0.37	0.135
ERP00426	E-229100	20030214-3	Indiana	Knox	Dugger Formation	Danville Coal Member	14.0	12.1	3.33	1.47	0.14	0.114	0.099	0.352	0.31	0.086	0.41	0.184
ERP00426	E-229101	20030214-4	Indiana	Knox	Dugger Formation	Danville Coal Member		9.0	1.93	0.94	0.56	0.071	0.068	0.186	0.43	0.055		
ERP00426	E-229102	20030321-A1	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	2.2	33.3	9.96	4.07	0.11	0.138	0.059	0.567	0.56	0.289	1.03	0.009
ERP00426	E-229103	20030321-A2	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	2.7	10.1	2.93	1.25	0.04	0.033	0.017	0.127	0.46	0.095	1.43	0.008
ERP00426	E-229104	20030321-A3	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	2.7	4.3	0.94	0.67	0.03	0.014	0.009	0.038	0.36	0.041	1.33	0.007
ERP00426	E-229105	20030321-A4	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	3.1	5.5	1.16	0.78	0.03	0.021	0.010	0.085	0.63	0.048	1.71	0.007
ERP00426	E-229106	20030321-B1	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	3.0	2.5	0.57	0.31	0.05	0.013	0.016	0.039	0.10	0.024	0.69	0.011
ERP00426	E-229107	20030321-B2	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	3.5	4.7	1.17	0.58	0.02	0.016	0.021	0.097	0.33	0.043	0.92	0.009
ERP00426	E-229108	20030321-B3	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	3.0	6.7	1.88	0.96	0.03	0.027	0.027	0.135	0.07	0.061	0.55	0.009
ERP00426	E-229109	20030321-B4	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	2.4	10.0	1.36	0.85	0.03	0.016	0.035	0.072	3.10	0.036	3.32	0.010
ERP00426	E-229110	20030321-C1	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	3.2	13.7	2.43	1.18	0.06	0.060	0.026	0.196	3.56	0.060	3.31	0.006
ERP00426	E-229111	20030321-C2	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	2.9	11.4	2.79	1.39	0.04	0.042	0.013	0.168	0.99	0.104	2.03	0.007
ERP00426	E-229113	20030321-C4	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	2.5	26.8	6.66	4.35	0.11	0.066	0.027	0.258	1.39	0.243	2.56	0.005
ERP00426	E-229114	20030321-C5	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	2.9	10.8	2.11	1.15	0.04	0.021	0.010	0.091	2.67	0.067	3.77	0.008
ERP00434	E-230453	20031028D-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.5	8.5	2.10	0.94	0.15	0.056	0.053	0.223	0.79	0.054	2.94	0.045
ERP00434	E-230454	20031028D-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.7	8.6	2.24	0.99	0.08	0.067	0.051	0.250	0.80	0.058	3.19	0.151
ERP00434	E-230455	20031028D-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.6	7.9	2.04	1.03	0.17	0.048	0.051	0.172	0.57	0.056	2.74	0.054
ERP00434	E-230456	20031028D-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.6	6.5	1.63	0.88	0.11	0.039	0.047	0.129	0.49	0.043	2.67	0.062
ERP00434	E-230457	20031028D-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.5	8.7	1.17	0.68	0.71	0.038	0.047	0.122	1.81	0.037	2.86	0.053
ERP00434	E-230458	20031028D-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.1	5.7	1.21	0.72	0.13	0.035	0.045	0.126	0.75	0.040	3.08	0.078
ERP00434	E-230459	20031028D-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.1	8.6	1.98	1.04	0.10	0.072	0.051	0.222	1.10	0.064	2.76	0.059
ERP00434	E-230460	20031028D-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.6	8.2	1.90	1.00	0.08	0.064	0.050	0.219	0.94	0.064	2.81	0.112
ERP00434	E-230461	2698001-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	3.0	4.1	0.98	0.61	0.01	0.017	0.025	0.078	0.37	0.032	1.27	0.088
ERP00434	E-230462	2698002-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.8	4.1	0.98	0.60	0.01	0.017	0.023	0.077	0.34	0.033	1.50	0.153
ERP00434	E-230463	2698004-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	3.5	6.3	1.27	0.89	0.03	0.019	0.025	0.066	0.99	0.039	1.54	0.082

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00277	E-203784	10803C4,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0447	<0.12	5.1	85	61	4.2	0.04	0.04	14.7	20.0	0.13	17.3	4.9
ERP00277	E-203785	10724D1,0-26	Indiana	Clay	Mansfield Formation	unnamed coal	0.0016	<0.05	7.5	161	6	2.8	0.02	0.16	5.1	3.4	0.05	3.0	2.8
ERP00277	E-203786	10724D1,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	0.0012	<0.05	5.9	170	5	3.1	0.02	0.11	5.1	4.1	0.05	2.7	3.0
ERP00277	E-203787	10724D2,26-48	Indiana	Clay	Mansfield Formation	unnamed coal	0.0022	<0.07	12.6	117	6	3.7	0.02	0.49	13.6	5.7	0.12	5.4	3.1
ERP00277	E-203788	10724D2,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	0.0018	<0.05	7.6	156	7	3.3	0.02	0.17	10.9	5.7	0.12	3.4	2.8
ERP00277	E-203789	10724D3,50-62	Indiana	Clay	Mansfield Formation	unnamed coal	0.0042	<0.12	7.8	147	13	2.9	0.02	7.78	12.7	9.1	0.34	13.4	5.2
ERP00277	E-203790	10724D3,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	0.0031	<0.08	5.2	103	14	3.0	0.03	1.99	12.6	11.2	0.37	8.7	4.2
ERP00277	E-203791	10803C1,0-30D	Indiana	Clay	Brazil Formation	Lower Block Coal Member	0.0012	0.08	15.2	101	5	3.2	0.02	0.15	7.1	5.0	0.06	4.0	3.4
ERP00313	E-209604	205241 0-27	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0079	<0.26	10.0	143	72	3.6	0.28	0.10	10.0	25.7	1.91	61.0	7.5
ERP00313	E-209605	205241 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0071	<0.24	8.5	146	46	3.3	0.26	0.09	8.7	21.5	1.74	51.3	6.9
ERP00313	E-209606	205242 27-61	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0057	0.18	5.7	118	30	3.1	0.20	0.11	11.9	16.9	1.14	34.1	5.3
ERP00313	E-209607	205242 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0043	0.17	4.2	126	27	3.2	0.16	0.07	10.3	16.4	1.00	28.9	4.6
ERP00313	E-209608	205243 61-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0051	<0.20	6.7	122	75	2.7	0.08	0.18	14.6	15.7	1.01	18.5	4.2
ERP00313	E-209609	205243 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0040	0.20	6.4	122	35	2.8	0.07	0.15	13.6	15.3	0.98	15.6	4.4
ERP00313	E-209610	20524FC 0-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0084	<0.28	7.5	128	59	3.3	0.30	0.09	11.4	22.4	1.79	65.3	6.4
ERP00313	E-209611	20524FC Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0063	<0.23	7.6	134	47	3.0	0.26	0.10	11.4	20.3	1.60	49.8	5.8
ERP00313	E-209612	205291 0-33	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0054	0.25	6.1	131	46	3.1	0.07	0.11	6.1	16.5	1.43	7.4	4.0
ERP00313	E-209613	205291 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0041	0.19	4.1	147	40	2.8	0.13	0.06	5.0	15.5	1.16	6.6	3.2
ERP00313	E-209614	205292 33-74	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0017	<0.12	1.6	149	20	3.0	0.04	0.19	3.4	8.9	0.84	3.9	1.6
ERP00313	E-209615	205292 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0015	<0.10	1.5	158	20	3.0	0.03	0.09	3.3	8.6	0.89	3.0	1.7
ERP00313	E-209616	205293 74-103	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0076	<0.32	11.1	149	39	1.9	0.06	0.13	3.3	13.1	1.37	8.0	2.0
ERP00313	E-209617	205293 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0035	<0.14	3.6	147	19	2.1	0.04	0.07	2.4	10.8	0.70	8.0	1.6
ERP00313	E-209618	205294 103-143	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0035	<0.23	2.4	162	47	2.1	0.03	0.15	3.2	13.2	1.35	4.6	2.8
ERP00313	E-209619	205294 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0030	<0.20	1.5	162	47	2.0	0.02	0.11	3.0	11.8	1.25	4.9	2.4
ERP00313	E-209620	20524FC FloatD	Indiana	Gibson	Dugger Formation	Hymera Coal Member	0.0080	<0.23	6.9	144	48	3.0	0.21	0.11	10.9	20.0	1.50	49.3	5.3
ERP00313	E-209621	205294 103-143D	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0040	<0.23	2.5	158	48	2.1	0.04	0.14	3.3	12.4	1.32	4.6	2.7
ERP00426	E-229090	20031009-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0247	<0.14	37.6	144	35	1.5	0.03	0.02	2.8	9.7	0.48	4.1	2.9
ERP00426	E-229091	20031009-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0302	0.16	32.5	143	31	2.0	0.04	0.02	3.5	15.8	0.53	5.1	3.2
ERP00426	E-229092	20031009-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0012	<0.06	3.9	145	9	1.6	0.03	0.02	2.0	4.6	0.23	3.2	0.9
ERP00426	E-229093	20031009-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0015	<0.06	4.5	145	12	1.6	0.03	0.03	2.1	4.6	0.20	3.7	0.9
ERP00426	E-229094	20031009-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0022	<0.09	3.9	155	21	2.4	0.03	0.03	4.8	8.0	0.70	2.9	1.7
ERP00426	E-229095	20031009-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0027	<0.09	3.6	162	23	2.2	0.03	0.02	4.5	7.8	0.72	2.9	1.7
ERP00426	E-229096	20031009-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0029	<0.12	6.2	150	26	3.4	0.03	0.09	11.0	10.2	0.70	6.1	2.5
ERP00426	E-229097	20031009-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0036	<0.13	6.0	149	28	3.6	0.03	0.12	13.4	11.4	0.82	6.9	2.8
ERP00426	E-229098	20030214-1	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0105	<0.36	1.3	116	102	3.3	0.07	0.03	11.7	20.3	2.23	11.9	7.2
ERP00426	E-229099	20030214-2	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0045	<0.30	0.4	113	72	2.4	0.06	0.02	5.5	14.9	2.15	6.0	4.5
ERP00426	E-229100	20030214-3	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0058	<0.25	0.5	108	60	1.9	0.05	0.12	5.4	15.6	1.69	6.8	3.9
ERP00426	E-229101	20030214-4	Indiana	Knox	Dugger Formation	Danville Coal Member	0.0040	<0.18	0.8	97	32	1.8	0.07	0.32	7.4	11.5	1.18	13.3	4.1
ERP00426	E-229102	20030321-A1	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	0.0092	<0.67	2.8	98	107	3.1	0.17	<0.03	5.8	40.3	2.94	4.9	10.0
ERP00426	E-229103	20030321-A2	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	0.0042	<0.21	4.7	150	30	2.8	0.08	0.61	5.7	11.4	0.45	10.5	6.8
ERP00426	E-229104	20030321-A3	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	0.0029	<0.09	5.9	151	11	2.7	0.03	0.35	5.9	8.2	0.49	18.0	5.1
ERP00426	E-229105	20030321-A4	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	0.0034	<0.11	4.6	151	18	2.8	0.05	0.21	7.3	26.0	0.69	45.3	5.2
ERP00426	E-229106	20030321-B1	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	0.0016	<0.05	1.3	206	12	3.3	0.02	0.36	9.2	4.1	0.17	11.1	5.4
ERP00426	E-229107	20030321-B2	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	0.0021	<0.09	0.7	141	21	3.2	0.03	0.01	7.6	6.3	0.79	12.2	5.1
ERP00426	E-229108	20030321-B3	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	0.0037	<0.14	0.8	130	30	3.1	0.03	0.06	7.1	10.9	1.38	22.1	4.9
ERP00426	E-229109	20030321-B4	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	0.0124	<0.20	4.0	72	28	4.5	0.06	<0.01	10.0	30.3	0.60	52.8	4.2
ERP00426	E-229110	20030321-C1	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	0.0077	<0.28	11.7	162	43	2.1	0.05	0.03	3.6	17.0	0.98	8.7	4.7
ERP00426	E-229111	20030321-C2	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	0.0050	<0.23	1.0	128	33	2.0	0.08	0.01	3.4	16.8	0.75	3.7	3.8
ERP00426	E-229113	20030321-C4	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	0.0722	<0.54	2.9	88	104	4.2	0.40	0.03	8.4	81.7	1.38	130.0	8.8
ERP00426	E-229114	20030321-C5	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	0.0189	<0.22	3.9	99	37	2.3	0.06	0.18	8.0	41.8	0.39	24.8	5.7
ERP00434	E-230453	20031028D-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0020	<0.18	1.3	123	39	2.6	0.05	0.18	2.9	12.0	1.45	6.6	2.5
ERP00434	E-230454	20031028D-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0041	<0.18	2.4	125	41	2.5	0.05	0.16	2.8	12.0	1.47	6.7	2.5
ERP00434	E-230455	20031028D-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0028	<0.16	0.8	113	30	3.1	0.07	0.76	2.5	14.3	1.22	10.2	2.0
ERP00434	E-230456	20031028D-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0035	<0.14	1.0	118	25	3.2	0.06	1.52	2.5	13.2	0.96	10.0	1.9
ERP00434	E-230457	20031028D-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0048	<0.18	4.5	92	22	2.9	0.05	0.09	2.7	9.8	1.19	4.1	2.2
ERP00434	E-230458	20031028D-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0031	<0.12	1.5	120	23	3.1	0.04	0.14	2.4	9.4	1.05	4.0	2.0
ERP00434	E-230459	20031028D-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0047	<0.18	2.7	118	37	2.9	0.05	0.04	3.7	13.3	1.06	7.6	3.6
ERP00434	E-230460	20031028D-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	0.0038	<0.17	2.4	122	35	2.7	0.05	0.06	3.5	13.1	1.06	7.6	3.5
ERP00434	E-230461	2698001-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0033	<0.08	2.7	123	13	1.6	0.03	0.10	2.2	17.8	0.54	13.5	4.3
ERP00434	E-230462	2698002-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0026	<0.08	2.5	141	14	1.5	0.03	0.19	1.8	15.3	0.59	11.6	4.3
ERP00434	E-230463	2698004-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0358	<0.13	3.6	119	49	2.7	0.05	1.21	3.4	13.6	0.46	14.1	4.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00277	E-203784	10803C4,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	9.6	0.05	7.3	3.1	3.7	1.0	66.0	13.8	1.6	1.0	8.1	3.0	0.8
ERP00277	E-203785	10724D1,0-26	Indiana	Clay	Mansfield Formation	unnamed coal	15.3	0.12	2.0	3.2	0.2	0.2	25.9	6.6	0.6	0.3	1.4	1.7	0.2
ERP00277	E-203786	10724D1,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	16.2	0.07	1.7	3.4	0.2	0.2	27.1	5.6	0.6	0.3	1.6	1.6	0.2
ERP00277	E-203787	10724D2,26-48	Indiana	Clay	Mansfield Formation	unnamed coal	24.2	0.15	2.6	6.7	0.5	0.4	65.5	17.7	1.4	0.7	1.8	2.8	0.3
ERP00277	E-203788	10724D2,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	13.3	0.10	2.3	6.4	0.4	0.4	56.7	6.3	1.3	0.6	1.7	1.6	0.3
ERP00277	E-203789	10724D3,50-62	Indiana	Clay	Mansfield Formation	unnamed coal	22.3	0.24	3.8	10.8	0.6	0.6	85.7	10.6	3.4	1.6	5.3	2.8	0.5
ERP00277	E-203790	10724D3,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	19.4	0.09	3.6	11.8	0.6	0.7	87.3	8.2	4.0	1.6	5.7	1.4	0.5
ERP00277	E-203791	10803C1,0-30D	Indiana	Clay	Brazil Formation	Lower Block Coal Member	22.3	0.24	2.3	1.6	3.4	0.3	87.0	19.7	0.9	2.5	3.0	5.8	0.2
ERP00313	E-209604	205241 0-27	Indiana	Gibson	Dugger Formation	Hymera Coal Member	20.7	0.06	45.9	8.3	2.9	2.5	42.4	22.0	21.2	5.2	10.2	2.4	1.6
ERP00313	E-209605	205241 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	22.5	0.07	39.8	7.4	2.7	2.2	38.0	21.2	19.5	4.8	9.4	2.1	1.3
ERP00313	E-209606	205242 27-61	Indiana	Gibson	Dugger Formation	Hymera Coal Member	20.0	0.05	26.7	6.1	3.2	1.8	35.8	20.5	12.5	3.4	4.8	1.3	1.2
ERP00313	E-209607	205242 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	16.2	0.04	25.3	4.4	2.1	1.6	32.5	14.4	10.7	2.8	4.9	1.5	1.2
ERP00313	E-209608	205243 61-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	19.1	0.06	15.7	7.3	1.9	1.4	61.3	10.3	13.4	2.7	4.8	1.0	0.8
ERP00313	E-209609	205243 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	22.1	0.06	15.0	6.8	2.0	1.4	57.2	10.8	12.5	2.9	4.8	1.2	1.6
ERP00313	E-209610	20524FC 0-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	19.9	0.06	59.1	8.7	2.9	2.4	42.2	25.5	19.3	3.7	7.9	1.9	1.4
ERP00313	E-209611	20524FC Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	15.0	0.07	40.4	7.0	2.8	2.0	42.2	24.0	17.3	3.7	6.8	2.2	1.6
ERP00313	E-209612	205291 0-33	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	30.3	0.07	9.8	21.1	1.5	2.6	12.8	4.1	23.3	0.2	3.3	1.3	1.1
ERP00313	E-209613	205291 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	24.1	0.05	7.2	11.7	1.0	2.2	11.3	3.1	18.2	0.2	2.8	1.4	1.1
ERP00313	E-209614	205292 33-74	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	5.0	0.04	4.6	10.9	0.9	0.9	7.8	1.8	11.3	0.1	1.3	1.7	0.7
ERP00313	E-209615	205292 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	6.6	0.04	4.0	7.9	0.9	0.9	7.4	1.9	12.4	0.1	1.3	2.0	0.5
ERP00313	E-209616	205293 74-103	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	1.0	0.11	10.3	13.8	6.0	1.0	9.2	2.9	14.4	0.2	2.1	2.9	2.8
ERP00313	E-209617	205293 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	1.0	0.06	5.9	11.4	3.3	0.9	10.0	2.2	7.7	0.2	2.0	3.0	0.6
ERP00313	E-209618	205294 103-143	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.8	0.05	6.1	22.2	8.9	1.5	8.8	2.9	23.1	0.8	2.4	3.7	0.7
ERP00313	E-209619	205294 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.1	0.04	5.1	16.3	7.5	1.4	8.7	2.7	20.9	0.7	2.2	3.2	0.6
ERP00313	E-209620	20524FC FloatD	Indiana	Gibson	Dugger Formation	Hymera Coal Member	18.1	0.07	39.4	6.8	2.7	1.9	39.9	20.8	16.4	3.3	6.7	2.5	1.3
ERP00313	E-209621	205294 103-143D	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	4.0	0.06	6.5	23.1	8.6	1.4	8.9	3.0	22.7	0.8	2.4	2.9	0.6
ERP00426	E-229090	20031009-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	17.5	0.23	7.5	11.7	0.6	1.9	11.8	42.2	6.9	1.4	1.6	1.6	0.6
ERP00426	E-229091	20031009-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	24.0	0.22	6.2	8.2	0.8	3.7	17.1	52.8	7.2	1.9	2.1	1.7	1.0
ERP00426	E-229092	20031009-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	1.6	0.16	2.8	7.3	0.3	0.5	3.7	4.8	2.3	0.1	0.7	1.6	0.3
ERP00426	E-229093	20031009-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	1.6	0.13	2.3	4.1	0.4	0.5	3.9	5.5	2.0	0.1	0.7	1.4	0.4
ERP00426	E-229094	20031009-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	3.0	0.07	4.2	4.4	0.4	0.8	7.9	4.6	7.4	0.1	1.3	0.8	0.5
ERP00426	E-229095	20031009-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	2.5	0.07	4.0	4.3	0.4	0.8	7.3	4.3	7.6	0.1	1.2	0.8	1.0
ERP00426	E-229096	20031009-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	24.7	0.05	5.5	7.6	1.5	1.4	42.7	6.0	8.8	1.5	1.8	0.6	1.0
ERP00426	E-229097	20031009-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	29.1	0.05	6.1	7.9	2.0	1.5	52.9	6.1	10.4	1.9	2.3	0.7	0.8
ERP00426	E-229098	20030214-1	Indiana	Knox	Dugger Formation	Danville Coal Member	53.4		14.9	64.4	10.5	3.2	54.6	14.7	33.3	11.0	5.7	nd	12.0
ERP00426	E-229099	20030214-2	Indiana	Knox	Dugger Formation	Danville Coal Member	12.8	0.04	13.3	45.7	2.0	1.6	19.7	7.5	31.8	4.0	3.3	0.7	1.3
ERP00426	E-229100	20030214-3	Indiana	Knox	Dugger Formation	Danville Coal Member	14.5	0.05	11.7	28.9	3.6	1.5	16.0	10.4	24.0	3.5	2.3	3.7	1.2
ERP00426	E-229101	20030214-4	Indiana	Knox	Dugger Formation	Danville Coal Member	28.7		11.2	70.1	6.3	1.2	34.4	35.0	15.1	7.8	3.7	nd	0.8
ERP00426	E-229102	20030321-A1	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	7.4	0.04	158.0	17.6	1.0	5.2	16.7	19.5	32.2	0.5	9.0	5.0	2.9
ERP00426	E-229103	20030321-A2	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	52.2	0.07	35.2	9.9	1.2	1.5	46.1	11.1	5.5	1.7	4.3	6.1	1.0
ERP00426	E-229104	20030321-A3	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	24.1	0.06	9.0	7.3	1.0	0.8	55.0	6.5	4.2	2.5	6.1	5.5	0.6
ERP00426	E-229105	20030321-A4	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	36.7	0.10	11.4	9.0	1.1	1.2	84.8	12.6	6.5	3.6	9.2	3.7	1.1
ERP00426	E-229106	20030321-B1	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	68.6	0.03	2.3	7.8	0.4	0.5	81.7	18.7	1.9	5.4	3.6	2.2	0.3
ERP00426	E-229107	20030321-B2	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	43.8	0.03	3.7	2.7	0.4	0.8	59.6	7.8	7.1	5.0	2.9	1.6	0.5
ERP00426	E-229108	20030321-B3	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	34.8	0.02	7.9	6.3	0.5	1.2	57.5	10.2	10.8	4.6	3.8	6.3	0.8
ERP00426	E-229109	20030321-B4	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	30.0	0.16	16.6	3.1	0.6	1.3	62.9	40.6	5.1	4.5	8.7	5.7	1.1
ERP00426	E-229110	20030321-C1	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	20.3	0.09	11.8	41.4	2.8	1.4	22.3	34.4	13.5	0.4	3.1	6.5	1.2
ERP00426	E-229111	20030321-C2	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	6.7	0.06	18.6	8.6	0.5	2.5	9.8	7.9	9.2	0.2	3.4	6.7	1.6
ERP00426	E-229113	20030321-C4	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	2.2	0.08	90.3	9.3	1.5	4.6	37.5	33.0	13.6	0.9	28.4	11.7	4.6
ERP00426	E-229114	20030321-C5	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	13.5	0.08	19.2	9.4	0.7	1.5	56.4	24.9	3.7	1.2	13.0	6.4	1.9
ERP00434	E-230453	20031028D-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	33.5	0.05	5.1	17.6	21.3	1.2	12.7	3.8	22.7	4.8	2.7	2.9	0.6
ERP00434	E-230454	20031028D-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	36.4	0.05	4.8	15.4	21.6	1.4	12.5	4.2	22.8	5.1	2.2	2.9	0.7
ERP00434	E-230455	20031028D-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	4.7	0.07	7.8	12.9	6.2	0.9	10.7	2.3	14.3	0.4	2.4	3.0	0.5
ERP00434	E-230456	20031028D-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	5.3	0.07	6.5	12.0	6.5	0.9	11.1	2.4	11.5	0.4	2.4	3.0	0.5
ERP00434	E-230457	20031028D-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	11.8	0.09	7.3	37.6	2.6	0.8	7.7	2.8	14.3	0.2	1.6	1.9	0.6
ERP00434	E-230458	20031028D-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	10.9	0.07	4.5	14.3	1.7	0.8	7.4	2.4	12.4	0.2	1.6	2.2	0.5
ERP00434	E-230459	20031028D-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	28.4	0.07	8.2	17.5	0.8	1.2	6.8	4.7	17.5	0.2	2.6	1.3	0.8
ERP00434	E-230460	20031028D-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	28.1	0.07	7.4	15.6	0.8	1.2	7.2	4.7	17.6	0.2	2.5	1.1	0.9
ERP00434	E-230461	2698001-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	5.2	0.03	4.2	2.0	6.4	1.0	11.0	4.0	7.1	2.2	3.6	3.4	0.6
ERP00434	E-230462	2698002-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	5.4	0.03	4.1	1.9	5.8	1.0	9.0	3.8	7.6	2.1	3.3	3.3	0.5
ERP00434	E-230463	2698004-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	6.0	0.05	11.0	4.7	2.9	1.4	16.8	6.4	4.6	1.4	5.0	3.7	0.8

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00277	E-203784	10803C4,1.6	Indiana	Clay	Brazil Formation	Lower Block Coal Member	382	0.03	7.2	0.37	0.6	35.4	5.0	18.1	20.3
ERP00277	E-203785	10724D1,0-26	Indiana	Clay	Mansfield Formation	unnamed coal	7	0.01	<0.2	0.44	0.2	3.6	3.4	58.1	3.5
ERP00277	E-203786	10724D1,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	8	0.01	0.3	0.30	0.2	3.9	3.8	36.8	3.6
ERP00277	E-203787	10724D2,26-48	Indiana	Clay	Mansfield Formation	unnamed coal	10	0.01	0.5	0.97	0.2	6.1	4.7	186.0	3.6
ERP00277	E-203788	10724D2,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	9	0.01	0.5	0.70	0.2	5.6	4.2	58.6	4.6
ERP00277	E-203789	10724D3,50-62	Indiana	Clay	Mansfield Formation	unnamed coal	12	0.02	<0.5	0.47	0.4	14.1	3.6	2790.0	6.5
ERP00277	E-203790	10724D3,1.5	Indiana	Clay	Mansfield Formation	unnamed coal	13	0.02	0.8	0.37	0.4	15.7	3.8	832.0	9.2
ERP00277	E-203791	10803C1,0-30D	Indiana	Clay	Brazil Formation	Lower Block Coal Member	6	0.01	0.5	1.77	0.2	6.8	2.6	58.3	3.6
ERP00313	E-209604	205241 0-27	Indiana	Gibson	Dugger Formation	Hymera Coal Member	39	0.26	6.6	0.58	6.6	84.9	15.9	30.6	24.8
ERP00313	E-209605	205241 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	34	0.23	6.2	0.46	6.1	79.9	14.5	27.6	22.2
ERP00313	E-209606	205242 27-61	Indiana	Gibson	Dugger Formation	Hymera Coal Member	22	0.21	3.8	0.50	4.0	47.9	8.7	33.3	15.2
ERP00313	E-209607	205242 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	22	0.17	3.8	0.26	3.6	48.4	8.5	27.9	14.1
ERP00313	E-209608	205243 61-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	14	0.08	2.9	0.45	2.1	28.8	5.5	39.1	19.6
ERP00313	E-209609	205243 Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	13	0.08	2.8	0.43	2.1	27.1	5.7	30.1	17.6
ERP00313	E-209610	20524FC 0-89	Indiana	Gibson	Dugger Formation	Hymera Coal Member	40	0.23	6.3	0.49	5.2	67.3	12.8	35.9	28.4
ERP00313	E-209611	20524FC Float	Indiana	Gibson	Dugger Formation	Hymera Coal Member	32	0.22	5.1	0.48	4.7	63.2	11.2	34.6	21.9
ERP00313	E-209612	205291 0-33	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	13	0.04	1.2	2.47	0.7	24.6	6.4	29.4	35.2
ERP00313	E-209613	205291 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	11	0.02	1.9	0.97	0.6	21.3	5.5	18.3	32.7
ERP00313	E-209614	205292 33-74	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	9	0.03	1.1	0.73	0.4	10.2	5.5	36.4	8.6
ERP00313	E-209615	205292 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	9	0.03	1.0	0.60	0.4	9.8	5.4	16.6	9.0
ERP00313	E-209616	205293 74-103	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	13	0.05	<1.6	4.37	1.5	23.5	5.9	13.8	18.9
ERP00313	E-209617	205293 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	9	0.05	2.0	1.01	1.5	23.5	5.5	9.9	11.3
ERP00313	E-209618	205294 103-143	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	16	0.03	1.1	1.27	2.6	15.6	4.9	14.0	15.8
ERP00313	E-209619	205294 Float	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	14	0.03	2.0	0.75	2.1	14.2	4.5	11.1	17.7
ERP00313	E-209620	20524FC FloatD	Indiana	Gibson	Dugger Formation	Hymera Coal Member	32	0.20	5.0	0.48	4.3	59.3	11.2	38.5	23.7
ERP00313	E-209621	205294 103-143D	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	16	0.04	1.1	1.27	2.6	15.7	5.0	13.2	19.0
ERP00426	E-229090	20031009-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	44	0.02	<0.5	0.92	0.5	24.7	3.2	11.3	41.3
ERP00426	E-229091	20031009-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	56	0.03	<0.5	0.78	0.7	50.2	4.4	8.3	45.8
ERP00426	E-229092	20031009-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	10	0.02	0.4	0.59	0.2	6.0	1.6	6.1	8.1
ERP00426	E-229093	20031009-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	9	0.02	0.3	0.53	0.2	5.9	1.5	6.0	6.8
ERP00426	E-229094	20031009-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	18	0.02	0.7	0.47	0.3	9.7	2.6	12.7	10.5
ERP00426	E-229095	20031009-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	17	0.02	0.8	0.40	0.3	9.4	2.2	10.8	11.6
ERP00426	E-229096	20031009-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	14	0.02	0.9	0.36	0.4	16.1	2.6	23.4	26.1
ERP00426	E-229097	20031009-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	15	0.02	1.0	0.33	0.4	20.3	3.3	29.6	32.2
ERP00426	E-229098	20030214-1	Indiana	Knox	Dugger Formation	Danville Coal Member	47	0.03	1.9	0.33	0.9	38.8	6.0	49.5	60.9
ERP00426	E-229099	20030214-2	Indiana	Knox	Dugger Formation	Danville Coal Member	43	0.02	3.0	0.21	0.7	21.8	4.5	9.7	28.3
ERP00426	E-229100	20030214-3	Indiana	Knox	Dugger Formation	Danville Coal Member	39	0.06	2.1	0.25	0.6	19.2	3.2	24.3	20.7
ERP00426	E-229101	20030214-4	Indiana	Knox	Dugger Formation	Danville Coal Member	22	0.06	1.5	0.15	1.5	19.9	3.5	38.1	18.5
ERP00426	E-229102	20030321-A1	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	95	0.04	6.1	0.28	2.1	48.3	10.1	4.7	67.9
ERP00426	E-229103	20030321-A2	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	41	0.02	2.5	0.24	0.7	18.9	5.2	267.0	19.3
ERP00426	E-229104	20030321-A3	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	10	0.01	1.6	0.11	0.4	11.1	5.0	168.0	7.5
ERP00426	E-229105	20030321-A4	Indiana	Daviess	Brazil Formation	Upper Block Coal Member	12	0.03	1.4	0.46	0.9	64.5	4.9	74.4	52.3
ERP00426	E-229106	20030321-B1	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	7	0.02	0.4	0.11	0.3	5.9	2.4	159.0	8.2
ERP00426	E-229107	20030321-B2	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	10	0.02	0.8	0.22	0.3	9.1	2.7	6.1	11.6
ERP00426	E-229108	20030321-B3	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	19	0.02	0.9	0.09	0.4	18.0	3.3	22.9	17.0
ERP00426	E-229109	20030321-B4	Indiana	Daviess	Brazil Formation	Lower Block Coal Member	94	0.07	2.4	2.29	0.8	42.2	4.9	159.0	18.4
ERP00426	E-229110	20030321-C1	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	18	0.03	<1.1	0.82	1.1	30.8	3.0	22.6	19.7
ERP00426	E-229111	20030321-C2	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	25	0.03	2.5	0.25	0.8	27.9	4.4	5.6	27.0
ERP00426	E-229113	20030321-C4	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	632	0.18	21.9	0.45	4.9	264.0	13.6	8.4	85.5
ERP00426	E-229114	20030321-C5	Indiana	Daviess	Brazil Formation	Buffaloville Coal Member	152	0.05	3.4	0.85	2.4	135.0	4.7	70.8	42.6
ERP00434	E-230453	20031028D-1R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	14	0.02	1.2	0.37	7.6	14.5	3.5	13.0	14.0
ERP00434	E-230454	20031028D-1F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	11	0.02	1.0	0.36	8.1	14.7	2.9	15.4	15.1
ERP00434	E-230455	20031028D-2R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	13	0.03	1.8	0.25	1.2	19.0	4.7	186.0	15.6
ERP00434	E-230456	20031028D-2F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	12	0.03	1.9	0.24	1.2	19.3	4.6	164.0	12.2
ERP00434	E-230457	20031028D-3R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	11	0.03	1.0	1.55	0.5	11.3	5.4	42.6	8.7
ERP00434	E-230458	20031028D-3F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	9	0.03	0.8	0.48	0.5	11.1	4.4	32.3	9.6
ERP00434	E-230459	20031028D-4R	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	10	0.03	1.0	0.69	0.5	16.6	4.7	8.5	16.1
ERP00434	E-230460	20031028D-4F	Indiana	Gibson	Petersburg Formation	Springfield Coal Member	10	0.03	1.0	0.62	0.5	16.6	4.2	11.4	15.0
ERP00434	E-230461	2698001-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	14	0.02	0.5	0.19	1.1	52.2	3.6	11.3	20.1
ERP00434	E-230462	2698002-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	11	0.02	0.4	0.20	1.0	41.3	3.2	192.0	18.8
ERP00434	E-230463	2698004-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	317	0.04	3.5	0.19	2.7	27.3	7.6	9.5	12.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00434	E-230464	2698005-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	3.1	5.7	1.11	0.84	0.03	0.014	0.024	0.050	0.86	0.040	1.62	0.133
ERP00434	E-230465	2698007-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.9	18.3	3.66	2.03	0.01	0.108	0.064	0.430	3.56	0.089	2.98	0.068
ERP00434	E-230466	2698008-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.8	12.4	2.88	1.38	0.02	0.091	0.070	0.327	1.66	0.084	2.74	0.066
ERP00434	E-230467	2698010-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.4	56.7	15.70	6.99	0.04	0.356	0.226	1.840	4.28	0.347	3.56	0.026
ERP00434	E-230468	2698011-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.7	22.8	4.97	2.91	0.05	0.114	0.066	0.409	3.81	0.110	5.74	0.059
ERP00434	E-230469	2698013-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	3.5	12.0	1.57	0.78	0.42	0.030	0.025	0.107	4.01	0.045	3.37	0.040
ERP00434	E-230470	2698014-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.4	7.8	1.17	0.73	0.06	0.010	0.020	0.034	2.53	0.045	4.69	0.086
ERP00434	E-230471	2698016-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.8	11.3	1.37	0.78	0.84	0.029	0.035	0.114	3.13	0.045	4.66	0.062
ERP00434	E-230472	2698017-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.4	7.0	1.19	0.66	0.08	0.022	0.028	0.094	1.93	0.039	4.14	0.097
ERP00434	E-230473	2698019-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.7	10.0	1.76	0.85	0.38	0.040	0.034	0.166	2.33	0.056	3.77	0.063
ERP00434	E-230474	2698020-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.4	7.1	1.60	0.77	0.07	0.036	0.034	0.158	1.08	0.053	2.59	0.142
ERP00434	E-230475	2698022-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.8	10.5	1.70	0.88	0.29	0.031	0.027	0.130	3.02	0.053	4.52	0.066
ERP00434	E-230476	2698023-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.6	7.7	1.40	0.73	0.04	0.025	0.025	0.104	2.03	0.045	4.33	0.124
ERP00434	E-230477	20031028A-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.8	18.2	2.33	1.07	0.19	0.070	0.061	0.252	7.05	0.061	6.29	0.018
ERP00434	E-230478	20031028A-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	2.7	11.3	2.51	1.20	0.06	0.079	0.070	0.281	2.17	0.068	3.31	0.051
ERP00434	E-230479	20031028A-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.4	6.4	1.16	0.66	0.20	0.033	0.029	0.114	1.28	0.034	2.86	0.024
ERP00434	E-230480	20031028A-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.1	6.0	1.13	0.62	0.04	0.037	0.030	0.117	1.33	0.034	2.52	0.087
ERP00434	E-230481	20031028A-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.3	12.5	2.82	1.38	0.16	0.085	0.069	0.300	2.01	0.079	2.98	0.023
ERP00434	E-230482	20031028A-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.1	9.6	2.11	1.24	0.03	0.066	0.040	0.232	1.27	0.063	2.04	0.102
ERP00434	E-230483	20031028B-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.6	11.4	2.34	1.16	0.16	0.042	0.033	0.159	2.50	0.062	2.67	0.036
ERP00434	E-230484	20031028B-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.3	10.5	2.13	1.07	0.02	0.036	0.036	0.144	2.44	0.058	3.16	0.142
ERP00434	E-230485	20031028B-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	2.3	22.1	4.78	1.31	0.88	0.036	0.036	0.129	5.27	0.126	6.74	0.049
ERP00434	E-230486	20031028B-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	2.9	8.1	1.52	0.70	0.05	0.024	0.027	0.105	2.15	0.046	2.76	0.159
ERP00434	E-230487	20031028B-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.3	7.8	1.44	0.92	0.31	0.026	0.035	0.084	1.36	0.032	2.30	0.043
ERP00434	E-230488	20031028B-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.1	6.8	1.30	0.80	0.08	0.023	0.034	0.083	1.31	0.033	2.36	0.113
ERP00434	E-230489	20031028B-4R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	3.3	9.8	2.14	0.98	0.31	0.032	0.034	0.152	1.55	0.059	3.75	0.040
ERP00434	E-230490	20031028B-4F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	2.7	8.5	1.81	0.84	0.14	0.026	0.030	0.130	1.54	0.053	2.45	0.158
ERP00434	E-230491	20031028C	Indiana	Gibson	Unknown	Pirtle Coal Member	3.2	10.6	1.50	0.82	0.33	0.044	0.019	0.172	3.19	0.048	3.89	0.022
ERP00434	E-230492	20031028C	Indiana	Gibson	Unknown	Pirtle coal	2.4	9.5	1.29	0.71	0.17	0.035	0.016	0.145	3.21	0.044	4.69	0.087
ERP00650	06500001	BigRun1	Kentucky	Ohio	Unknown	Big Run coal	3.1	7.87	1.66	0.78	0.18	0.035	0.059	0.137	1.30	0.052	3.10	0.021
ERP00650	06500002	DC0410WKY10	Kentucky	Webster	Carbondale Formation	Briar Hill coal	0.8	13.59	2.77	1.41	0.17	0.079	0.131	0.316	2.48	0.086	4.10	0.220
ERP00650	06500003	DC0410WKY13Ba	Kentucky	Webster	Shelburn Formation	Baker coal	0.6	72.47	18.19	7.80	1.65	0.769	1.277	1.741	6.89	0.359	1.00	0.044
ERP00650	06500004	DC0410WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	0.8	10.12	1.80	0.69	0.14	0.030	0.050	0.087	2.71	0.044	1.16	0.153
ERP00650	06500005	DC0410WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	0.9	14.95	1.17	0.59	1.73	0.285	0.473	0.102	4.16	0.039	6.15	0.248
ERP00650	06500006	DC0410WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	0.9	21.12	2.46	0.90	0.34	0.067	0.112	0.203	7.95	0.059	9.80	0.195
ERP00650	06500007	DC0410WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	1.0	73.26	20.38	7.38	2.04	1.102	1.831	2.512	4.04	0.324	2.64	0.059
ERP00650	06500008	DC049WKY10	Kentucky	Webster	Carbondale Formation	uncorrelated coal	1.0	13.35	2.62	1.35	0.15	0.075	0.124	0.292	2.64	0.081	4.28	0.192
ERP00650	06500009	DC049WKY13A	Kentucky	Webster	Shelburn Formation	Baker coal	0.9	22.56	1.63	0.85	2.37	0.059	0.098	0.115	7.97	0.051	8.92	0.218
ERP00650	06500010	DC049WKY13B	Kentucky	Webster	Shelburn Formation	Baker coal	1.0	7.66	1.68	0.87	0.11	0.030	0.050	0.109	1.14	0.045	2.56	0.263
ERP00650	06500011	DC049WKY13C	Kentucky	Webster	Shelburn Formation	Baker coal	1.3	10.78	2.32	1.01	0.31	0.049	0.081	0.181	1.87	0.063	3.07	0.249
ERP00650	06500012	DC049WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	1.0	9.93	2.54	1.02	0.16	0.052	0.086	0.203	0.99	0.066	2.91	0.251
ERP00650	06500013	DC049WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	1.2	12.47	1.57	0.72	0.35	0.038	0.063	0.129	4.31	0.048	6.49	0.241
ERP00650	06500014	DC049WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	1.0	14.53	2.36	0.93	0.38	0.065	0.108	0.185	4.08	0.064	5.82	0.226
ERP00650	06500015	DC049WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	0.9	73.64	18.25	7.26	1.80	0.771	1.281	2.295	6.56	0.302	6.24	0.045
ERP00650	06500016	P42WKY6Davis	Kentucky	Hopkins	Carbondale Formation	Davis coal	1.3	12.27	2.51	1.10	0.11	0.065	0.108	0.199	2.57	0.060	4.19	0.177
ERP00650	06500017	P42WKY6DavisRI	Kentucky	Hopkins	Carbondale Formation	Davis coal	1.1	77.74	18.36	7.29	1.71	0.821	1.365	2.342	8.07	0.311	8.11	0.039
ERP00650	06500018	P42WKY8B1	Kentucky	Hopkins	Carbondale Formation	Survant coal	1.2	77.42	18.37	6.31	4.72	1.061	1.763	2.312	5.18	0.272	3.67	0.040
ERP00650	06500019	P42WKY8B2	Kentucky	Hopkins	Carbondale Formation	Survant coal	1.3	66.81	19.23	6.06	0.68	0.895	1.487	2.139	4.16	0.298	2.97	0.066
ERP00650	06500020	P42WKY9A	Kentucky	Hopkins	Carbondale Formation	Springfield coal	1.7	10.37	2.85	1.10	0.11	0.054	0.090	0.230	0.96	0.071	2.74	0.225
ERP00650	06500021	P42WKY9B	Kentucky	Hopkins	Carbondale Formation	Springfield coal	1.7	14.82	1.41	0.68	0.49	0.026	0.044	0.114	6.04	0.043	9.24	0.226
ERP00650	06500022	P42WKY9C	Kentucky	Hopkins	Carbondale Formation	Springfield coal	1.7	13.53	2.53	1.03	0.40	0.062	0.103	0.209	3.41	0.066	5.26	0.221
ERP00650	06500023	P42WKY9RR	Kentucky	Hopkins	Carbondale Formation	Springfield coal	0.9	69.48	17.18	6.30	2.63	0.801	1.331	2.201	4.49	0.283	3.56	0.046
ERP00650	06500024	P42WKYColch	Kentucky	Hopkins	Carbondale Formation	Colchester coal	1.3	15.53	3.04	1.25	0.25	0.144	0.239	0.357	3.02	0.076	4.34	0.178
ERP00650	06500025	P42WKYColchRR	Kentucky	Hopkins	Carbondale Formation	Colchester coal	1.2	79.70	21.69	8.57	0.33	0.946	1.572	2.748	6.51	0.359	5.12	0.032
ERP00650	06500026	P42WKY11A	Kentucky	Hopkins	Shelburn Formation	Herrin coal	1.7	9.49	1.46	0.88	0.14	0.024	0.040	0.096	2.59	0.045	4.53	0.226
ERP00650	06500027	P42WKY11B	Kentucky	Hopkins	Shelburn Formation	Herrin coal	2.0	5.72	1.16	0.66	0.07	0.029	0.048	0.118	0.91	0.041	3.17	0.231
ERP00650	06500028	P42WKY11C	Kentucky	Hopkins	Shelburn Formation	Herrin coal	2.0	14.70	3.82	1.93	0.09	0.044	0.072	0.242	1.01	0.101	3.14	0.207
ERP00650	06500029	P42WKY11D	Kentucky	Hopkins	Shelburn Formation	Herrin coal	1.6	12.36	2.42	1.12	0.13	0.071	0.118	0.243	2.59	0.070	4.22	0.212

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00434	E-230464	2698005-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0428	<0.12	2.8	122	53	2.6	0.04	0.05	3.1	13.0	0.43	10.7	4.0
ERP00434	E-230465	2698007-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0305	<0.37	55.1	112	86	2.8	0.24	0.16	8.2	23.4	2.40	64.6	8.4
ERP00434	E-230466	2698008-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0056	<0.25	20.7	156	46	4.0	0.10	0.05	20.2	22.7	1.87	22.8	7.2
ERP00434	E-230467	2698010-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0205	<1.20	13.1	120	243	2.3	0.35	0.49	17.4	103.0	6.52	59.0	16.7
ERP00434	E-230468	2698011-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0145	<0.46	10.5	106	58	1.6	0.11	0.78	17.2	62.0	1.70	29.0	6.0
ERP00434	E-230469	2698013-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0061	<0.24	76.4	128	21	2.8	0.07	0.03	4.7	8.9	0.85	10.8	3.4
ERP00434	E-230470	2698014-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0044	<0.16	3.6	102	7	1.8	0.07	0.12	5.2	12.4	0.14	5.1	2.6
ERP00434	E-230471	2698016-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0048	<0.23	8.0	116	17	2.2	0.05	0.11	2.7	10.9	0.84	5.1	2.2
ERP00434	E-230472	2698017-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0030	<0.14	4.3	112	14	2.0	0.03	0.05	2.1	9.3	0.65	4.4	1.7
ERP00434	E-230473	2698019-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0048	<0.20	2.6	134	26	2.2	0.06	0.10	2.9	11.8	1.06	9.9	3.7
ERP00434	E-230474	2698020-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0040	<0.15	2.0	125	24	2.3	0.04	0.03	2.6	11.9	0.98	9.3	3.0
ERP00434	E-230475	2698022-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0065	<0.21	5.2	128	21	2.7	0.05	0.36	4.9	18.4	1.40	23.8	6.5
ERP00434	E-230476	2698023-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	0.0046	<0.16	3.8	123	17	2.7	0.05	0.13	5.1	18.0	1.26	22.7	5.8
ERP00434	E-230477	20031028A-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0095	<0.37	94.3	117	40	3.4	0.05	0.08	7.3	12.6	1.14	4.6	3.1
ERP00434	E-230478	20031028A-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0057	<0.23	30.5	147	44	4.0	0.05	0.04	7.4	13.9	1.41	6.5	4.0
ERP00434	E-230479	20031028A-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0040	<0.13	34.1	150	22	4.0	0.05	0.02	8.9	8.2	0.82	8.4	4.2
ERP00434	E-230480	20031028A-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0044	<0.13	20.9	173	23	4.2	0.04	0.02	8.5	8.7	0.70	7.9	3.3
ERP00434	E-230481	20031028A-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0058	<0.25	21.8	153	45	4.0	0.09	0.05	21.3	21.9	1.71	23.8	6.6
ERP00434	E-230482	20031028A-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0305	<0.20	12.6	128	58	2.9	0.15	0.11	6.2	17.5	1.50	34.0	6.1
ERP00434	E-230483	20031028B-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0044	<0.23	9.5	125	32	3.0	0.05	0.05	6.9	14.7	1.21	12.0	5.6
ERP00434	E-230484	20031028B-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0037	<0.21	7.8	121	29	3.4	0.05	0.05	7.4	16.8	1.11	12.6	5.3
ERP00434	E-230485	20031028B-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0096	<0.45	8.7	84	23	1.6	0.10	0.10	6.5	15.6	0.39	7.5	3.1
ERP00434	E-230486	20031028B-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0036	<0.17	21.7	148	20	3.0	0.06	0.02	3.6	9.7	0.84	8.3	3.1
ERP00434	E-230487	20031028B-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0050	<0.16	9.9	121	20	3.2	0.12	0.07	5.7	10.8	0.59	15.3	3.0
ERP00434	E-230488	20031028B-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0038	<0.14	12.3	131	19	3.1	0.10	0.08	4.9	10.1	0.53	12.9	2.7
ERP00434	E-230489	20031028B-4R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0040	<0.20	14.1	132	34	2.7	0.06	3.28	10.8	19.4	0.90	20.1	3.6
ERP00434	E-230490	20031028B-4F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	0.0024	<0.17	14.5	114	28	2.3	0.06	0.42	9.4	17.6	0.87	15.5	3.3
ERP00434	E-230491	20031028C	Indiana	Gibson	Unknown	Pirtle Coal Member	0.0042	<0.22	33.3	187	28	3.8	0.06	0.06	8.6	12.1	1.14	11.9	6.1
ERP00434	E-230492	20031028C	Indiana	Gibson	Unknown	Pirtle coal	0.0039	<0.19	35.7	181	26	3.7	0.05	0.14	8.5	10.5	1.13	9.0	5.8
ERP00650	06500001	BigRun1	Kentucky	Ohio	Unknown	Big Run coal	0.0028	0.08	5.9		26	1.8	0.05	0.38	3.8	13.0	0.96	6.3	2.5
ERP00650	06500002	DC0410WKY10	Kentucky	Webster	Carbondale Formation	Briar Hill coal	0.0073	0.13	5.3		1612	3.6	0.07	0.48	3.8	21.9	2.29	15.2	4.4
ERP00650	06500003	DC0410WKY13Ba	Kentucky	Webster	Shelburn Formation	Baker coal	0.2094	0.52	17.4		442	4.2	0.41	0.17	25.2	100.2	9.04	46.4	18.7
ERP00650	06500004	DC0410WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0021	0.09	11.7		21	1.1	0.05	0.18	2.0	18.4	0.66	4.7	1.6
ERP00650	06500005	DC0410WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0050	0.05	10.2		29	0.4	0.03	0.17	1.6	6.2	0.74	3.4	1.3
ERP00650	06500006	DC0410WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0070	0.12	29.8		49	0.9	0.06	0.18	8.7	13.2	1.38	11.4	2.5
ERP00650	06500007	DC0410WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	0.3519	3.48	36.2		276	3.3	0.53	82.20	20.1	462.2	10.20	145.9	15.9
ERP00650	06500008	DC049WKY10	Kentucky	Webster	Carbondale Formation	uncorrelated coal	0.0104	0.20	5.6		79	3.8	0.07	0.27	5.6	21.9	2.18	17.5	4.7
ERP00650	06500009	DC049WKY13A	Kentucky	Webster	Shelburn Formation	Baker coal	0.0100	0.12	51.8		101	1.6	0.06	0.14	4.9	14.0	1.04	10.7	2.8
ERP00650	06500010	DC049WKY13B	Kentucky	Webster	Shelburn Formation	Baker coal	0.0076	0.09	7.3		19	0.8	0.10	0.04	2.9	10.9	1.02	10.7	1.9
ERP00650	06500011	DC049WKY13C	Kentucky	Webster	Shelburn Formation	Baker coal	0.0048	0.15	31.0		38	1.1	0.13	0.14	7.7	15.2	1.37	28.3	3.1
ERP00650	06500012	DC049WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0020	0.11	4.0		91	1.0	0.06	0.13	2.8	15.2	1.33	5.9	2.8
ERP00650	06500013	DC049WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0032	0.07	7.9		21	0.8	0.04	0.15	3.1	16.6	1.00	4.7	1.6
ERP00650	06500014	DC049WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	0.0065	0.10	14.9		43	1.3	0.05	0.17	5.8	22.7	1.20	11.0	3.1
ERP00650	06500015	DC049WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	0.1167	1.77	43.3		293	2.8	0.59	34.56	19.1	286.3	10.78	103.7	16.1
ERP00650	06500016	P42WKY6Davis	Kentucky	Hopkins	Carbondale Formation	Davis coal	0.0037	0.14	5.0		24	5.7	0.07	0.95	9.2	14.6	1.84	12.9	4.6
ERP00650	06500017	P42WKY6DavisRI	Kentucky	Hopkins	Carbondale Formation	Davis coal	0.2825	1.15	61.4		283	3.6	0.56	1.41	20.1	158.5	10.15	62.4	18.4
ERP00650	06500018	P42WKY8B1	Kentucky	Hopkins	Carbondale Formation	Survant coal	1.6422	4.66	69.5		258	3.3	0.53	65.21	20.1	389.5	9.59	137.5	15.4
ERP00650	06500019	P42WKY8B2	Kentucky	Hopkins	Carbondale Formation	Survant coal	0.1037	2.64	50.8		262	3.8	0.38	32.53	21.3	210.3	9.48	91.6	15.3
ERP00650	06500020	P42WKY9A	Kentucky	Hopkins	Carbondale Formation	Springfield coal	0.0031	0.09	2.3		46	1.3	0.07	2.06	3.2	15.1	1.54	8.6	2.9
ERP00650	06500021	P42WKY9B	Kentucky	Hopkins	Carbondale Formation	Springfield coal	0.0032	0.03	12.3		458	1.0	0.04	0.24	2.4	8.0	1.09	4.0	1.4
ERP00650	06500022	P42WKY9C	Kentucky	Hopkins	Carbondale Formation	Springfield coal	0.0107	0.07	13.3		40	1.6	0.05	0.80	5.0	13.1	1.16	8.3	2.5
ERP00650	06500023	P42WKY9RR	Kentucky	Hopkins	Carbondale Formation	Springfield coal	0.1236	1.95	35.4		389	3.1	0.49	64.00	19.0	346.4	10.49	117.6	15.1
ERP00650	06500024	P42WKYColch	Kentucky	Hopkins	Carbondale Formation	Colchester coal	0.0175	0.50	58.9		45	5.7	0.12	0.74	16.6	53.9	4.37	28.5	11.3
ERP00650	06500025	P42WKYColchRR	Kentucky	Hopkins	Carbondale Formation	Colchester coal	0.0906	1.69	82.5		404	3.6	0.82	20.19	25.0	201.5	12.85	90.6	21.2
ERP00650	06500026	P42WKY11A	Kentucky	Hopkins	Shelburn Formation	Herrin coal	0.0288	0.22	6.2		23	1.4	0.08	0.22	2.7	54.8	1.20	7.1	2.3
ERP00650	06500027	P42WKY11B	Kentucky	Hopkins	Shelburn Formation	Herrin coal	0.0016	0.06	1.7		19	1.5	0.05	0.08	1.9	8.3	1.20	4.8	1.8
ERP00650	06500028	P42WKY11C	Kentucky	Hopkins	Shelburn Formation	Herrin coal	0.0190	0.17	9.6		70	3.3	0.12	0.07	7.6	29.5	2.80	12.3	6.5
ERP00650	06500029	P42WKY11D	Kentucky	Hopkins	Shelburn Formation	Herrin coal	0.0060	0.16	8.2		108	2.7	0.08	3.08	4.8	29.8	1.67	13.4	3.7

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00434	E-230464	2698005-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	5.2	0.05	9.1	3.3	2.5	1.4	16.3	5.5	4.0	1.2	4.2	4.0	0.6
ERP00434	E-230465	2698007-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	7.2	0.23	32.4	27.1	3.6	2.8	30.7	40.6	33.7	3.0	6.7	7.3	2.2
ERP00434	E-230466	2698008-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	27.3	0.07	23.1	21.1	0.9	2.4	94.0	41.0	27.3	4.4	8.4	1.9	1.3
ERP00434	E-230467	2698010-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.5	0.19	56.2	35.6	37.5	7.3	76.0	23.2	112.0	2.7	13.0	11.9	4.1
ERP00434	E-230468	2698011-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.7	0.21	46.5	26.9	22.0	3.1	79.1	22.7	26.4	3.1	9.7	9.2	1.1
ERP00434	E-230469	2698013-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	11.9	0.19	11.1	36.6	1.2	0.9	20.4	68.6	9.2	0.8	2.1	2.2	0.7
ERP00434	E-230470	2698014-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	1.9	0.15	10.0	22.1	4.2	1.4	15.4	5.8	2.1	0.7	4.2	7.2	0.5
ERP00434	E-230471	2698016-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.8	0.11	10.5	41.8	2.7	1.1	5.2	3.0	12.0	0.1	1.9	2.4	3.3
ERP00434	E-230472	2698017-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	2.4	0.09	5.7	11.7	1.8	0.9	4.2	2.4	9.1	0.1	1.4	2.1	0.5
ERP00434	E-230473	2698019-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	11.4	0.05	9.8	26.6	1.8	1.6	4.7	5.5	16.8	0.1	2.5	2.0	1.0
ERP00434	E-230474	2698020-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	9.0	0.05	6.8	13.1	1.2	1.3	4.7	5.6	15.5	0.1	2.5	2.0	0.7
ERP00434	E-230475	2698022-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	25.5	0.07	12.1	25.0	2.3	1.5	15.6	16.7	14.5	0.3	10.0	2.6	1.3
ERP00434	E-230476	2698023-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	24.7	0.06	9.3	10.7	1.8	1.3	16.8	11.6	13.4	0.3	9.2	2.5	1.0
ERP00434	E-230477	20031028A-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	8.5	0.42	12.9	30.2	2.0	1.0	22.2	49.5	18.7	0.2	1.4	1.3	0.9
ERP00434	E-230478	20031028A-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15.0	0.19	8.4	20.6	0.8	1.5	24.0	45.5	23.7	0.2	2.7	1.2	1.0
ERP00434	E-230479	20031028A-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	22.3	0.07	4.9	26.7	0.9	0.9	36.9	43.3	11.8	0.8	2.9	1.2	0.6
ERP00434	E-230480	20031028A-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	17.8	0.10	4.3	15.1	0.8	0.9	37.0	29.9	10.3	0.6	2.7	1.1	0.6
ERP00434	E-230481	20031028A-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	26.3	0.06	22.5	26.3	0.7	2.2	95.9	38.0	25.0	4.2	9.1	1.6	1.2
ERP00434	E-230482	20031028A-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	7.9	0.07	15.6	17.1	2.3	2.5	29.3	17.3	18.6	2.1	6.1	4.0	1.1
ERP00434	E-230483	20031028B-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15.6	0.22	16.9	19.3	0.6	1.9	65.1	14.9	14.6	2.9	6.0	1.8	0.8
ERP00434	E-230484	20031028B-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	14.3	0.18	16.8	12.4	0.7	1.9	62.4	13.9	13.3	2.7	5.5	1.5	0.8
ERP00434	E-230485	20031028B-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	1.6	0.18	27.8	57.7	4.5	2.2	17.5	5.7	6.5	0.7	4.6	6.5	1.2
ERP00434	E-230486	20031028B-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	12.0	0.13	7.6	12.7	0.8	0.9	16.1	33.0	9.1	0.7	2.0	1.7	0.7
ERP00434	E-230487	20031028B-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	17.2	0.15	18.6	25.4	1.0	0.7	22.2	21.5	5.3	0.8	2.7	2.1	1.0
ERP00434	E-230488	20031028B-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	16.0	0.12	16.2	14.1	0.8	0.6	20.2	20.3	4.8	0.6	2.5	2.0	0.8
ERP00434	E-230489	20031028B-4R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	25.3	0.10	9.1	29.2	1.5	1.7	54.0	15.0	11.1	1.9	5.1	2.2	0.9
ERP00434	E-230490	20031028B-4F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	24.5	0.09	6.5	15.1	1.4	1.6	49.4	15.7	10.3	1.8	4.3	2.3	0.9
ERP00434	E-230491	20031028C	Indiana	Gibson	Unknown	Pirtle Coal Member	81.0	0.09	7.4	39.9	1.2	3.1	31.7	34.0	14.3	8.8	8.2	2.3	1.0
ERP00434	E-230492	20031028C	Indiana	Gibson	Unknown	Pirtle coal	86.2	0.10	6.0	21.6	1.2	2.8	30.7	37.2	12.6	8.2	7.4	2.5	0.7
ERP00650	06500001	BigRun1	Kentucky	Ohio	Unknown	Big Run coal	11.3	0.11	6.3	23.3	2.4	1.1	8.6	5.4	10.8	0.3	2.1	1.6	0.9
ERP00650	06500002	DC0410WKY10	Kentucky	Webster	Carbondale Formation	Briar Hill coal	14.0	0.16	14.9	53.0	2.6	1.8	9.7	10.3	29.8	0.2	5.3	1.7	1.3
ERP00650	06500003	DC0410WKY13Ba	Kentucky	Webster	Shelburn Formation	Baker coal	3.7	0.06	97.6	2790.8	2.7	8.6	50.9	25.6	124.4	1.0	21.1	1.7	5.3
ERP00650	06500004	DC0410WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	6.5	0.24	6.4	29.4	18.4	1.2	8.4	3.1	6.3	6.7	1.5	7.0	0.7
ERP00650	06500005	DC0410WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	0.5	0.12	6.9	199.6	2.6	0.6	3.1	3.9	7.0	0.3	1.0	2.1	0.8
ERP00650	06500006	DC0410WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	14.2	0.34	11.5	56.0	4.5	1.4	21.4	62.2	14.6	0.9	2.6	1.5	1.2
ERP00650	06500007	DC0410WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	1.7	0.21	41.2	247.8	467.4	7.3	280.0	35.9	160.7	24.9	15.9	53.4	4.5
ERP00650	06500008	DC049WKY10	Kentucky	Webster	Carbondale Formation	uncorrelated coal	8.4	0.15	15.8	47.0	3.4	2.0	13.6	5.9	29.2	0.2	6.2	2.4	1.0
ERP00650	06500009	DC049WKY13A	Kentucky	Webster	Shelburn Formation	Baker coal	3.3	0.22	16.2	282.7	4.6	1.1	11.4	17.1	8.1	0.6	4.1	3.5	1.0
ERP00650	06500010	DC049WKY13B	Kentucky	Webster	Shelburn Formation	Baker coal	0.2	0.09	19.7	18.6	1.4	1.0	8.0	3.4	7.0	0.2	2.0	1.9	0.7
ERP00650	06500011	DC049WKY13C	Kentucky	Webster	Shelburn Formation	Baker coal	13.8	0.06	14.7	34.8	4.9	1.5	29.3	17.6	12.2	1.4	3.6	2.0	0.9
ERP00650	06500012	DC049WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	5.5	0.07	9.7	24.9	9.2	1.7	5.1	7.1	12.9	1.2	2.6	2.4	0.9
ERP00650	06500013	DC049WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	1.5	0.19	7.6	51.2	1.5	0.9	9.4	11.3	9.2	0.2	1.5	1.9	0.7
ERP00650	06500014	DC049WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	21.0	0.13	11.1	55.1	2.3	1.4	20.1	22.2	12.9	0.5	3.0	1.4	1.4
ERP00650	06500015	DC049WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	2.5	0.30	47.2	333.1	307.6	7.1	181.2	30.4	161.5	17.5	14.9	43.9	4.8
ERP00650	06500016	P42WKY6Davis	Kentucky	Hopkins	Carbondale Formation	Davis coal	21.8	0.12	13.0	46.0	7.9	1.6	12.5	25.6	17.3	0.4	3.2	2.1	1.1
ERP00650	06500017	P42WKY6DavisRI	Kentucky	Hopkins	Carbondale Formation	Davis coal	2.3	0.20	53.7	635.3	113.3	7.9	121.0	66.2	170.2	5.6	15.0	28.0	5.0
ERP00650	06500018	P42WKY8B1	Kentucky	Hopkins	Carbondale Formation	Survant coal	1.5	0.34	43.1	289.8	265.2	6.4	262.0	74.1	152.0	27.8	15.2	53.9	4.0
ERP00650	06500019	P42WKY8B2	Kentucky	Hopkins	Carbondale Formation	Survant coal	13.3	0.32	35.1	224.4	462.5	6.9	238.5	51.4	143.1	27.3	13.9	53.2	3.8
ERP00650	06500020	P42WKY9A	Kentucky	Hopkins	Carbondale Formation	Springfield coal	7.9	0.05	9.6	27.5	6.0	1.8	5.5	16.0	16.8	3.2	2.7	2.0	0.8
ERP00650	06500021	P42WKY9B	Kentucky	Hopkins	Carbondale Formation	Springfield coal	1.4	0.14	7.6	40.8	2.7	0.9	4.0	11.6	9.8	0.6	1.3	1.0	0.6
ERP00650	06500022	P42WKY9C	Kentucky	Hopkins	Carbondale Formation	Springfield coal	19.2	0.22	9.1	48.4	1.5	1.3	14.6	45.2	13.7	0.6	2.7	0.9	0.8
ERP00650	06500023	P42WKY9RR	Kentucky	Hopkins	Carbondale Formation	Springfield coal	2.2	0.21	41.3	358.5	374.4	7.0	248.2	36.6	166.2	23.4	14.5	52.6	4.3
ERP00650	06500024	P42WKYColch	Kentucky	Hopkins	Carbondale Formation	Colchester coal	38.2	0.21	9.9	142.0	99.2	3.0	62.5	84.5	40.2	11.8	7.6	24.1	2.7
ERP00650	06500025	P42WKYColchRR	Kentucky	Hopkins	Carbondale Formation	Colchester coal	2.1	0.32	66.7	230.1	382.6	9.9	180.6	66.9	214.3	18.4	17.8	38.2	5.7
ERP00650	06500026	P42WKY11A	Kentucky	Hopkins	Shelburn Formation	Herrin coal	7.2	0.08	11.7	29.1	22.0	1.5	7.7	43.3	11.1	1.8	2.5	5.8	0.7
ERP00650	06500027	P42WKY11B	Kentucky	Hopkins	Shelburn Formation	Herrin coal	1.6	0.09	4.3	18.7	2.8	0.8	3.6	33.9	11.7	0.2	1.7	0.5	0.5
ERP00650	06500028	P42WKY11C	Kentucky	Hopkins	Shelburn Formation	Herrin coal	5.9	0.06	17.9	39.6	2.0	2.9	10.9	10.6	23.2	0.2	5.9	0.9	1.6
ERP00650	06500029	P42WKY11D	Kentucky	Hopkins	Shelburn Formation	Herrin coal	22.7	0.10	8.6	31.3	12.1	2.1	17.2	10.4	18.5	0.6	3.1	2.4	1.0

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00434	E-230464	2698005-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	313	0.04	2.7	0.17	2.8	26.2	6.9	8.8	11.7
ERP00434	E-230465	2698007-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	236	0.15	4.2	2.29	3.6	70.1	8.9	37.7	24.2
ERP00434	E-230466	2698008-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	22	0.08	2.9	0.98	1.5	50.1	5.8	23.8	56.4
ERP00434	E-230467	2698010-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	93	0.23	8.6	2.30	22.3	152.0	13.0	43.3	98.1
ERP00434	E-230468	2698011-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	37	0.10	5.4	1.87	18.4	112.0	10.3	83.0	44.2
ERP00434	E-230469	2698013-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	12	0.04	<1.0	1.17	0.7	14.0	4.8	10.8	11.1
ERP00434	E-230470	2698014-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	18	0.04	0.6	1.09	1.6	23.7	7.6	11.4	14.3
ERP00434	E-230471	2698016-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	13	0.03	0.9	2.85	0.6	12.9	7.3	10.9	10.1
ERP00434	E-230472	2698017-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	8	0.02	0.7	1.72	0.5	10.7	5.6	8.2	9.0
ERP00434	E-230473	2698019-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	13	0.02	1.2	0.70	0.6	15.6	6.9	13.4	15.0
ERP00434	E-230474	2698020-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	12	0.02	1.4	0.48	0.5	15.8	6.6	7.5	15.3
ERP00434	E-230475	2698022-R	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	11	0.04	2.0	1.54	3.0	61.8	11.9	31.0	54.9
ERP00434	E-230476	2698023-F	Indiana	Gibson	Staunton Formation	Seeleyville Coal Member	8	0.03	1.9	1.03	2.8	61.3	9.6	20.5	51.5
ERP00434	E-230477	20031028A-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15	<0.02	<1.5	7.81	0.4	15.0	4.6	11.5	13.7
ERP00434	E-230478	20031028A-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	21	0.02	1.3	2.27	0.6	17.5	4.6	7.4	16.0
ERP00434	E-230479	20031028A-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	16	0.04	1.5	0.86	0.7	10.4	4.7	7.9	8.3
ERP00434	E-230480	20031028A-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15	0.04	1.0	0.93	0.6	10.9	4.3	7.2	8.8
ERP00434	E-230481	20031028A-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	22	0.08	2.6	0.89	1.2	50.6	6.3	31.5	52.0
ERP00434	E-230482	20031028A-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	229	0.12	4.4	0.52	3.4	64.3	7.8	27.8	20.7
ERP00434	E-230483	20031028B-1R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15	0.03	<0.9	1.29	1.2	41.0	5.2	11.6	30.3
ERP00434	E-230484	20031028B-1F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	14	0.03	<0.8	1.04	1.3	55.0	4.8	10.7	33.3
ERP00434	E-230485	20031028B-2R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	24	0.04	1.9	1.35	3.2	25.2	13.0	13.4	32.7
ERP00434	E-230486	20031028B-2F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	11	0.04	1.2	0.71	0.7	16.2	4.2	6.0	12.8
ERP00434	E-230487	20031028B-3R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	23	0.07	3.2	0.64	1.1	19.4	5.0	14.4	8.1
ERP00434	E-230488	20031028B-3F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	20	0.06	3.1	0.59	0.9	17.6	4.0	10.8	8.4
ERP00434	E-230489	20031028B-4R	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	15	0.05	0.9	0.72	1.2	32.8	4.5	375.0	36.6
ERP00434	E-230490	20031028B-4F	Indiana	Gibson	Dugger Formation	Upper Millersburg Coal Member	10	0.05	0.7	0.68	1.2	29.3	3.7	138.0	32.4
ERP00434	E-230491	20031028C	Indiana	Gibson	Unknown	Pirtle Coal Member	13	0.03	<0.9	0.66	1.7	32.1	7.2	12.2	67.2
ERP00434	E-230492	20031028C	Indiana	Gibson	Unknown	Pirtle coal	9	0.03	<0.8	0.60	1.8	27.4	6.3	23.8	57.5
ERP00650	06500001	BigRun1	Kentucky	Ohio	Unknown	Big Run coal	12	0.03	1.4	1.01	0.6	16.0	4.1	35.5	
ERP00650	06500002	DC0410WKY10	Kentucky	Webster	Carbondale Formation	Briar Hill coal	71	0.03	2.1	1.38	1.5	45.8	7.5	188.0	
ERP00650	06500003	DC0410WKY13Ba	Kentucky	Webster	Shelburn Formation	Baker coal	259	0.13	16.3	0.95	3.3	151.9	31.2	92.3	
ERP00650	06500004	DC0410WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	21	0.11	1.1	2.77	4.0	230.2	1.7	9.9	
ERP00650	06500005	DC0410WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	40	0.03	0.9	1.80	0.2	11.7	3.0	8.5	
ERP00650	06500006	DC0410WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	21	0.03	2.2	5.96	1.0	35.3	5.4	20.1	
ERP00650	06500007	DC0410WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	125	0.43	11.2	13.31	56.6	1686.6	27.4	1582.3	
ERP00650	06500008	DC049WKY10	Kentucky	Webster	Carbondale Formation	uncorrelated coal	50	0.03	2.1	1.24	1.8	47.6	10.2	60.5	
ERP00650	06500009	DC049WKY13A	Kentucky	Webster	Shelburn Formation	Baker coal	58	0.04	2.1	3.69	1.2	55.1	9.2	11.0	
ERP00650	06500010	DC049WKY13B	Kentucky	Webster	Shelburn Formation	Baker coal	26	0.07	1.9	1.22	1.0	16.9	5.8	7.8	
ERP00650	06500011	DC049WKY13C	Kentucky	Webster	Shelburn Formation	Baker coal	47	0.09	2.2	0.75	2.2	33.4	9.0	20.4	
ERP00650	06500012	DC049WKY9A	Kentucky	Webster	Carbondale Formation	Springfield coal	28	0.02	1.7	1.16	3.0	28.7	3.8	44.4	
ERP00650	06500013	DC049WKY9B	Kentucky	Webster	Carbondale Formation	Springfield coal	28	0.02	1.4	3.80	0.3	16.7	3.1	24.4	
ERP00650	06500014	DC049WKY9C	Kentucky	Webster	Carbondale Formation	Springfield coal	35	0.02	1.8	2.34	0.6	21.2	5.5	35.5	
ERP00650	06500015	DC049WKY9RR	Kentucky	Webster	Carbondale Formation	Springfield coal	138	0.24	12.3	10.89	48.9	1069.5	26.4	693.4	
ERP00650	06500016	P42WKY6Davis	Kentucky	Hopkins	Carbondale Formation	Davis coal	22	0.04	1.7	1.19	1.8	27.6	8.8	54.3	
ERP00650	06500017	P42WKY6DavisRI	Kentucky	Hopkins	Carbondale Formation	Davis coal	124	0.29	12.1	7.33	22.1	275.8	39.7	69.5	
ERP00650	06500018	P42WKY8B1	Kentucky	Hopkins	Carbondale Formation	Survant coal	212	0.46	10.9	13.11	55.0	1155.0	46.2	1223.2	
ERP00650	06500019	P42WKY8B2	Kentucky	Hopkins	Carbondale Formation	Survant coal	103	0.27	8.8	13.19	70.4	990.5	36.6	881.7	
ERP00650	06500020	P42WKY9A	Kentucky	Hopkins	Carbondale Formation	Springfield coal	25	0.05	1.7	1.02	1.4	23.7	4.2	86.3	
ERP00650	06500021	P42WKY9B	Kentucky	Hopkins	Carbondale Formation	Springfield coal	26	0.02	1.2	5.47	0.3	18.7	2.5	14.2	
ERP00650	06500022	P42WKY9C	Kentucky	Hopkins	Carbondale Formation	Springfield coal	24	0.02	1.8	3.20	0.8	26.7	4.5	85.1	
ERP00650	06500023	P42WKY9RR	Kentucky	Hopkins	Carbondale Formation	Springfield coal	136	0.27	10.0	14.95	57.7	1403.5	32.8	1281.7	
ERP00650	06500024	P42WKYColch	Kentucky	Hopkins	Carbondale Formation	Colchester coal	26	0.18	3.0	3.28	40.7	241.9	8.2	28.1	
ERP00650	06500025	P42WKYColchRR	Kentucky	Hopkins	Carbondale Formation	Colchester coal	123	0.42	13.5	9.31	40.6	755.9	31.9	604.9	
ERP00650	06500026	P42WKY11A	Kentucky	Hopkins	Shelburn Formation	Herrin coal	21	0.04	1.5	1.11	3.3	85.4	3.0	10.9	
ERP00650	06500027	P42WKY11B	Kentucky	Hopkins	Shelburn Formation	Herrin coal	23	0.02	1.1	0.75	0.4	11.8	2.7	11.1	
ERP00650	06500028	P42WKY11C	Kentucky	Hopkins	Shelburn Formation	Herrin coal	31	0.05	3.4	1.19	1.1	45.6	5.8	16.5	
ERP00650	06500029	P42WKY11D	Kentucky	Hopkins	Shelburn Formation	Herrin coal	28	0.04	2.0	2.65	1.9	55.0	3.1	272.6	

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
Eastern Province																		
ERP00249	E-201622	92789C	Kentucky	Pulaski		prepared coal	0.3	5.5	1.25	0.72	0.07	0.025	0.018	0.064	0.54	0.053	1.41	0.110
ERP00249	E-201623	92790C	Kentucky	Pulaski		prepared coal	0.1	35.6	2.36	0.58	0.23	0.066	0.016	0.119	16.80	0.064	22.80	0.082
ERP00249	E-201624	92807C	Kentucky	Pulaski		prepared coal	0.4	5.8	1.28	0.81	0.06	0.027	0.021	0.068	0.50	0.056	1.32	0.111
ERP00249	E-201625	92808C	Kentucky	Pulaski		prepared coal	0.4	3.3	0.73	0.47	0.04	0.016	0.011	0.047	0.29	0.034	1.45	0.131
ERP00249	E-201626	92809C	Kentucky	Pulaski		prepared coal	0.5	6.7	1.47	0.93	0.08	0.032	0.021	0.084	0.64	0.068	1.36	0.117
ERP00249	E-201627	92810C	Kentucky	Pulaski		prepared coal	1.6	4.5	1.03	0.60	0.06	0.024	0.013	0.049	0.33	0.043	1.12	0.161
ERP00249	E-201628	92811C	Kentucky	Pulaski		prepared coal	0.3	3.3	0.76	0.45	0.05	0.018	0.012	0.030	0.26	0.036	1.04	0.133
ERP00249	E-201629	92812C	Kentucky	Pulaski		prepared coal	1.0	5.3	1.15	0.69	0.08	0.028	0.015	0.053	0.38	0.048	0.96	0.129
ERP00249	E-201630	5498C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.4	5.6	0.94	0.56	0.04	0.020	0.014	0.070	0.94	0.037	3.00	0.116
ERP00249	E-201631	5499C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.3	7.9	1.49	0.88	0.03	0.041	0.013	0.211	1.39	0.057	4.37	0.098
ERP00249	E-201632	5500C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.4	1.8	0.20	0.21	0.03	0.009	0.008	0.009	0.48	0.007	2.20	0.136
ERP00249	E-201633	5501C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.6	1.5	0.25	0.26	0.04	0.014	0.024	0.010	0.09	0.009	0.74	0.091
ERP00249	E-201634	5502C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.5	2.8	0.65	0.45	0.04	0.013	0.012	0.013	0.07	0.029	0.74	0.116
ERP00249	E-201635	5503C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.4	7.3	1.98	1.06	0.04	0.020	0.015	0.061	0.12	0.101	0.83	0.098
ERP00249	E-201636	5504C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.5	5.3	1.24	0.83	0.02	0.015	0.007	0.053	0.13	0.057	1.00	0.109
ERP00249	E-201637	92790D	Kentucky	Pulaski		prepared coal	0.1	35.1	2.33	0.58	0.19	0.051	0.013	0.117	16.86	0.067	22.40	0.059
ERP00249	E-201638	5498D	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.4	4.4	0.81	0.50	0.04	0.018	0.013	0.059	0.76	0.037	2.82	0.101
ERP00250	E-201639	92791A	Kentucky	Pulaski		fly ash	0.3	99.7	23.23	12.87	1.28	0.426	0.310	1.246	12.06	0.956	0.07	0.019
ERP00250	E-201640	92792A	Kentucky	Pulaski		fly ash	0.4	89.1	22.05	12.82	1.21	0.418	0.310	1.188	8.78	0.907	0.14	0.019
ERP00250	E-201641	92793A	Kentucky	Pulaski		fly ash	0.4	87.9	21.63	12.60	1.19	0.418	0.326	1.172	8.17	0.895	0.15	0.021
ERP00250	E-201642	92794A	Kentucky	Pulaski		fly ash	0.4	83.4	20.91	11.34	1.07	0.372	0.321	1.112	6.94	0.799	0.17	0.017
ERP00250	E-201643	92795A	Kentucky	Pulaski		fly ash	0.4	87.2	20.89	11.21	1.06	0.373	0.310	1.162	6.16	0.783	0.16	0.018
ERP00250	E-201644	92796A	Kentucky	Pulaski		fly ash	0.4	88.5	21.66	12.50	1.14	0.405	0.308	1.180	8.35	0.901	0.13	0.015
ERP00250	E-201645	92797A	Kentucky	Pulaski		fly ash	0.4	88.1	21.19	11.93	1.13	0.398	0.300	1.101	8.13	0.844	0.13	0.021
ERP00250	E-201646	92798A	Kentucky	Pulaski		fly ash	0.5	83.2	18.81	10.48	1.01	0.341	0.271	1.040	8.08	0.748	0.17	0.017
ERP00250	E-201647	92799A	Kentucky	Pulaski		fly ash	0.3	86.1	20.51	11.66	1.11	0.378	0.281	1.076	8.19	0.825	0.16	0.018
ERP00250	E-201648	92800A	Kentucky	Pulaski		fly ash	0.7	89.3	21.14	13.89	1.40	0.516	0.443	1.413	5.93	1.070	0.46	0.018
ERP00250	E-201649	92801A	Kentucky	Pulaski		fly ash	0.7	88.2	20.64	13.76	1.45	0.504	0.438	1.396	6.10	1.057	0.52	<0.015
ERP00250	E-201650	92802A	Kentucky	Pulaski		fly ash	0.7	89.3	20.39	13.56	1.47	0.538	0.450	1.413	6.62	1.070	0.59	0.017
ERP00250	E-201651	92803A	Kentucky	Pulaski		fly ash	0.7	88.4	18.74	12.58	1.39	0.490	0.452	1.325	5.50	0.953	0.57	0.018
ERP00250	E-201652	92804A	Kentucky	Pulaski		fly ash	1.0	86.6	18.44	13.10	1.42	0.573	0.391	1.587	7.75	0.986	1.16	0.022
ERP00250	E-201653	92805A	Kentucky	Pulaski		fly ash	1.1	85.4	19.50	13.28	1.40	0.566	0.424	1.423	6.75	1.023	0.76	0.017
ERP00250	E-201654	92806A	Kentucky	Pulaski		bottom ash	0.3	94.8	23.24	12.44	1.02	0.382	0.267	1.185	11.80	0.909	0.09	0.019
ERP00250	E-201655	92794D	Kentucky	Pulaski		fly ash	0.5	83.3	17.66	10.18	1.01	0.331	0.290	0.971	6.06	0.748	0.17	0.016
ERP00250	E-201656	92802D	Kentucky	Pulaski		fly ash	0.8	89.2	21.41	14.34	1.46	0.591	0.443	1.412	7.11	1.122	0.60	0.015
ERP00423	E-227705	PAS 1321-1	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	2.1	24.5	5.06	4.43	0.04	0.078	0.026	0.311	2.50	0.107	0.63	0.034
ERP00423	E-227706	PAS 1321-2	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	2.2	24.5	5.22	4.59	0.04	0.081	0.026	0.319	2.59	0.110	0.64	0.020
ERP00423	E-227707	PAS 1322	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	2.9	6.8	1.26	1.22	0.06	0.037	0.014	0.115	0.74	0.071	1.13	0.023
ERP00423	E-227708	PAS 1400	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.3	13.8	2.55	1.91	0.19	0.038	0.016	0.139	2.67	0.102	3.73	0.093
ERP00423	E-227709	PAS 1401	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.3	23.2	5.44	3.44	0.15	0.067	0.029	0.320	2.63	0.221	3.47	0.082
ERP00423	E-227710	PAS 1402	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.2	55.8	14.30	8.51	0.16	0.178	0.075	0.922	4.84	0.619	5.12	0.025
ERP00423	E-227711	PAS 1403	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.5	76.2	20.70	12.50	0.19	0.202	0.116	1.140	3.44	0.936	3.36	0.016
ERP00423	E-227712	PAS 1404	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.3	25.1	5.90	3.77	0.12	0.086	0.031	0.383	2.65	0.257	3.37	0.065
ERP00423	E-227713	PAS 1405	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	0.2	16.5	3.53	1.50	0.07	0.085	0.028	0.307	4.07	0.086	4.89	0.016
ERP00423	E-227714	PAS 1406	Pennsylvania	Somerset	Monongahela Group	Redstone coal	0.2	6.6	1.67	0.99	0.05	0.028	0.053	0.119	0.27	0.051	1.01	0.019
ERP00423	E-227715	PAS 1407	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	0.1	27.8	6.78	3.69	0.31	0.176	0.050	0.692	2.53	0.170	3.40	<0.015
ERP00423	E-227716	PAS 1408	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	0.2	12.8	2.66	2.06	0.11	0.061	0.034	0.247	1.40	0.103	0.86	0.048
ERP00423	E-227717	PAS 1409	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	0.0	24.9	6.74	2.57	0.23	0.148	0.051	0.602	3.03	0.154	3.49	0.036
ERP00423	E-227718	PAS 1410	Pennsylvania	Somerset	Monongahela Group	Redstone coal	0.3	14.9	4.42	1.99	0.06	0.070	0.056	0.354	0.44	0.106	1.03	0.019
ERP00423	E-227719	PAS 1411	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	0.2	39.0	10.50	5.45	0.24	0.280	0.072	1.160	2.18	0.243	2.23	<0.015
ERP00423	E-227720	PAS 1412	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	0.1	8.1	1.54	1.27	0.09	0.033	0.034	0.102	1.18	0.064	2.04	0.114
ERP00423	E-227721	PAS 1413	Pennsylvania	Somerset	Allegheny Formation	Upper Kittanning coal	0.1	17.1	3.46	2.24	0.60	0.078	0.027	0.285	2.00	0.121	2.87	0.082
ERP00423	E-227722	PAS 1414	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.1	18.9	4.27	2.70	0.14	0.065	0.027	0.297	2.43	0.165	3.25	0.076
ERP00423	E-227723	PAS 1415	Pennsylvania	Somerset	Allegheny Formation		0.2	71.6	18.00	8.75	1.81	0.425	0.115	1.760	6.06	0.472	5.13	0.031
ERP00423	E-227724	PAS 1416	Pennsylvania	Somerset	Allegheny Formation		0.1	42.8	10.40	5.16	0.48	0.170	0.081	0.846	5.33	0.272	2.10	0.085
ERP00423	E-227725	PAS 1417	Pennsylvania	Somerset	Monongahela Group	Pittsburgh coal	0.2	11.8	2.69	1.69	0.20	0.061	0.021	0.228	1.18	0.093	4.91	<0.015
ERP00423	E-227726	PAS 1418	Pennsylvania	Somerset	Monongahela Group	Blue Lick coal	0.1	19.2	3.99	3.81	0.32	0.108	0.048	0.167	0.71	0.284	2.85	<0.015
ERP00423	E-227727	PAS 1419	Pennsylvania	Somerset	Allegheny Formation		0.2	4.0	1.02	0.54	0.01	0.016	0.049	0.090	0.40	0.029	2.48	0.017

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
Eastern Province																			
ERP00249	E-201622	92789C	Kentucky	Pulaski		prepared coal	0.0046	0.17	9.7	26	55	1.9	0.10	0.03	3.4	8.3	0.29	7.7	3.3
ERP00249	E-201623	92790C	Kentucky	Pulaski		prepared coal	0.0327	<0.71	491.3	161	54	1.2	0.14	0.25	12.1	115.0	0.36	18.9	3.0
ERP00249	E-201624	92807C	Kentucky	Pulaski		prepared coal	0.0046	0.21	12.5	29	59	2.2	0.09	0.04	4.0	7.3	0.37	9.4	4.3
ERP00249	E-201625	92808C	Kentucky	Pulaski		prepared coal	0.0026	0.09	4.5	16	32	1.2	0.04	0.02	2.0	4.1	0.19	4.5	1.9
ERP00249	E-201626	92809C	Kentucky	Pulaski		prepared coal	0.0070	0.16	11.0	34	70	2.5	0.07	0.03	4.5	8.7	0.34	9.8	4.1
ERP00249	E-201627	92810C	Kentucky	Pulaski		prepared coal	0.0061	0.14	4.5	21	58	1.4	0.07	0.03	2.7	6.2	0.24	7.5	2.8
ERP00249	E-201628	92811C	Kentucky	Pulaski		prepared coal	0.0042	0.08	5.2	18	41	0.9	0.05	0.02	1.8	3.5	0.13	5.4	1.8
ERP00249	E-201629	92812C	Kentucky	Pulaski		prepared coal	0.0063	0.16	5.4	26	67	1.4	0.06	0.03	2.7	5.5	0.31	8.0	3.3
ERP00249	E-201630	5498C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0027	<0.11	20.4	23	37	1.5	0.06	0.04	3.2	5.4	0.24	6.5	2.3
ERP00249	E-201631	5499C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0041	<0.16	19.9	29	50	3.4	0.08	0.06	5.4	10.4	0.79	10.5	5.4
ERP00249	E-201632	5500C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0010	<0.04	9.2	20	21	1.0	0.03	0.02	1.3	1.3	0.03	2.5	0.6
ERP00249	E-201633	5501C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0015	0.04	0.9	22	44	0.5	0.04	0.01	1.2	1.5	0.03	3.0	0.8
ERP00249	E-201634	5502C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0021	0.07	0.5	13	37	0.9	0.04	0.01	1.8	2.8	0.04	5.2	1.2
ERP00249	E-201635	5503C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0057	0.20	1.1	15	51	2.0	0.10	0.03	4.3	10.1	0.24	12.6	3.2
ERP00249	E-201636	5504C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0037	0.27	0.9	10	29	1.6	0.07	0.03	3.7	6.5	0.58	6.7	5.3
ERP00249	E-201637	92790D	Kentucky	Pulaski		prepared coal	0.0307	<0.70	473.9	171	55	1.1	0.08	0.21	12.6	8.4	0.39	16.4	2.8
ERP00249	E-201638	5498D	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.0027	<0.09	16.5	21	35	1.4	0.05	0.04	2.7	4.5	0.21	5.7	2.1
ERP00250	E-201639	92791A	Kentucky	Pulaski		fly ash	0.0741	<2.00	114.7	429	997	30.9	0.51	0.27	56.8	147.6	5.88	110.7	40.9
ERP00250	E-201640	92792A	Kentucky	Pulaski		fly ash	0.0662	<1.78	77.1	274	909	28.1	0.89	0.33	50.6	123.0	4.90	116.7	37.2
ERP00250	E-201641	92793A	Kentucky	Pulaski		fly ash	0.0615	<1.76	89.7	246	905	29.1	2.20	0.36	51.5	130.1	5.10	119.5	39.4
ERP00250	E-201642	92794A	Kentucky	Pulaski		fly ash	0.0583	<1.66	85.1	235	824	27.8	1.25	0.36	48.3	120.1	4.84	115.1	37.3
ERP00250	E-201643	92795A	Kentucky	Pulaski		fly ash	0.0572	<1.74	75.9	196	801	27.9	1.31	0.31	51.0	125.6	4.71	115.1	35.1
ERP00250	E-201644	92796A	Kentucky	Pulaski		fly ash	0.0580	<1.77	75.5	197	903	27.5	0.89	0.32	49.8	120.4	5.13	107.1	36.3
ERP00250	E-201645	92797A	Kentucky	Pulaski		fly ash	0.0577	<1.76	69.3	186	822	27.2	0.80	0.28	50.7	120.7	4.76	107.5	33.7
ERP00250	E-201646	92798A	Kentucky	Pulaski		fly ash	0.0545	<1.66	69.0	181	755	24.4	0.76	0.33	46.1	107.3	4.49	113.2	31.7
ERP00250	E-201647	92799A	Kentucky	Pulaski		fly ash	0.0564	<1.72	68.3	179	823	25.4	0.75	0.29	46.8	112.8	4.39	100.7	31.5
ERP00250	E-201648	92800A	Kentucky	Pulaski		fly ash	0.1405	<1.78	482.2	408	1197	47.2	4.38	1.79	87.8	242.9	6.79	234.9	117.0
ERP00250	E-201649	92801A	Kentucky	Pulaski		fly ash	0.1349	<1.76	484.2	390	1191	46.6	4.67	1.76	89.1	224.0	6.88	224.0	121.7
ERP00250	E-201650	92802A	Kentucky	Pulaski		fly ash	0.1678	<1.78	686.7	463	1277	52.0	6.07	2.32	101.8	235.8	7.14	260.8	148.2
ERP00250	E-201651	92803A	Kentucky	Pulaski		fly ash	0.1545	<1.76	562.2	419	1132	49.5	5.48	13.70	93.7	238.7	7.07	241.3	136.1
ERP00250	E-201652	92804A	Kentucky	Pulaski		fly ash	0.2498	<1.73	1428.9	508	1550	52.8	8.49	3.81	124.7	278.9	8.49	359.4	210.4
ERP00250	E-201653	92805A	Kentucky	Pulaski		fly ash	0.1866	<1.71	740.4	470	1255	50.1	6.49	2.39	102.5	265.6	7.09	275.8	154.6
ERP00250	E-201654	92806A	Kentucky	Pulaski		bottom ash	0.0621	<1.89	17.8	180	846	25.1	0.56	<0.10	45.9	121.3	4.74	85.1	24.4
ERP00250	E-201655	92794D	Kentucky	Pulaski		fly ash	0.0510	<1.66	79.1	163	760	26.3	0.92	0.33	48.7	113.3	4.66	105.8	35.4
ERP00250	E-201656	92802D	Kentucky	Pulaski		fly ash	0.1676	<1.78	673.5	460	1365	51.0	5.71	2.23	100.8	254.2	6.87	265.8	143.6
ERP00423	E-227705	PAS 1321-1	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0261	<0.49	73.3	20	132	2.9	0.18	0.38	6.5	37.7	2.07	30.9	15.1
ERP00423	E-227706	PAS 1321-2	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0273	<0.49	79.1	16	136	2.9	0.19	0.43	6.4	37.2	2.23	31.6	16.6
ERP00423	E-227707	PAS 1322	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0126	<0.14	5.2	13	171	1.1	0.09	0.04	3.3	17.5	1.03	4.9	5.7
ERP00423	E-227708	PAS 1400	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0087	<0.28	46.0	4	43	1.7	0.17	0.10	5.8	26.1	0.87	30.4	6.3
ERP00423	E-227709	PAS 1401	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0205	<0.47	34.1	11	125	1.9	0.29	0.18	8.8	45.0	1.88	37.4	10.4
ERP00423	E-227710	PAS 1402	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0506	<1.20	82.6	31	336	3.1	0.63	0.36	20.1	91.5	5.80	62.5	22.3
ERP00423	E-227711	PAS 1403	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0934	<1.60	36.1	40	551	3.9	0.75	0.33	28.9	110.0	6.76	78.5	26.8
ERP00423	E-227712	PAS 1404	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0188	<0.51	32.6	12	139	2.0	0.27	0.16	8.7	42.7	2.26	35.6	9.8
ERP00423	E-227713	PAS 1405	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	0.0184	<0.33	33.3	<3	97	2.7	0.09	0.08	9.5	19.8	1.78	6.5	6.5
ERP00423	E-227714	PAS 1406	Pennsylvania	Somerset	Monongahela Group	Redstone coal	0.0040	<0.14	2.4	16	37	0.9	0.08	0.06	3.8	11.2	0.68	5.3	2.8
ERP00423	E-227715	PAS 1407	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	0.0525	<0.56	26.7	21	189	1.9	0.30	0.17	9.5	42.3	4.03	50.3	10.1
ERP00423	E-227716	PAS 1408	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	0.0158	<0.26	15.5	6	81	1.7	0.12	0.09	8.5	27.3	1.45	26.4	7.8
ERP00423	E-227717	PAS 1409	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	0.0372	<0.50	28.6	8	128	2.6	0.12	0.12	12.7	32.9	2.89	12.9	8.5
ERP00423	E-227718	PAS 1410	Pennsylvania	Somerset	Monongahela Group	Redstone coal	0.0125	<0.30	4.8	16	79	1.3	0.12	0.09	6.3	22.4	2.03	10.3	5.2
ERP00423	E-227719	PAS 1411	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	0.0475	<0.78	17.2	35	244	2.2	0.33	0.20	13.5	55.8	5.81	54.2	14.0
ERP00423	E-227720	PAS 1412	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	0.0068	<0.17	50.6	6	25	1.0	0.09	0.10	6.3	15.7	0.69	14.0	4.0
ERP00423	E-227721	PAS 1413	Pennsylvania	Somerset	Allegheny Formation	Upper Kittanning coal	0.0372	<0.35	20.9	6	90	1.7	0.14	0.22	7.1	28.4	1.71	19.3	6.7
ERP00423	E-227722	PAS 1414	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	0.0113	<0.38	35.2	6	94	1.9	0.19	0.13	7.2	36.7	1.77	31.6	8.4
ERP00423	E-227723	PAS 1415	Pennsylvania	Somerset	Allegheny Formation		0.0753	<1.50	113.0	43	387	2.4	0.49	0.26	21.3	80.2	8.74	49.9	17.9
ERP00423	E-227724	PAS 1416	Pennsylvania	Somerset	Allegheny Formation		0.2630	<0.86	80.0	22	591	3.7	0.44	0.33	22.9	58.6	4.88	34.1	14.0
ERP00423	E-227725	PAS 1417	Pennsylvania	Somerset	Monongahela Group	Pittsburgh coal	0.0274	<0.24	11.0	6	73	1.6	0.13	0.09	5.1	25.8	1.43	17.0	6.3
ERP00423	E-227726	PAS 1418	Pennsylvania	Somerset	Monongahela Group	Blue Lick coal	0.1150	<0.39	32.4	189	205	1.6	0.38	0.35	8.5	30.0	2.65	23.0	7.3
ERP00423	E-227727	PAS 1419	Pennsylvania	Somerset	Allegheny Formation		0.0037	<0.08	0.3	3	65	0.4	0.06	0.01	2.2	6.1	0.19	5.5	2.5

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
Eastern Province																			
ERP00249	E-201622	92789C	Kentucky	Pulaski		prepared coal	1.2	0.03	6.2	5.4	0.8	1.5	6.6	4.1	4.0	0.2	2.3	4.0	1.3
ERP00249	E-201623	92790C	Kentucky	Pulaski		prepared coal	1.0	0.67	17.0	159.1	15.1	1.1	22.7	22.0	6.7	1.0	<1.4	26.3	2.2
ERP00249	E-201624	92807C	Kentucky	Pulaski		prepared coal	1.7	0.09	7.9	5.5	1.0	2.0	7.3	5.3	5.1	0.3	2.8	4.3	1.8
ERP00249	E-201625	92808C	Kentucky	Pulaski		prepared coal	0.7	0.18	3.7	2.8	0.3	0.9	3.8	2.2	2.6	0.1	1.3	3.7	0.9
ERP00249	E-201626	92809C	Kentucky	Pulaski		prepared coal	2.0	0.12	7.8	7.2	0.7	1.7	8.4	5.1	4.6	0.3	2.9	4.1	1.7
ERP00249	E-201627	92810C	Kentucky	Pulaski		prepared coal	1.0	0.12	6.5	5.4	0.6	1.4	5.6	4.6	3.4	0.2	1.9	4.4	3.8
ERP00249	E-201628	92811C	Kentucky	Pulaski		prepared coal	0.6	0.08	4.2	3.6	0.4	0.9	3.5	2.6	1.7	0.1	1.4	3.8	0.7
ERP00249	E-201629	92812C	Kentucky	Pulaski		prepared coal	0.9	0.36	6.6	11.5	0.7	1.7	5.1	4.8	4.3	0.2	2.2	3.5	2.8
ERP00249	E-201630	5498C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.9	0.52	4.8	7.4	0.6	1.0	5.7	3.4	3.6	0.2	1.7	6.7	1.1
ERP00249	E-201631	5499C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	3.2	0.26	5.6	8.1	0.8	1.4	10.4	5.6	11.6	0.4	2.7	10.3	1.3
ERP00249	E-201632	5500C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.1	0.03	2.6	1.9	0.4	0.2	2.1	1.1	0.5	0.1	0.5	4.9	0.7
ERP00249	E-201633	5501C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.3	0.02	2.9	2.0	0.3	0.4	3.3	1.5	0.6	0.0	0.8	1.5	0.9
ERP00249	E-201634	5502C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.3	0.03	4.9	1.6	0.3	0.8	4.6	2.5	0.7	0.1	1.3	3.0	0.7
ERP00249	E-201635	5503C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.5	0.10	7.6	2.5	0.5	2.3	6.7	6.1	3.7	0.1	4.0	4.3	3.7
ERP00249	E-201636	5504C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	1.7	2.70	5.2	4.4	0.4	2.7	5.2	5.8	6.1	0.2	2.7	3.3	3.4
ERP00249	E-201637	92790D	Kentucky	Pulaski		prepared coal	1.0	0.36	16.6	151.3	7.0	1.2	21.2	21.6	6.5	0.9	<1.4	28.1	3.0
ERP00249	E-201638	5498D	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	0.8	0.34	4.0	5.9	0.5	0.9	5.0	3.0	3.2	0.2	1.6	6.2	0.9
ERP00250	E-201639	92791A	Kentucky	Pulaski		fly ash	24.9	<0.02	117.6	136.6	5.0	31.6	102.7	28.0	85.2	3.0	43.6	2.5	9.1
ERP00250	E-201640	92792A	Kentucky	Pulaski		fly ash	17.2	0.22	109.6	99.8	7.5	26.3	95.3	52.3	70.9	2.0	39.6	2.2	10.9
ERP00250	E-201641	92793A	Kentucky	Pulaski		fly ash	17.9	0.18	107.2	109.0	11.7	28.3	96.7	55.9	74.8	2.9	41.3	18.9	15.7
ERP00250	E-201642	92794A	Kentucky	Pulaski		fly ash	17.0	0.40	105.1	93.4	8.7	27.1	90.9	53.8	71.8	2.3	39.0	19.6	12.2
ERP00250	E-201643	92795A	Kentucky	Pulaski		fly ash	15.9	0.23	106.4	98.5	7.8	26.0	95.9	53.6	69.9	2.0	39.3	22.7	11.6
ERP00250	E-201644	92796A	Kentucky	Pulaski		fly ash	16.6	0.18	108.0	99.1	7.6	27.5	95.6	49.5	75.6	2.0	39.2	13.6	10.4
ERP00250	E-201645	92797A	Kentucky	Pulaski		fly ash	14.6	0.12	106.6	98.7	7.0	25.7	96.0	45.3	71.2	1.9	38.7	14.9	9.9
ERP00250	E-201646	92798A	Kentucky	Pulaski		fly ash	14.1	0.40	99.0	93.2	6.7	23.9	84.9	46.0	67.1	1.7	35.0	18.5	9.5
ERP00250	E-201647	92799A	Kentucky	Pulaski		fly ash	14.8	0.17	98.2	94.7	6.8	23.7	88.7	42.5	65.6	1.7	35.7	18.4	9.1
ERP00250	E-201648	92800A	Kentucky	Pulaski		fly ash	78.7	0.72	137.5	119.7	36.3	34.6	183.1	159.8	88.2	9.6	53.8	76.5	47.4
ERP00250	E-201649	92801A	Kentucky	Pulaski		fly ash	84.2	0.76	135.8	118.2	36.4	35.5	184.3	164.1	92.6	9.6	53.1	239.0	48.3
ERP00250	E-201650	92802A	Kentucky	Pulaski		fly ash	116.1	1.40	145.6	142.0	49.0	34.8	219.7	185.7	91.1	13.9	55.3	9.2	62.8
ERP00250	E-201651	92803A	Kentucky	Pulaski		fly ash	97.2	0.95	141.4	126.4	40.1	35.7	204.2	177.7	91.1	11.3	54.2	8.6	57.3
ERP00250	E-201652	92804A	Kentucky	Pulaski		fly ash	272.8	0.50	175.8	231.2	69.5	30.2	308.3	242.5	103.9	38.7	55.9	5.4	83.3
ERP00250	E-201653	92805A	Kentucky	Pulaski		fly ash	126.4	1.60	146.9	147.7	47.1	32.5	225.5	192.2	89.7	16.4	53.4	6.0	65.4
ERP00250	E-201654	92806A	Kentucky	Pulaski		bottom ash	11.4	<0.02	104.3	124.2	3.2	24.1	85.5	24.4	70.2	1.1	36.8	26.1	59.7
ERP00250	E-201655	92794D	Kentucky	Pulaski		fly ash	16.7	0.35	98.3	106.6	7.4	25.9	90.8	48.9	68.9	1.9	36.7	22.6	10.3
ERP00250	E-201656	92802D	Kentucky	Pulaski		fly ash	109.7	1.50	141.8	161.5	42.3	33.4	218.5	182.9	88.9	13.6	54.1	19.0	60.7
ERP00423	E-227705	PAS 1321-1	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	15.7	0.46	59.3	13.0	14.9	3.3	18.3	9.3	20.6	2.7	13.0	41.4	3.8
ERP00423	E-227706	PAS 1321-2	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	16.1	0.45	60.3	14.0	16.2	2.8	18.2	10.1	22.5	2.8	13.0	171.0	<0.74
ERP00423	E-227707	PAS 1322	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	1.3	0.12	13.4	9.1	2.1	1.7	8.8	3.5	9.0	0.3	4.0	4.6	0.4
ERP00423	E-227708	PAS 1400	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	1.4	0.40	34.1	9.7	2.5	2.2	17.3	9.2	10.1	0.8	5.5	8.6	1.1
ERP00423	E-227709	PAS 1401	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	2.0	0.38	57.5	16.2	2.8	4.6	25.3	18.3	21.6	1.1	8.4	9.8	1.6
ERP00423	E-227710	PAS 1402	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	3.8	0.77	157.0	41.0	4.1	12.1	51.1	43.7	64.7	1.6	17.6	19.9	2.5
ERP00423	E-227711	PAS 1403	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	3.8	0.60	233.0	47.2	4.4	17.4	70.3	47.1	68.4	1.4	24.4	19.0	23.0
ERP00423	E-227712	PAS 1404	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	2.1	0.37	70.0	14.3	2.3	5.1	22.5	14.1	25.4	0.9	8.5	9.8	1.2
ERP00423	E-227713	PAS 1405	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	5.5	0.26	11.9	95.5	4.8	3.0	42.6	6.8	22.3	1.6	5.8	1.6	<0.5
ERP00423	E-227714	PAS 1406	Pennsylvania	Somerset	Monongahela Group	Redstone coal	1.3	0.03	8.2	6.4	1.4	1.4	14.0	3.3	8.5	0.4	2.5	1.5	0.4
ERP00423	E-227715	PAS 1407	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	1.5	0.17	57.3	48.4	4.0	3.8	27.7	13.3	50.0	1.2	9.3	2.2	1.2
ERP00423	E-227716	PAS 1408	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	2.8	0.28	27.4	81.3	3.3	2.6	19.3	8.7	17.2	1.0	6.9	5.4	0.7
ERP00423	E-227717	PAS 1409	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	11.6	0.25	18.3	123.0	4.5	4.6	42.3	8.4	39.8	1.5	6.4	1.6	0.9
ERP00423	E-227718	PAS 1410	Pennsylvania	Somerset	Monongahela Group	Redstone coal	1.8	0.05	13.0	14.4	1.5	2.6	17.7	6.6	26.4	0.5	4.5	2.1	0.6
ERP00423	E-227719	PAS 1411	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	2.0	0.16	58.5	187.0	2.8	5.3	35.9	16.7	75.7	1.3	11.6	2.5	2.3
ERP00423	E-227720	PAS 1412	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	1.4	0.26	15.1	10.1	2.6	1.4	12.2	5.7	7.3	0.5	3.7	4.1	0.3
ERP00423	E-227721	PAS 1413	Pennsylvania	Somerset	Allegheny Formation	Upper Kittanning coal	3.8	0.43	25.0	33.7	2.2	2.6	15.4	10.3	21.2	0.7	5.4	6.2	0.8
ERP00423	E-227722	PAS 1414	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	3.5	0.28	45.4	15.7	2.2	3.6	20.4	13.6	20.4	1.1	7.1	7.3	0.8
ERP00423	E-227723	PAS 1415	Pennsylvania	Somerset	Allegheny Formation		3.6	0.54	110.0	179.0	7.3	7.0	53.1	32.2	116.0	1.2	13.7	6.9	2.2
ERP00423	E-227724	PAS 1416	Pennsylvania	Somerset	Allegheny Formation		9.8	0.18	66.3	72.8	3.9	5.8	51.4	18.4	59.9	2.1	14.8	2.9	1.4
ERP00423	E-227725	PAS 1417	Pennsylvania	Somerset	Monongahela Group	Pittsburgh coal	2.9	0.45	19.4	28.0	2.3	2.6	13.9	6.1	17.9	0.7	5.8	4.5	0.5
ERP00423	E-227726	PAS 1418	Pennsylvania	Somerset	Monongahela Group	Blue Lick coal	3.4	0.19	23.6	15.1	2.3	3.6	18.4	11.1	33.4	1.2	7.9	3.6	0.9
ERP00423	E-227727	PAS 1419	Pennsylvania	Somerset	Allegheny Formation		0.2	0.22	12.4	1.5	0.3	1.1	2.9	2.5	2.2	0.2	2.1	2.9	0.3

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
Eastern Province															
ERP00249	E-201622	92789C	Kentucky	Pulaski		prepared coal	54	0.08	4.5	0.49	1.3	11.3	9.9	5.6	39.3
ERP00249	E-201623	92790C	Kentucky	Pulaski		prepared coal	53	0.11	<3.8	19.79	1.0	8.5	6.7	28.9	58.4
ERP00249	E-201624	92807C	Kentucky	Pulaski		prepared coal	61	0.05	5.3	0.55	1.8	13.7	11.4	6.5	41.5
ERP00249	E-201625	92808C	Kentucky	Pulaski		prepared coal	30	0.02	2.6	0.25	0.8	6.9	5.5	3.3	27.3
ERP00249	E-201626	92809C	Kentucky	Pulaski		prepared coal	63	0.04	5.4	0.55	1.5	14.5	11.5	7.2	49.3
ERP00249	E-201627	92810C	Kentucky	Pulaski		prepared coal	58	0.04	3.4	0.28	1.2	11.2	8.0	4.8	36.1
ERP00249	E-201628	92811C	Kentucky	Pulaski		prepared coal	44	0.02	2.5	0.19	0.7	7.1	6.0	2.9	24.5
ERP00249	E-201629	92812C	Kentucky	Pulaski		prepared coal	61	0.03	4.0	0.27	1.4	11.4	9.4	5.6	35.8
ERP00249	E-201630	5498C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	36	0.03	2.7	1.08	0.9	9.6	6.4	5.0	24.8
ERP00249	E-201631	5499C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	32	0.05	1.8	1.60	1.1	21.2	4.4	8.8	19.0
ERP00249	E-201632	5500C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	32	0.02	0.5	0.55	0.2	2.8	2.6	2.2	4.0
ERP00249	E-201633	5501C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	51	0.02	2.0	0.05	0.4	3.6	5.3	1.3	8.7
ERP00249	E-201634	5502C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	38	0.01	3.0	0.03	0.7	5.4	9.2	1.8	13.7
ERP00249	E-201635	5503C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	44	0.04	8.7	0.09	1.8	18.3	16.9	8.2	41.0
ERP00249	E-201636	5504C	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	20	0.02	8.8	0.15	3.0	11.4	11.0	5.3	92.2
ERP00249	E-201637	92790D	Kentucky	Pulaski		prepared coal	48	0.15	<2.8	19.06	1.0	8.4	6.4	28.2	40.0
ERP00249	E-201638	5498D	Kentucky	Knox	Breathitt Formation	Dean (Fireclay) coal	33	0.03	2.3	0.92	0.9	8.8	6.0	4.1	25.0
ERP00250	E-201639	92791A	Kentucky	Pulaski		fly ash	964	0.14	80.8	1.50	29.4	205.4	202.4	80.9	672.0
ERP00250	E-201640	92792A	Kentucky	Pulaski		fly ash	871	0.20	76.4	3.83	21.7	176.4	186.2	69.3	684.3
ERP00250	E-201641	92793A	Kentucky	Pulaski		fly ash	905	0.88	80.2	4.13	23.4	181.1	187.2	67.2	652.2
ERP00250	E-201642	92794A	Kentucky	Pulaski		fly ash	876	0.38	77.7	4.17	22.1	171.0	180.1	66.9	584.6
ERP00250	E-201643	92795A	Kentucky	Pulaski		fly ash	881	0.30	78.6	3.92	21.6	176.1	181.4	61.9	593.8
ERP00250	E-201644	92796A	Kentucky	Pulaski		fly ash	853	0.26	75.0	3.81	22.6	173.5	183.2	57.8	639.0
ERP00250	E-201645	92797A	Kentucky	Pulaski		fly ash	849	0.19	74.3	3.35	21.2	175.3	180.6	57.2	595.6
ERP00250	E-201646	92798A	Kentucky	Pulaski		fly ash	776	0.16	67.5	3.41	20.6	156.4	161.4	51.5	553.3
ERP00250	E-201647	92799A	Kentucky	Pulaski		fly ash	795	0.16	67.8	3.44	20.1	161.9	164.5	55.5	585.5
ERP00250	E-201648	92800A	Kentucky	Pulaski		fly ash	1188	1.16	93.8	24.38	45.5	320.6	225.9	218.8	821.6
ERP00250	E-201649	92801A	Kentucky	Pulaski		fly ash	1173	1.23	89.1	25.40	46.4	316.6	223.1	220.5	796.4
ERP00250	E-201650	92802A	Kentucky	Pulaski		fly ash	1214	1.52	87.0	32.06	52.2	375.1	230.4	288.4	797.4
ERP00250	E-201651	92803A	Kentucky	Pulaski		fly ash	1193	1.33	88.0	29.26	49.3	342.1	229.0	250.2	696.6
ERP00250	E-201652	92804A	Kentucky	Pulaski		fly ash	1247	2.34	66.4	44.08	59.4	506.6	194.9	507.5	624.4
ERP00250	E-201653	92805A	Kentucky	Pulaski		fly ash	1187	1.54	78.7	31.85	50.7	378.3	213.5	317.7	758.4
ERP00250	E-201654	92806A	Kentucky	Pulaski		bottom ash	757	<0.10	77.1	1.33	21.7	169.7	174.4	36.1	654.1
ERP00250	E-201655	92794D	Kentucky	Pulaski		fly ash	823	0.20	69.6	3.92	21.7	164.9	174.1	57.2	539.8
ERP00250	E-201656	92802D	Kentucky	Pulaski		fly ash	1195	1.52	85.5	30.77	50.0	369.3	224.8	285.4	818.0
ERP00423	E-227705	PAS 1321-1	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	99	0.29	3.2	1.46	2.7	204.0	24.3	47.8	26.0
ERP00423	E-227706	PAS 1321-2	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	96	0.31	3.4	1.66	2.9	203.0	24.7	46.1	29.4
ERP00423	E-227707	PAS 1322	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	84	0.04	1.9	0.18	0.8	24.1	7.7	12.2	20.9
ERP00423	E-227708	PAS 1400	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	70	0.08	3.2	2.21	1.6	37.4	10.3	20.0	27.3
ERP00423	E-227709	PAS 1401	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	258	0.13	6.2	1.95	2.3	63.3	11.9	29.5	71.7
ERP00423	E-227710	PAS 1402	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	764	0.21	13.7	3.64	4.6	109.0	19.2	63.1	186.0
ERP00423	E-227711	PAS 1403	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	1620	0.30	21.9	1.66	5.6	133.0	28.7	72.1	269.0
ERP00423	E-227712	PAS 1404	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	234	0.12	7.0	1.95	2.1	57.7	12.1	25.9	77.8
ERP00423	E-227713	PAS 1405	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	24	0.05	<1.4	1.49	1.1	37.5	6.9	15.9	33.2
ERP00423	E-227714	PAS 1406	Pennsylvania	Somerset	Monongahela Group	Redstone coal	28	0.05	1.6	0.13	0.6	15.3	3.4	11.9	15.1
ERP00423	E-227715	PAS 1407	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	109	0.14	5.8	0.92	4.0	75.1	14.2	43.1	43.9
ERP00423	E-227716	PAS 1408	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	31	0.12	2.8	0.31	1.5	48.4	9.5	33.2	27.1
ERP00423	E-227717	PAS 1409	Pennsylvania	Somerset	Monongahela Group	Sewickley coal	40	0.08	<2	1.36	1.5	60.0	9.1	31.9	70.7
ERP00423	E-227718	PAS 1410	Pennsylvania	Somerset	Monongahela Group	Redstone coal	49	0.07	3.2	0.28	0.9	31.0	5.7	22.1	32.8
ERP00423	E-227719	PAS 1411	Pennsylvania	Somerset	Allegheny Formation	Morantown coal	91	0.18	7.9	0.82	4.2	98.7	14.9	58.5	67.9
ERP00423	E-227720	PAS 1412	Pennsylvania	Somerset	Allegheny Formation	Lower Freeport coal	36	0.05	2.2	1.34	0.8	26.4	6.3	21.3	17.8
ERP00423	E-227721	PAS 1413	Pennsylvania	Somerset	Allegheny Formation	Upper Kittanning coal	143	0.07	3.4	1.02	1.1	42.8	7.6	35.9	31.8
ERP00423	E-227722	PAS 1414	Pennsylvania	Somerset	Allegheny Formation	Lower Kittanning coal	111	0.10	4.1	1.55	2.0	53.5	10.6	26.3	52.5
ERP00423	E-227723	PAS 1415	Pennsylvania	Somerset	Allegheny Formation		181	0.19	11.4	2.75	3.9	105.0	19.5	78.0	134.0
ERP00423	E-227724	PAS 1416	Pennsylvania	Somerset	Allegheny Formation		1120	0.18	5.6	2.01	3.3	99.7	23.0	62.9	98.9
ERP00423	E-227725	PAS 1417	Pennsylvania	Somerset	Monongahela Group	Pittsburgh coal	101	0.06	3.1	0.46	1.7	45.5	7.9	21.7	29.5
ERP00423	E-227726	PAS 1418	Pennsylvania	Somerset	Monongahela Group	Blue Lick coal	87	0.13	3.8	1.23	1.5	51.8	8.2	28.4	93.1
ERP00423	E-227727	PAS 1419	Pennsylvania	Somerset	Allegheny Formation		146	0.03	1.8	0.05	0.4	11.8	3.3	1.8	9.4

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00427	E-229115	PAS 1420	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.8	14.1	3.04	1.75	0.11	0.062	0.014	0.267	1.91	0.116	2.44	0.149
ERP00427	E-229116	PAS 1421	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.7	19.8	4.55	2.53	0.10	0.084	0.020	0.352	2.42	0.184	2.78	0.135
ERP00427	E-229117	PAS 1422	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	1.1	57.3	13.80	7.58	0.22	0.453	0.071	1.680	4.41	0.378	3.43	0.043
ERP00427	E-229118	PAS 1423	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.8	31.0	7.38	4.10	0.14	0.273	0.039	0.885	2.62	0.212	2.23	0.101
ERP00427	E-229119	PAS 1424	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	1.4	9.3	2.08	1.37	0.07	0.044	0.012	0.155	0.91	0.071	1.06	0.145
ERP00427	E-229120	PAS 1425	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	1.2	9.2	2.00	1.09	0.13	0.039	0.033	0.159	1.22	0.058	2.00	0.092
ERP00427	E-229121	PAS 1426	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	1.1	30.4	8.50	3.73	0.35	0.156	0.117	0.694	1.29	0.224	1.40	0.055
ERP00427	E-229122	PAS 1427	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	1.0	31.6	8.97	3.80	0.27	0.158	0.127	0.735	1.33	0.233	1.37	0.054
ERP00427	E-229123	PAS 1428	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	1.1	9.1	2.18	1.11	0.12	0.040	0.034	0.150	0.91	0.066	1.57	0.067
ERP00427	E-229124	PAS 1429	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.8	79.6	23.30	9.44	0.60	0.375	0.298	1.740	3.06	0.592	1.82	<0.015
ERP00424	E-227728	DUN-413	Tennessee	Anderson	Breathitt Formation	Jellico coal	1.2	9.4	2.31	1.54	0.17	0.056	0.023	0.162	0.35	0.080	1.63	0.095
ERP00424	E-227729	EAG-68	Tennessee	Claiborne	Breathitt Formation	Mingo coal	1.2	4.0	0.80	0.60	0.06	0.023	0.020	0.089	0.69	0.030	0.70	<0.015
ERP00424	E-227730	NEM-2041	Tennessee	Fentress	Lee Formation	Nemo coal	1.7	7.9	1.87	1.36	0.13	0.056	0.014	0.185	0.34	0.075	2.24	0.122
ERP00424	E-227731	PEW-2438	Tennessee	Scott	Breathitt Formation	Pewee coal	1.1	7.6	1.86	1.13	0.29	0.075	0.014	0.196	0.38	0.043	0.95	0.192
ERP00424	E-227732	RICH-51	Tennessee	Cumberland	Lee Formation	Richland coal	0.6	5.5	1.38	0.85	0.05	0.051	0.008	0.166	0.44	0.037	0.58	0.203
ERP00424	E-227733	CAR-0315	Tennessee	Morgan	Lee Formation	Rex coal	0.8	11.4	3.03	1.86	0.22	0.080	0.024	0.283	0.32	0.127	1.27	0.099
ERP00424	E-227734	WAL-2182	Tennessee	Scott	Breathitt Formation	Walnut Mountain	1.1	9.3	2.42	1.50	0.18	0.064	0.019	0.226	0.26	0.103	0.94	0.188
ERP00424	E-227735	STR-1389	Tennessee	Claiborne	Breathitt Formation		1.2	1.6	0.31	0.24	0.04	0.011	0.005	0.017	0.09	0.019	0.76	0.047
ERP00424	E-227736	EAG-96S TOP	Tennessee	Claiborne	Breathitt Formation	Mingo coal	1.7	6.6	1.08	0.74	0.08	0.042	0.011	0.157	1.62	0.030	2.54	0.024
ERP00424	E-227737	EAG-96S BTM	Tennessee	Claiborne	Breathitt Formation	Mingo coal	1.9	3.5	0.85	0.60	0.07	0.018	0.005	0.059	0.14	0.030	1.12	0.051
ERP00063	E-141556	WVGS#18883	West Virginia	Marion	Monongahela Group	Sewickley coal	1.2	16.3	3.31	1.88	0.16	0.098	0.044	0.325	2.46	0.092		0.020
ERP00063	E-141557	WVGS#18493	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	1.7	10.4	2.81	1.59	0.03	0.025	0.012	0.095	0.14	0.125		0.083
ERP00063	E-141558	WVGS#18505	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	2.1	11.8	2.59	2.20	0.04	0.046	0.016	0.196	0.26	0.113		0.068
ERP00063	E-141559	WVGS#18471	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	1.8	6.5	1.74	0.96	0.04	0.016	0.013	0.054	0.11	0.078		0.116
ERP00063	E-141560	WVGS#18485	West Virginia	Kanawha	Allegheny Formation	Little No. 5 Block coal	1.8	12.0	2.77	1.97	0.04	0.051	0.021	0.259	0.30	0.079		0.082
ERP00063	E-141561	WVGS#18879	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.7	25.6	5.33	3.35	0.26	0.130	0.048	0.510	0.77	0.169		0.080
ERP00063	E-141562	WVGS#18882	West Virginia	Kanawha	Kanawha Formation	Stockton coal	2.2	20.4	5.03	3.35	0.09	0.113	0.035	0.525	0.57	0.220		0.057
ERP00063	E-141563	WVGS#18881	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.8	23.5	4.93	3.46	0.24	0.122	0.051	0.585	0.51	0.169		0.087
ERP00063	E-141564	WVGS#18919	West Virginia	Nicholas	Kanawha Formation	Stockton coal	0.9	13.8	2.48	1.01	0.08	0.047	0.013	0.160	3.32	0.056		0.048
ERP00063	E-141565	WVGS#18852	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.5	28.6	7.02	3.95	0.12	0.147	0.047	0.617	1.44	0.223		0.064
ERP00063	E-141566	WVGS#18854	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.6	21.9	5.62	3.37	0.07	0.108	0.044	0.491	1.13	0.184		0.089
ERP00063	E-141567	WVGS#18245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	3.1	12.2	2.66	1.75	0.08	0.058	0.019	0.203	0.23	0.102		0.059
ERP00063	E-141568	WVGS#18926	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.3	18.5	3.72	2.47	0.05	0.071	0.025	0.323	2.45	0.111		0.074
ERP00063	E-141569	WVGS#18923	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.7	30.2	7.68	3.92	0.06	0.171	0.043	0.827	0.82	0.199		0.029
ERP00063	E-141570	WVGS#18609	West Virginia	Boone	Kanawha Formation	Winifrede coal	1.9	7.1	1.76	0.84	0.11	0.038	0.017	0.013	0.13	0.081		0.113
ERP00063	E-141571	WVGS#18340	West Virginia	Kanawha	Kanawha Formation	Coalburg coal	2.5	32.8	7.24	4.74	0.04	0.156	0.058	0.762	0.57	0.256		0.055
ERP00063	E-141572	WVGS#18456	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.7	6.1	1.28	1.09	0.06	0.028	0.016	0.081	0.12	0.037		0.118
ERP00063	E-141573	WVGS#18457	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.6	10.3	2.83	1.79	0.04	0.021	0.021	0.078	0.15	0.148		0.092
ERP00063	E-141574	WVGS#18458	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.3	9.0	2.38	1.76	0.03	0.028	0.021	0.127	0.12	0.135		0.110
ERP00063	E-141575	WVGS#18443	West Virginia	Kanawha	Kanawha Formation	Williamson coal	1.4	11.3	3.08	1.55	0.04	0.027	0.026	0.131	0.76	0.135		0.155
ERP00063	E-141576	WVGS#18423	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	2.9	13.4	3.65	2.15	0.06	0.042	0.016	0.178	0.56	0.209		0.061
ERP00063	E-141577	WVGS#18436	West Virginia	Wayne	Allegheny Formation	Coalburg coal	3.1	7.8	1.75	1.24	0.07	0.043	0.028	0.194	0.19	0.043		0.148
ERP00063	E-141578	WVGS#18847	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.3	27.9	7.36	3.81	0.24	0.151	0.039	0.649	1.44	0.234		0.061
ERP00063	E-141579	WVGS#18850	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.2	38.7	10.90	5.22	0.13	0.280	0.075	1.250	1.27	0.278		0.077
ERP00063	E-141580	WVGS#18928	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.4	8.0	2.19	1.25	0.05	0.024	0.021	0.066	0.38	0.091		0.114
ERP00063	E-141581	WVGS#18907	West Virginia	Nicholas	Kanawha Formation	Winifrede coal	1.1	12.0	3.10	1.94	0.06	0.037	0.020	0.139	0.19	0.122		0.104
ERP00063	E-141582	WVGS#18611	West Virginia	Boone	Kanawha Formation	Winifrede coal	1.8	4.8	1.00	0.72	0.07	0.032	0.018	0.076	0.31	0.052		0.139
ERP00063	E-141583	WVGS#18596	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.7	6.1	1.41	1.07	0.05	0.030	0.015	0.096	0.26	0.040		0.164
ERP00063	E-141584	WVGS#18265	West Virginia	Mingo	Kanawha Formation	Coalburg coal	2.7	20.5	5.31	3.42	0.04	0.115	0.030	0.545	0.55	0.197		0.034
ERP00063	E-141585	WVGS#18300	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	2.6	25.7	5.65	4.43	0.07	0.130	0.046	0.747	0.81	0.231		0.029
ERP00063	E-141586	WVGS#18308	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	2.2	13.5	3.15	2.24	0.06	0.055	0.017	0.202	0.59	0.146		0.056
ERP00075	E-159650	WVGS#18858	West Virginia	Harrison	Monongahela Group	Redstone coal	1.5	9.3	1.62	0.99	0.46	0.060	0.016	0.120	1.40	0.051		0.029
ERP00075	E-159651	WVGS#18855	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.6	25.8	7.25	3.70	0.16	0.150	0.040	0.464	0.67	0.193		0.037
ERP00075	E-159652	WVGS#18869	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.9	15.8	3.73	2.17	0.25	0.094	0.029	0.286	1.40	0.095		0.167
ERP00075	E-159653	WVGS#1184	West Virginia	Fayette	Allegheny Formation	No. 5 Block coal	1.8	22.9	7.49	2.92	0.06	0.027	0.011	0.050	0.23	0.281		0.040
ERP00075	E-159654	WVGS#18218	West Virginia	Mingo	Allegheny Formation	No. 5 Block coal	2.0	22.8	6.11	3.97	0.04	0.097	0.033	0.583	0.31	0.220		0.024
ERP00075	E-159655	WVGS#18327	West Virginia	Kanawha	Kanawha Formation	Stockton coal	2.1	13.2	3.93	1.87	0.06	0.039	0.017	0.148	0.28	0.153		0.086
ERP00075	E-159656	WVGS#11497	West Virginia	Raleigh	Kanawha Formation	Winifrede coal	3.0	8.0	2.17	1.12	0.09	0.095	0.023	0.111	0.20	0.062		0.076
ERP00075	E-159657	WVGS#18449	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	1.2	9.2	2.29	1.17	0.08	0.043	0.023	0.139	1.03	0.064		0.183
ERP00075	E-159658	WVGS#9696	West Virginia	Kanawha	Kanawha Formation	Powellton coal	1.5	20.0	5.06	3.15	0.03	0.189	0.063	0.803	0.97	0.118		0.060
ERP00075	E-159659	WVGS#15952	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.3	18.5	5.64	2.63	0.03	0.052	0.037	0.273	0.27	0.173		0.090

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00427	E-229115	PAS 1420	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0277	<0.29	22.7	17	248	2.0	0.15	0.17	5.9	20.9	1.15	21.7	6.3
ERP00427	E-229116	PAS 1421	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0484	<0.40	27.1	18	279	2.1	0.23	0.14	9.0	27.7	1.81	27.9	8.4
ERP00427	E-229117	PAS 1422	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0583	<1.20	39.4	39	1250	3.3	0.52	0.39	21.8	71.1	6.70	53.3	18.9
ERP00427	E-229118	PAS 1423	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0384	<0.62	16.2	29	865	2.4	0.28	0.24	10.5	42.5	3.19	30.6	10.4
ERP00427	E-229119	PAS 1424	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	0.0247	<0.19	13.3	11	162	3.0	0.09	0.06	3.4	20.0	0.77	15.3	8.5
ERP00427	E-229120	PAS 1425	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.0049	<0.19	16.2	56	51	1.3	0.11	0.11	3.5	12.8	0.97	6.1	4.3
ERP00427	E-229121	PAS 1426	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.0316	<0.61	16.2	59	186	1.4	0.35	0.19	9.2	38.9	3.40	29.3	9.5
ERP00427	E-229122	PAS 1427	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.0237	<0.64	12.7	63	181	1.6	0.38	0.20	8.5	43.0	3.57	25.6	9.8
ERP00427	E-229123	PAS 1428	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.0114	<0.19	7.0	58	56	1.1	0.13	0.11	4.5	15.2	0.86	8.3	3.8
ERP00427	E-229124	PAS 1429	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	0.0552	<1.60	40.4	63	550	2.6	0.88	0.42	19.1	87.6	8.60	59.2	20.9
ERP00424	E-227728	DUN-413	Tennessee	Anderson	Breathitt Formation	Jellico coal	0.0356	<0.19	26.0	86	140	1.4	0.26	0.08	3.0	13.7	0.46	35.9	5.3
ERP00424	E-227729	EAG-68	Tennessee	Claiborne	Breathitt Formation	Mingo coal	0.0061	<0.08	1.7	37	28	1.0	0.08	0.05	7.5	6.3	0.34	9.8	2.0
ERP00424	E-227730	NEM-2041	Tennessee	Fentress	Lee Formation	Nemo coal	0.0200	<0.16	54.5	31	74	2.4	0.12	0.06	4.5	12.5	1.24	15.1	5.5
ERP00424	E-227731	PEW-2438	Tennessee	Scott	Breathitt Formation	Pewee coal	0.0050	<0.16	3.8	14	57	2.1	0.16	0.11	11.2	17.3	0.77	26.6	4.5
ERP00424	E-227732	RICH-51	Tennessee	Cumberland	Lee Formation	Richland coal	0.0030	<0.11	0.9	6	70	1.0	0.04	0.02	9.1	8.0	0.88	9.2	2.0
ERP00424	E-227733	CAR-0315	Tennessee	Morgan	Lee Formation	Rex coal	0.1080	<0.23	19.4	55	311	1.4	0.13	0.10	6.9	18.6	1.77	29.5	4.3
ERP00424	E-227734	WAL-2182	Tennessee	Scott	Breathitt Formation	Walnut Mountain	0.0887	<0.19	2.1	43	249	1.1	0.21	0.08	4.9	14.6	0.66	17.7	4.6
ERP00424	E-227735	STR-1389	Tennessee	Claiborne	Breathitt Formation		0.0012	0.08	1.4	16	20	1.7	0.14	0.03	4.6	4.6	0.05	6.3	2.8
ERP00424	E-227736	EAG-96S TOP	Tennessee	Claiborne	Breathitt Formation	Mingo coal	0.0193	<0.14	72.0	42	74	0.8	0.12	0.09	3.3	7.0	0.51	19.8	2.5
ERP00424	E-227737	EAG-96S BTM	Tennessee	Claiborne	Breathitt Formation	Mingo coal	0.0216	<0.07	1.7	34	60	1.5	0.09	0.09	9.8	9.3	0.14	22.9	5.1
ERP00063	E-141556	WVGS#18883	West Virginia	Marion	Monongahela Group	Sewickley coal	0.0064	<0.17	6.4	38	131	0.9	0.13	0.10	6.5	14.6	1.76	7.2	5.1
ERP00063	E-141557	WVGS#18493	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	0.0018	<0.11	2.1	9	37	2.1	0.22	0.05	5.8	15.3	0.44	23.4	5.9
ERP00063	E-141558	WVGS#18505	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	0.0077	<0.12	1.9	10	56	1.2	0.21	0.08	7.6	20.3	1.32	23.8	7.5
ERP00063	E-141559	WVGS#18471	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	0.0017	0.07	1.1	7	35	0.9	0.11	0.03	6.9	10.3	0.24	15.0	3.1
ERP00063	E-141560	WVGS#18485	West Virginia	Kanawha	Allegheny Formation	Little No. 5 Block coal	0.0031	<0.12	2.5	8	67	3.8	0.13	0.08	7.0	16.1	1.56	25.6	9.2
ERP00063	E-141561	WVGS#18879	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0413	<0.26	38.7	28	142	1.7	0.33	0.11	9.2	30.7	2.66	30.7	11.1
ERP00063	E-141562	WVGS#18882	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0053	0.20	5.2	22	133	2.0	0.27	0.08	8.7	28.2	3.22	25.1	9.2
ERP00063	E-141563	WVGS#18881	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0215	<0.24	11.4	24	146	1.7	0.24	0.10	9.7	27.0	3.10	25.4	11.8
ERP00063	E-141564	WVGS#18919	West Virginia	Nicholas	Kanawha Formation	Stockton coal	0.0036	<0.14	27.5	16	142	4.3	0.08	0.10	8.1	13.3	0.88	11.2	3.4
ERP00063	E-141565	WVGS#18852	West Virginia	Webster	Kanawha Formation	Coalburg coal	0.0075	<0.29	18.1	28	209	2.0	0.25	0.10	10.8	32.6	3.43	15.7	11.4
ERP00063	E-141566	WVGS#18854	West Virginia	Webster	Kanawha Formation	Coalburg coal	0.0029	<0.22	26.7	36	142	2.2	0.26	0.09	10.5	28.3	2.65	26.5	10.2
ERP00063	E-141567	WVGS#18245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0027	<0.13	3.4	32	74	1.0	0.17	0.04	6.9	16.0	1.11	18.5	6.4
ERP00063	E-141568	WVGS#18926	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0040	<0.19	46.4	23	76	1.3	0.13	0.09	10.7	23.7	2.02	7.3	10.1
ERP00063	E-141569	WVGS#18923	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0066	<0.31	4.1	18	486	2.7	0.19	0.08	9.0	34.4	4.65	16.2	13.0
ERP00063	E-141570	WVGS#18609	West Virginia	Boone	Kanawha Formation	Winifrede coal	0.0009	0.14	0.6	3	68	5.6	0.21	0.03	7.7	8.0	0.04	19.2	3.1
ERP00063	E-141571	WVGS#18340	West Virginia	Kanawha	Kanawha Formation	Coalburg coal	0.0072	0.36	2.0	31	196	2.4	0.31	0.05	7.9	40.7	4.00	22.1	14.3
ERP00063	E-141572	WVGS#18456	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0186	0.06	1.8	12	59	1.1	0.06	0.07	7.6	10.6	0.49	17.8	4.6
ERP00063	E-141573	WVGS#18457	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0023	0.12	2.0	7	50	1.4	0.24	0.04	6.5	17.4	0.38	26.8	4.8
ERP00063	E-141574	WVGS#18458	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0012	0.11	0.8	7	52	1.5	0.20	0.01	7.2	20.8	0.75	30.1	6.2
ERP00063	E-141575	WVGS#18443	West Virginia	Kanawha	Kanawha Formation	Williamson coal	0.0020	0.12	2.4	11	89	9.0	0.25	0.02	9.1	18.8	0.26	30.5	10.6
ERP00063	E-141576	WVGS#18423	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	0.0029	0.19	8.5	36	45	5.4	0.23	0.07	16.6	26.5	0.91	17.7	7.7
ERP00063	E-141577	WVGS#18436	West Virginia	Wayne	Allegheny Formation	Coalburg coal	0.0014	<0.08	1.4	47	49	5.3	0.10	0.10	14.2	10.9	1.17	30.1	5.1
ERP00063	E-141578	WVGS#18847	West Virginia	Webster	Kanawha Formation	Coalburg coal	0.0073	<0.28	4.4	23	138	1.6	0.25	0.08	10.6	35.4	3.01	20.3	9.8
ERP00063	E-141579	WVGS#18850	West Virginia	Webster	Kanawha Formation	Coalburg coal	0.0068	<0.39	2.4	27	260	2.6	0.34	0.12	10.9	51.1	5.26	31.0	13.5
ERP00063	E-141580	WVGS#18928	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0014	<0.08	7.3	22	56	0.6	0.12	0.04	4.8	14.7	0.26	13.0	3.4
ERP00063	E-141581	WVGS#18907	West Virginia	Nicholas	Kanawha Formation	Winifrede coal	0.0026	0.13	0.6	4	70	2.5	0.25	0.03	8.2	20.2	0.42	29.4	5.7
ERP00063	E-141582	WVGS#18611	West Virginia	Boone	Kanawha Formation	Winifrede coal	0.0008	0.06	24.5	9	69	3.0	0.18	0.05	7.8	11.6	0.36	21.3	5.1
ERP00063	E-141583	WVGS#18596	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0048	0.06	6.0	10	71	3.0	0.10	0.08	7.4	8.2	0.54	17.3	4.6
ERP00063	E-141584	WVGS#18265	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0063	0.21	5.4	33	89	3.2	0.23	0.03	7.7	27.3	3.18	18.0	8.1
ERP00063	E-141585	WVGS#18300	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	0.0067	<0.26	8.0	29	125	4.5	0.28	0.10	18.9	46.3	4.37	31.6	11.7
ERP00063	E-141586	WVGS#18308	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	0.0035	0.15	9.4	31	53	1.4	0.20	0.05	9.2	29.6	1.40	20.7	6.7
ERP00075	E-159650	WVGS#18858	West Virginia	Harrison	Monongahela Group	Redstone coal	0.0382	0.09	7.4	23	132	0.5	0.07	0.04	3.5	10.0	0.65	3.7	2.9
ERP00075	E-159651	WVGS#18855	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.0514	0.26	8.9	<5	872	2.1	0.23	0.13	10.1	40.0	2.79	23.4	10.7
ERP00075	E-159652	WVGS#18869	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.0217	<0.16	34.1	25	66	1.0	0.12	0.06	6.5	22.8	1.61	10.0	5.7
ERP00075	E-159653	WVGS#1184	West Virginia	Fayette	Allegheny Formation	No. 5 Block coal	0.0360	0.32	0.7	9	155	1.2	0.41	0.17	6.3	38.7	0.20	71.0	4.4
ERP00075	E-159654	WVGS#18218	West Virginia	Mingo	Allegheny Formation	No. 5 Block coal	<0.0040	0.27	1.6	15	115	6.0	0.37	0.03	10.5	47.7	1.96	52.4	10.9
ERP00075	E-159655	WVGS#18327	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0217	0.20	3.6	14	88	1.5	0.28	0.03	8.7	27.7	0.49	27.9	6.5
ERP00075	E-159656	WVGS#11497	West Virginia	Raleigh	Kanawha Formation	Winifrede coal	0.0029	0.08	0.5	2	67	1.0	0.11	0.02	3.4	11.8	0.46	157.0	2.9
ERP00075	E-159657	WVGS#18449	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	0.0025	0.09	7.0	20	74	1.3	0.18	0.03	3.4	12.1	0.48	21.2	3.7
ERP00075	E-159658	WVGS#9696	West Virginia	Kanawha	Kanawha Formation	Powellton coal	0.0022	<0.2	15.2	19	348	1.5	0.24	0.07	9.4	23.0	2.70	34.0	9.6
ERP00075	E-159659	WVGS#15952	West Virginia	Webster	Kanawha Formation	Coalburg coal	<0.0040	0.22	2.4	21	105	1.6	0.24	0.05	7.6	31.3	1.28	33.5	8.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.

[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00427	E-229115	PAS 1420	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	7.0	0.22	24.1	13.5	2.5	2.0	13.3	11.7	14.7	0.9	5.8	4.2	2.3
ERP00427	E-229116	PAS 1421	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	7.2	0.29	34.7	42.4	3.4	3.1	20.2	18.8	20.8	1.3	6.6	4.4	2.6
ERP00427	E-229117	PAS 1422	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	11.2	0.31	116.0	127.0	3.3	6.8	48.4	42.2	99.7	1.9	18.3	6.0	5.7
ERP00427	E-229118	PAS 1423	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	4.3	0.23	59.5	137.0	2.0	3.1	22.6	14.7	48.4	0.6	10.0	5.2	3.4
ERP00427	E-229119	PAS 1424	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	21.3	0.29	17.4	34.4	2.7	1.4	18.9	6.8	9.0	2.8	5.9	4.3	1.2
ERP00427	E-229120	PAS 1425	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	1.4	0.22	11.5	10.4	1.2	1.2	11.4	4.6	10.9	0.7	3.7	1.9	1.3
ERP00427	E-229121	PAS 1426	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	4.0	0.14	43.5	32.2	1.5	3.9	23.2	13.4	42.3	1.1	7.9	2.2	7.7
ERP00427	E-229122	PAS 1427	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	3.6	0.12	51.2	39.8	1.4	3.7	22.8	13.8	40.1	1.0	8.2	2.4	5.2
ERP00427	E-229123	PAS 1428	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	2.8	0.11	12.6	12.4	1.1	1.4	13.1	4.9	9.9	0.7	3.9	1.9	1.3
ERP00427	E-229124	PAS 1429	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	3.2	0.24	128.0	191.0	2.3	9.6	44.3	35.8	103.0	1.5	18.3	4.4	10.3
ERP00424	E-227728	DUN-413	Tennessee	Anderson	Breathitt Formation	Jellico coal	1.0	0.13	36.0	7.7	3.2	1.4	9.2	9.7	4.6	1.4	4.4	4.2	12.0
ERP00424	E-227729	EAG-68	Tennessee	Claiborne	Breathitt Formation	Mingo coal	5.8	0.02	6.7	6.5	1.2	0.8	12.5	2.9	3.9	0.5	1.5	1.4	0.5
ERP00424	E-227730	NEM-2041	Tennessee	Fentress	Lee Formation	Nemo coal	1.9	0.50	21.4	7.8	2.4	1.4	13.4	4.6	7.3	0.8	1.3	1.8	0.9
ERP00424	E-227731	PEW-2438	Tennessee	Scott	Breathitt Formation	Pewee coal	3.1	0.09	12.2	7.3	1.7	1.6	20.0	6.2	8.1	0.7	10.9	3.5	0.9
ERP00424	E-227732	RICH-51	Tennessee	Cumberland	Lee Formation	Richland coal	1.8	0.01	8.5	13.6	0.6	0.6	12.1	3.6	3.4	0.4	2.6	1.2	0.4
ERP00424	E-227733	CAR-0315	Tennessee	Morgan	Lee Formation	Rex coal	3.1	0.10	26.0	21.0	2.8	1.2	13.3	6.5	11.0	2.3	3.4	2.6	1.5
ERP00424	E-227734	WAL-2182	Tennessee	Scott	Breathitt Formation	Walnut Mountain	1.8	0.05	15.5	7.9	1.2	0.4	13.5	6.9	7.5	0.4	4.3	5.0	<0.28
ERP00424	E-227735	STR-1389	Tennessee	Claiborne	Breathitt Formation		10.7	0.02	1.8	2.2	0.4	1.0	8.9	2.0	0.7	1.1	1.8	2.8	0.3
ERP00424	E-227736	EAG-96S TOP	Tennessee	Claiborne	Breathitt Formation	Mingo coal	1.6	0.23	8.2	18.4	2.7	0.8	11.0	3.8	5.2	1.0	0.9	2.8	0.7
ERP00424	E-227737	EAG-96S BTM	Tennessee	Claiborne	Breathitt Formation	Mingo coal	3.1	0.03	5.6	4.4	2.3	0.7	9.7	4.8	1.5	1.0	6.6	1.4	0.9
ERP00063	E-141556	WVGS#18883	West Virginia	Marion	Monongahela Group	Sewickley coal	3.2	0.09	27.1	34.1	0.8	2.0	10.5	6.2	23.5	0.1	3.3	2.7	2.1
ERP00063	E-141557	WVGS#18493	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	1.4	0.07	20.6	4.1	1.1	2.4	9.9	9.2	6.7	0.5	4.3	7.7	4.0
ERP00063	E-141558	WVGS#18505	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	1.1	0.20	34.5	8.1	2.0	2.7	14.9	11.5	15.8	0.7	5.5	11.3	4.1
ERP00063	E-141559	WVGS#18471	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	0.7	0.08	13.3	3.0	1.0	1.7	11.6	5.8	3.5	0.3	2.4	6.9	3.2
ERP00063	E-141560	WVGS#18485	West Virginia	Kanawha	Allegheny Formation	Little No. 5 Block coal	2.4	0.08	24.6	12.2	2.2	2.0	14.5	8.8	19.6	1.4	5.1	5.4	2.8
ERP00063	E-141561	WVGS#18879	West Virginia	Kanawha	Kanawha Formation	Stockton coal	2.0	0.16	47.9	23.3	1.8	4.5	20.1	15.1	42.8	1.0	7.5	6.0	4.0
ERP00063	E-141562	WVGS#18882	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.6	0.06	39.4	10.4	1.2	5.7	19.5	13.1	45.3	1.2	6.4	7.1	3.4
ERP00063	E-141563	WVGS#18881	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.9	0.15	63.7	24.0	1.7	4.3	19.2	13.6	49.6	0.9	6.6	5.9	3.7
ERP00063	E-141564	WVGS#18919	West Virginia	Nicholas	Kanawha Formation	Stockton coal	8.5	0.24	7.6	34.1	3.6	1.3	11.9	4.8	13.1	0.4	1.8	6.9	3.8
ERP00063	E-141565	WVGS#18852	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.8	0.22	38.9	45.2	2.4	4.5	19.8	13.4	54.1	0.8	6.8	6.2	3.5
ERP00063	E-141566	WVGS#18854	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.7	0.24	27.6	22.6	1.9	4.1	19.9	13.1	39.0	1.0	6.3	8.0	3.3
ERP00063	E-141567	WVGS#18245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.0	0.05	21.1	25.5	1.6	2.8	16.2	7.7	16.1	0.7	4.2	5.5	4.1
ERP00063	E-141568	WVGS#18926	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.6	1.30	28.7	16.4	1.4	2.7	20.4	7.2	30.7	0.5	4.8	7.6	3.4
ERP00063	E-141569	WVGS#18923	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	2.1	0.05	35.0	83.7	1.3	5.4	15.8	12.3	>60.4	0.8	6.4	5.0	4.1
ERP00063	E-141570	WVGS#18609	West Virginia	Boone	Kanawha Formation	Winifrede coal	0.6	0.02	13.3	3.9	0.5	2.3	14.0	5.5	0.5	0.2	1.8	5.5	2.0
ERP00063	E-141571	WVGS#18340	West Virginia	Kanawha	Kanawha Formation	Coalburg coal	2.1	0.09	115.0	22.0	1.5	7.6	17.6	16.7	54.1	1.0	10.1	7.0	6.4
ERP00063	E-141572	WVGS#18456	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.9	0.09	20.2	5.5	2.1	1.4	12.7	4.1	5.6	0.8	4.2	8.3	2.7
ERP00063	E-141573	WVGS#18457	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.5	0.06	19.5	2.3	1.0	3.1	13.4	9.4	4.6	0.5	4.3	5.3	2.7
ERP00063	E-141574	WVGS#18458	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.3	0.04	26.8	3.1	1.0	2.8	17.6	11.2	7.1	0.7	4.7	4.9	3.7
ERP00063	E-141575	WVGS#18443	West Virginia	Kanawha	Kanawha Formation	Williamson coal	7.0	0.16	23.2	5.6	0.5	2.6	18.2	9.0	5.8	0.7	5.6	5.2	2.6
ERP00063	E-141576	WVGS#18423	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	4.1	0.24	23.3	31.2	1.8	4.6	26.5	11.9	11.3	1.2	6.1	7.8	4.5
ERP00063	E-141577	WVGS#18436	West Virginia	Wayne	Allegheny Formation	Coalburg coal	5.3	0.02	13.3	5.9	1.8	1.3	21.8	11.4	14.0	2.0	4.3	3.8	3.2
ERP00063	E-141578	WVGS#18847	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.5	0.17	31.5	245.0	1.6	5.6	19.3	12.5	41.3	0.8	7.0	6.2	3.5
ERP00063	E-141579	WVGS#18850	West Virginia	Webster	Kanawha Formation	Coalburg coal	2.5	0.05	35.6	148.0	1.2	6.2	18.8	18.0	76.2	1.0	10.2	5.7	3.6
ERP00063	E-141580	WVGS#18928	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.5	0.14	10.8	3.1	1.2	1.9	9.8	5.5	4.0	0.3	2.7	5.6	1.9
ERP00063	E-141581	WVGS#18907	West Virginia	Nicholas	Kanawha Formation	Winifrede coal	1.9	0.02	27.1	9.1	0.9	3.4	17.9	10.7	6.2	0.8	4.6	6.3	2.3
ERP00063	E-141582	WVGS#18611	West Virginia	Boone	Kanawha Formation	Winifrede coal	2.0	0.10	7.5	7.4	2.2	1.3	17.0	7.1	5.0	1.7	4.0	2.8	1.9
ERP00063	E-141583	WVGS#18596	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.8	0.11	11.4	3.2	1.7	1.1	14.4	5.0	6.0	0.9	2.6	5.9	3.9
ERP00063	E-141584	WVGS#18265	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.2	0.05	33.6	14.0	1.3	4.2	14.0	11.7	34.2	0.6	5.5	7.0	3.4
ERP00063	E-141585	WVGS#18300	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	4.0	0.13	65.0	17.9	1.9	5.9	35.7	16.9	51.9	1.2	9.3	9.4	3.4
ERP00063	E-141586	WVGS#18308	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	1.1	0.20	47.5	11.2	1.6	3.8	15.1	10.2	15.7	0.5	5.6	9.0	6.8
ERP00075	E-159650	WVGS#18858	West Virginia	Harrison	Monongahela Group	Redstone coal	1.5	0.16	7.9	110.0	0.8	5.7	6.7	4.1	7.6	0.4	2.4	2.3	1.7
ERP00075	E-159651	WVGS#18855	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	13.6	0.15	107.0	12.8	8.3	20.9	21.2	14.5	32.0	2.1	7.4	12.9	2.9
ERP00075	E-159652	WVGS#18869	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.8	0.28	32.5	23.5	1.3	11.1	13.4	7.5	22.4	0.3	4.4	<0.1	2.3
ERP00075	E-159653	WVGS#1184	West Virginia	Fayette	Allegheny Formation	No. 5 Block coal	0.5	0.25	53.1	23.1	1.2	29.3	9.7	22.9	2.8	0.4	9.0	20.6	5.6
ERP00075	E-159654	WVGS#18218	West Virginia	Mingo	Allegheny Formation	No. 5 Block coal	2.4	0.04	52.4	8.6	1.5	23.5	22.7	21.0	30.6	0.9	9.0	14.7	4.7
ERP00075	E-159655	WVGS#18327	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.2	0.06	37.5	7.0	1.5	16.1	16.1	11.9	7.3	0.7	5.1	9.2	4.1
ERP00075	E-159656	WVGS#11497	West Virginia	Raleigh	Kanawha Formation	Winifrede coal	0.6	0.02	9.1	4.9	0.6	6.3	8.3	4.6	5.7	0.3	2.7	4.2	3.1
ERP00075	E-159657	WVGS#18449	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	2.6	0.17	20.0	17.6	1.0	6.4	7.0	7.4	7.1	0.7	3.1	6.3	1.8
ERP00075	E-159658	WVGS#9696	West Virginia	Kanawha	Kanawha Formation	Powellton coal	1.2	0.18	25.0	38.8	1.7	11.5	24.6	11.9	42.4	1.3	6.1	2.1	2.2
ERP00075	E-159659	WVGS#15952	West Virginia	Webster	Kanawha Formation	Coalburg coal	1.4	0.07	21.5	6.8	1.6	17.7	15.3	11.5	17.3	0.7	7.0	8.6	9.6

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00427	E-229115	PAS 1420	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	189	0.09	3.9	1.13	1.4	35.1	10.2	45.5	36.4
ERP00427	E-229116	PAS 1421	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	501	0.11	4.2	1.29	1.5	40.4	10.9	44.2	49.9
ERP00427	E-229117	PAS 1422	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	573	0.27	14.4	1.70	5.6	128.0	23.0	139.0	95.1
ERP00427	E-229118	PAS 1423	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	247	0.15	7.1	1.17	2.1	71.3	13.1	91.8	55.5
ERP00427	E-229119	PAS 1424	Pennsylvania	Elk	Allegheny Formation	Lower Kittanning coal	157	0.05	3.0	0.45	1.0	36.7	8.9	35.3	20.1
ERP00427	E-229120	PAS 1425	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	48	0.06	1.8	1.04	0.6	19.8	4.8	22.1	17.5
ERP00427	E-229121	PAS 1426	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	128	0.15	5.3	0.77	1.7	60.5	10.1	47.4	69.3
ERP00427	E-229122	PAS 1427	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	112	0.16	5.3	0.67	1.6	61.0	10.0	58.5	73.6
ERP00427	E-229123	PAS 1428	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	81	0.07	1.9	0.38	0.8	29.1	5.3	18.4	24.1
ERP00427	E-229124	PAS 1429	Pennsylvania	Washington	Monongahela Group	Pittsburgh coal	275	0.37	13.5	1.50	3.8	119.0	20.3	97.9	181.0
ERP00424	E-227728	DUN-413	Tennessee	Anderson	Breathitt Formation	Jellico coal	289	0.11	5.2	0.42	3.5	47.3	8.3	7.1	32.3
ERP00424	E-227729	EAG-68	Tennessee	Claiborne	Breathitt Formation	Mingo coal	31	0.03	1.2	0.09	0.6	16.6	3.7	4.9	9.8
ERP00424	E-227730	NEM-2041	Tennessee	Fentress	Lee Formation	Nemo coal	84	0.04	0.7	3.12	1.5	27.2	4.4	12.8	24.2
ERP00424	E-227731	PEW-2438	Tennessee	Scott	Breathitt Formation	Pewee coal	122	0.04	7.5	0.36	1.6	38.5	15.4	16.9	11.2
ERP00424	E-227732	RICH-51	Tennessee	Cumberland	Lee Formation	Richland coal	81	0.02	2.0	0.08	0.3	11.6	5.8	8.8	10.5
ERP00424	E-227733	CAR-0315	Tennessee	Morgan	Lee Formation	Rex coal	59	0.06	2.0	0.42	1.0	34.7	6.4	14.5	46.1
ERP00424	E-227734	WAL-2182	Tennessee	Scott	Breathitt Formation	Walnut Mountain	230	0.05	4.0	0.20	1.7	27.7	6.1	6.4	36.7
ERP00424	E-227735	STR-1389	Tennessee	Claiborne	Breathitt Formation		11	0.03	0.3	0.06	0.2	11.8	4.7	6.4	19.8
ERP00424	E-227736	EAG-96S TOP	Tennessee	Claiborne	Breathitt Formation	Mingo coal	46	0.04	<0.5	1.93	1.3	22.3	3.2	13.9	8.7
ERP00424	E-227737	EAG-96S BTM	Tennessee	Claiborne	Breathitt Formation	Mingo coal	62	0.04	3.6	0.14	1.4	23.7	8.0	8.5	10.5
ERP00063	E-141556	WVGS#18883	West Virginia	Marion	Monongahela Group	Sewickley coal	106	0.06	3.9	0.72	1.2	25.1	5.2	35.0	28.9
ERP00063	E-141557	WVGS#18493	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	44	0.07	4.1	0.21	1.3	26.6	9.7	6.0	32.0
ERP00063	E-141558	WVGS#18505	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	57	0.09	4.4	0.35	1.7	42.6	8.3	9.0	30.1
ERP00063	E-141559	WVGS#18471	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	42	0.05	1.9	0.10	0.8	14.2	5.4	2.2	22.6
ERP00063	E-141560	WVGS#18485	West Virginia	Kanawha	Allegheny Formation	Little No. 5 Block coal	38	0.08	2.7	0.24	1.6	40.3	13.2	18.7	24.2
ERP00063	E-141561	WVGS#18879	West Virginia	Kanawha	Kanawha Formation	Stockton coal	142	0.11	7.0	1.31	2.1	59.1	11.2	25.2	43.0
ERP00063	E-141562	WVGS#18882	West Virginia	Kanawha	Kanawha Formation	Stockton coal	71	0.10	4.8	0.73	1.6	46.1	8.9	15.1	60.6
ERP00063	E-141563	WVGS#18881	West Virginia	Kanawha	Kanawha Formation	Stockton coal	111	0.08	6.8	0.78	1.7	60.2	9.8	25.4	47.7
ERP00063	E-141564	WVGS#18919	West Virginia	Nicholas	Kanawha Formation	Stockton coal	59	0.04	2.3	1.96	1.5	22.9	10.7	20.0	13.6
ERP00063	E-141565	WVGS#18852	West Virginia	Webster	Kanawha Formation	Coalburg coal	102	0.09	6.3	0.80	2.0	52.1	11.4	24.5	60.6
ERP00063	E-141566	WVGS#18854	West Virginia	Webster	Kanawha Formation	Coalburg coal	99	0.12	5.9	1.07	1.8	51.9	10.5	16.1	51.5
ERP00063	E-141567	WVGS#18245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	40	0.07	2.9	0.31	1.2	32.2	7.9	8.4	27.0
ERP00063	E-141568	WVGS#18926	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	58	0.09	3.2	4.46	1.0	40.5	9.0	12.6	29.2
ERP00063	E-141569	WVGS#18923	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	49	0.07	7.4	0.76	1.6	60.1	11.8	23.2	53.8
ERP00063	E-141570	WVGS#18609	West Virginia	Boone	Kanawha Formation	Winifrede coal	47	0.06	2.6	0.11	0.9	13.2	4.5	4.9	21.0
ERP00063	E-141571	WVGS#18340	West Virginia	Kanawha	Kanawha Formation	Coalburg coal	54	0.09	7.5	0.46	2.4	74.1	13.9	16.2	48.2
ERP00063	E-141572	WVGS#18456	West Virginia	Kanawha	Kanawha Formation	Stockton coal	127	0.04	1.4	0.12	0.7	29.6	7.0	5.7	10.9
ERP00063	E-141573	WVGS#18457	West Virginia	Kanawha	Kanawha Formation	Stockton coal	49	0.08	3.8	0.19	1.2	27.1	10.1	1.6	30.2
ERP00063	E-141574	WVGS#18458	West Virginia	Kanawha	Kanawha Formation	Stockton coal	43	0.08	3.8	0.13	1.5	26.3	6.4	10.6	34.2
ERP00063	E-141575	WVGS#18443	West Virginia	Kanawha	Kanawha Formation	Williamson coal	90	0.07	3.5	0.35	1.2	27.2	14.2	4.6	33.4
ERP00063	E-141576	WVGS#18423	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	37	0.09	5.5	1.38	1.6	38.1	12.7	25.7	49.6
ERP00063	E-141577	WVGS#18436	West Virginia	Wayne	Allegheny Formation	Coalburg coal	34	0.06	2.8	0.23	1.1	40.2	14.7	49.5	14.2
ERP00063	E-141578	WVGS#18847	West Virginia	Webster	Kanawha Formation	Coalburg coal	69	0.08	7.6	0.59	1.9	54.1	11.6	21.1	61.1
ERP00063	E-141579	WVGS#18850	West Virginia	Webster	Kanawha Formation	Coalburg coal	87	0.13	7.6	0.54	3.1	77.4	13.3	44.9	73.5
ERP00063	E-141580	WVGS#18928	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	80	0.06	2.7	0.34	0.8	19.1	5.1	4.4	23.5
ERP00063	E-141581	WVGS#18907	West Virginia	Nicholas	Kanawha Formation	Winifrede coal	64	0.08	4.1	0.09	1.3	32.6	9.5	4.1	35.3
ERP00063	E-141582	WVGS#18611	West Virginia	Boone	Kanawha Formation	Winifrede coal	86	0.09	2.1	0.40	1.8	36.3	10.8	10.5	14.5
ERP00063	E-141583	WVGS#18596	West Virginia	Boone	Kanawha Formation	Coalburg coal	82	0.05	1.5	0.42	0.9	19.5	8.0	5.9	11.2
ERP00063	E-141584	WVGS#18265	West Virginia	Mingo	Kanawha Formation	Coalburg coal	39	0.08	5.8	0.49	1.5	43.3	9.5	10.9	54.7
ERP00063	E-141585	WVGS#18300	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	47	0.11	9.2	0.75	2.6	67.8	12.6	35.7	61.9
ERP00063	E-141586	WVGS#18308	West Virginia	Mingo	Allegheny Formation	No. 6 Block coal	44	0.07	6.3	1.08	1.4	34.6	7.8	19.2	39.2
ERP00075	E-159650	WVGS#18858	West Virginia	Harrison	Monongahela Group	Redstone coal	178	0.05	2.6	0.43	0.4	15.3	3.3	10.5	12.0
ERP00075	E-159651	WVGS#18855	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	126	0.11	6.9	0.41	1.6	58.8	8.3	20.4	22.9
ERP00075	E-159652	WVGS#18869	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	110	0.06	5.2	1.72	0.9	28.4	6.5	15.2	27.0
ERP00075	E-159653	WVGS#1184	West Virginia	Fayette	Allegheny Formation	No. 5 Block coal	240	0.23	9.2	0.34	2.1	33.7	9.3	<0.9	81.5
ERP00075	E-159654	WVGS#18218	West Virginia	Mingo	Allegheny Formation	No. 5 Block coal	35	0.14	7.7	0.39	2.6	62.5	17.4	16.6	40.4
ERP00075	E-159655	WVGS#18327	West Virginia	Kanawha	Kanawha Formation	Stockton coal	101	0.10	4.9	0.19	1.5	36.0	9.5	4.9	25.3
ERP00075	E-159656	WVGS#11497	West Virginia	Raleigh	Kanawha Formation	Winifrede coal	74	0.05	1.9	0.08	0.6	17.8	5.7	46.5	15.0
ERP00075	E-159657	WVGS#18449	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	111	0.06	1.8	0.37	0.9	21.4	6.4	5.5	17.8
ERP00075	E-159658	WVGS#9696	West Virginia	Kanawha	Kanawha Formation	Powellton coal	91	0.13	6.8	1.06	2.1	53.0	7.8	27.6	32.4
ERP00075	E-159659	WVGS#15952	West Virginia	Webster	Kanawha Formation	Coalburg coal	91	0.10	7.7	0.28	1.9	47.4	12.8	8.0	38.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00075	E-159660	WVGS#15986	West Virginia	Webster	Kanawha Formation	Winifrede coal	1.2	14.1	4.33	1.98	0.07	0.045	0.019	0.180	0.15	0.132		0.147
ERP00075	E-159661	WVGS#18873	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	1.4	22.1	6.01	3.30	0.09	0.122	0.045	0.504	0.95	0.154		0.026
ERP00075	E-159662	WVGS#18875	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	1.3	16.8	4.13	2.06	0.05	0.071	0.031	0.353	2.08	0.109		0.015
ERP00075	E-159663	WVGS#18857	West Virginia	Monongalia	Monongahela Group	Sewickley coal	2.3	11.1	3.02	1.57	0.07	0.048	0.033	0.203	0.52	0.092		0.024
ERP00075	E-159664	WVGS#18865	West Virginia	Monongalia	Monongahela Group	Sewickley coal	1.2	13.3	3.07	1.60	0.11	0.064	0.050	0.219	1.90	0.079		0.038
ERP00075	E-159665	WVGS#18862	West Virginia	Monongalia	Monongahela Group	Sewickley coal	1.0	11.9	2.81	1.54	0.07	0.055	0.044	0.208	1.71	0.075		0.037
ERP00075	E-159666	WVGS#18859	West Virginia	Harrison	Monongahela Group	Redstone coal	1.7	5.8	0.74	0.61	0.51	0.036	0.009	0.068	0.89	0.030		0.025
ERP00075	E-159667	WVGS#18866	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.6	36.2	9.84	5.63	0.17	0.294	0.061	0.941	0.84	0.271		0.025
ERP00075	E-159668	WVGS#18867	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.7	5.9	1.43	0.99	0.11	0.040	0.023	0.078	0.19	0.057		0.093
ERP00075	E-159669	WVGS#18868	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	0.5	15.9	3.52	2.25	0.13	0.092	0.027	0.342	2.09	0.118		0.045
ERP00075	E-159670	WVGS#18872	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.8	16.0	4.06	2.35	0.28	0.108	0.033	0.351	0.79	0.106		0.149
ERP00075	E-159671	WVGS#18870	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.9	14.0	2.39	1.78	0.23	0.046	0.026	0.149	3.15	0.053		0.179
ERP00075	E-159672	WVGS#18449B	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	1.2	9.2	2.31	1.15	0.07	0.044	0.023	0.146	1.01	0.061		0.179
ERP00076	E-159673	WVGS#18904	West Virginia	Boone	Kanawha Formation	Stockton coal	1.3	13.4	3.84	2.09	0.07	0.060	0.023	0.258	0.19	0.130		0.136
ERP00076	E-159674	WVGS#11506	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	1.8	3.3	0.78	0.65	0.05	0.012	0.009	0.016	0.07	0.035		0.105
ERP00076	E-159675	WVGS#11505	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	2.0	9.7	2.75	1.49	0.05	0.068	0.016	0.289	0.24	0.058		0.102
ERP00076	E-159676	WVGS#11503	West Virginia	Boone	Allegheny Formation	Upper No. 5 Block coal	1.7	16.4	4.80	2.49	0.07	0.086	0.022	0.387	0.38	0.151		0.091
ERP00076	E-159677	WVGS#11502	West Virginia	Boone	Kanawha Formation	Stockton coal	1.7	25.5	6.62	4.26	0.05	0.177	0.044	1.024	1.55	0.170		0.051
ERP00076	E-159678	WVGS#11500	West Virginia	Boone	Kanawha Formation	Stockton coal	1.9	14.7	3.73	2.43	0.05	0.089	0.025	0.480	0.51	0.106		0.079
ERP00076	E-159679	WVGS#11499	West Virginia	Boone	Kanawha Formation	Stockton coal	1.9	5.7	1.66	0.77	0.05	0.016	0.011	0.054	0.11	0.053		0.122
ERP00076	E-159680	WVGS#11498	West Virginia	Boone	Kanawha Formation	Stockton coal	1.3	4.0	1.13	0.64	0.03	0.008	0.013	0.011	0.04	0.038		0.142
ERP00076	E-159681	WVGS#18902	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.8	24.5	6.17	3.45	0.05	0.159	0.030	0.845	0.86	0.181		0.052
ERP00076	E-159682	WVGS#18903	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.5	18.6	4.71	3.55	0.08	0.100	0.048	0.514	0.30	0.203		0.093
ERP00076	E-159683	WVGS#18991	West Virginia	Boone	Kanawha Formation	Stockton coal	1.6	16.4	4.56	2.72	0.07	0.072	0.043	0.423	0.24	0.172		0.098
ERP00076	E-159684	WVGS#18905	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.6	23.2	6.62	3.65	0.05	0.122	0.046	0.591	0.42	0.189		0.073
ERP00076	E-159685	WVGS#7798	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.3	18.5	6.25	2.00	0.06	0.068	0.060	0.310	0.31	0.127		0.102
ERP00076	E-159686	WVGS#7767	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.8	7.4	1.51	1.32	0.06	0.037	0.116	0.149	0.66	0.057		0.126
ERP00076	E-159687	WVGS#7796	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.8	7.1	1.58	1.38	0.06	0.035	0.098	0.160	0.20	0.092		0.091
ERP00076	E-159688	WVGS#7784	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.8	9.5	2.50	1.39	0.05	0.041	0.031	0.202	0.47	0.055		0.150
ERP00076	E-159689	WVGS#7782	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.7	7.0	1.59	1.25	0.06	0.020	0.082	0.053	0.32	0.089		0.129
ERP00076	E-159690	WVGS#7775	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	2.9	10.3	2.41	1.98	0.06	0.045	0.020	0.269	0.39	0.091		0.066
ERP00076	E-159691	WVGS#7792	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.6	3.8	0.82	0.63	0.08	0.021	0.038	0.020	0.38	0.031		0.176
ERP00076	E-159692	WVGS#18610	West Virginia	Boone	Kanawha Formation	Winifrede coal	1.2	3.2	0.81	0.58	0.05	0.021	0.012	0.055	0.06	0.033		0.153
ERP00076	E-159693	WVGS#9697	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	2.1	6.5	1.75	1.07	0.05	0.013	0.006	0.033	0.08	0.113		0.113
ERP00076	E-159694	WVGS#18902B	West Virginia	Boone	Kanawha Formation	Coalburg coal	2.3	24.6	6.72	3.77	0.06	0.175	0.034	0.918	0.93	0.193		0.061
ERP00128	E-183433	WVGS#19478	West Virginia	Boone	Kanawha Formation	Stockton coal	1.2	11.0	2.77	1.73	0.07	0.044	0.017	0.164	0.25	0.132		0.077
ERP00128	E-183434	WVGS#19479	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	1.0	16.3	4.15	2.35	0.06	0.052	0.024	0.217	0.22	0.186		0.095
ERP00128	E-183435	WVGS#19483	West Virginia	Lincoln	Allegheny Formation	No. 5 Block coal	1.6	10.5	2.44	1.42	0.05	0.036	0.014	0.148	0.14	0.145		0.073
ERP00128	E-183436	WVGS#19484	West Virginia	Lincoln	Allegheny Formation	No. 6 Block coal	1.0	37.6	12.30	4.34	0.05	0.132	0.045	0.812	0.63	0.383		0.027
ERP00128	E-183437	WVGS#19485	West Virginia	Boone	Kanawha Formation	Stockton coal	1.3	16.0	4.11	2.33	0.07	0.072	0.023	0.266	0.45	0.173		0.074
ERP00128	E-183438	WVGS#19486	West Virginia	Boone	Kanawha Formation	Stockton coal	1.1	11.4	2.78	1.59	0.05	0.035	0.016	0.123	0.11	0.109		0.100
ERP00128	E-183439	WVGS#19488	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	1.6	11.8	2.77	1.67	0.08	0.058	0.022	0.225	0.33	0.120		0.088
ERP00128	E-183440	WVGS#19489	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.1	32.9	9.75	4.30	0.05	0.190	0.049	0.847	0.78	0.237		0.058
ERP00128	E-183441	WVGS#19491	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.7	16.9	4.57	2.67	0.07	0.102	0.036	0.379	0.38	0.142		0.117
ERP00128	E-183442	WVGS#19492	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	1.1	22.6	5.38	3.35	0.06	0.117	0.037	0.525	0.68	0.217		0.073
ERP00128	E-183443	WVGS#19588	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.6	14.0	3.36	1.79	0.04	0.068	0.046	0.186	0.33	0.151		0.076
ERP00128	E-183444	WVGS#19589	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.8	23.9	5.76	3.15	0.07	0.131	0.034	0.575	0.49	0.172		0.070
ERP00128	E-183445	WVGS#19590	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.7	11.1	3.10	1.36	0.05	0.049	0.017	0.175	0.21	0.133		0.131
ERP00128	E-183446	WVGS#19591	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.9	28.8	8.13	4.37	0.07	0.172	0.062	0.813	0.52	0.242		0.064
ERP00128	E-183447	WVGS#19593A	West Virginia	Logan	Kanawha Formation	Coalburg coal	2.6	15.6	4.42	2.14	0.05	0.083	0.036	0.376	0.31	0.131		0.093
ERP00128	E-183448	WVGS#19594	West Virginia	Logan	Kanawha Formation	Stockton coal	1.0	4.8	1.05	0.74	0.05	0.020	0.012	0.056	0.07	0.037		0.130
ERP00128	E-183449	WVGS#19595	West Virginia	Logan	Kanawha Formation	Stockton coal	0.8	23.1	5.86	3.58	0.05	0.181	0.057	0.901	0.84	0.133		0.071
ERP00128	E-183450	WVGS#19596A	West Virginia	Logan	Kanawha Formation	Stockton coal	0.9	18.0	4.28	2.75	0.04	0.109	0.043	0.553	0.35	0.162		0.072
ERP00128	E-183451	WVGS#19597	West Virginia	Logan	Allegheny Formation	Upper No. 5 Block coal	2.5	8.0	2.63	0.68	0.07	0.042	0.014	0.030	0.07	0.086		0.074
ERP00128	E-183452	WVGS#19598	West Virginia	Logan	Kanawha Formation	Stockton coal	1.4	12.9	3.20	2.16	0.05	0.093	0.029	0.428	0.29	0.101		0.093
ERP00128	E-183453	WVGS#19599	West Virginia	Logan	Allegheny Formation	No. 5 Block coal	1.1	6.8	1.62	0.99	0.04	0.030	0.011	0.113	0.11	0.065		0.128
ERP00128	E-183454	WVGS#19600	West Virginia	Logan	Kanawha Formation	Stockton coal	0.9	6.9	1.66	1.10	0.05	0.036	0.016	0.160	0.12	0.054		0.128
ERP00128	E-183455	WVGS#19601	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.9	31.8	8.13	4.36	0.07	0.230	0.259	1.270	0.60	0.210		0.091
ERP00128	E-183456	WVGS#19602	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.1	43.2	11.80	6.10	0.07	0.234	0.205	1.360	1.03	0.363		0.017
ERP00128	E-183457	WVGS#19603	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.8	10.3	2.55	1.61	0.04	0.053	0.041	0.257	0.22	0.093		0.093
ERP00128	E-183458	WVGS#19604	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.1	31.5	8.56	4.47	0.07	0.190	0.089	1.180	0.60	0.264		0.034

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00075	E-159660	WVGS#15986	West Virginia	Webster	Kanawha Formation	Winifrede coal	0.0037	0.16	1.5	8	96	1.3	0.25	0.05	6.6	20.9	0.92	27.2	7.6
ERP00075	E-159661	WVGS#18873	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	0.0421	0.22	3.9	31	296	1.5	0.14	0.10	8.9	39.6	3.25	22.5	8.8
ERP00075	E-159662	WVGS#18875	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	0.0027	0.27	5.0	28	157	0.8	0.16	0.05	6.8	21.7	2.03	11.2	5.5
ERP00075	E-159663	WVGS#18857	West Virginia	Monongalia	Monongahela Group	Sewickley coal	0.0080	0.14	4.1	27	95	0.9	0.13	0.05	4.5	19.4	1.47	15.2	4.6
ERP00075	E-159664	WVGS#18865	West Virginia	Monongalia	Monongahela Group	Sewickley coal	0.0105	0.13	15.2	46	68	0.7	0.11	0.06	5.9	16.4	1.44	5.9	4.5
ERP00075	E-159665	WVGS#18862	West Virginia	Monongalia	Monongahela Group	Sewickley coal	0.0128	<0.12	26.1	42	106	1.1	0.09	0.05	5.6	15.4	1.31	5.2	4.3
ERP00075	E-159666	WVGS#18859	West Virginia	Harrison	Monongahela Group	Redstone coal	0.0053	<0.06	15.0	22	142	0.5	0.04	0.03	2.8	6.4	0.37	1.9	1.8
ERP00075	E-159667	WVGS#18866	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.1022	<0.37	2.9	10	503	1.5	0.32	0.12	10.7	51.8	4.60	23.5	15.7
ERP00075	E-159668	WVGS#18867	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	0.0113	0.08	7.0	2	62	1.6	0.08	0.08	13.7	11.7	0.33	6.6	4.5
ERP00075	E-159669	WVGS#18868	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	0.0338	0.18	34.8	<3	165	1.4	0.18	0.11	11.2	25.4	1.83	15.3	7.9
ERP00075	E-159670	WVGS#18872	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.0666	0.18	22.4	9	148	1.1	0.18	0.08	5.8	25.1	1.86	12.6	5.9
ERP00075	E-159671	WVGS#18870	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	0.0225	<0.14	37.2	7	47	1.2	0.08	0.08	9.8	15.0	0.98	4.7	4.7
ERP00075	E-159672	WVGS#18449B	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	0.0023	<0.09	8.8	17	73	1.3	0.18	0.03	3.2	11.3	0.49	20.2	3.9
ERP00076	E-159673	WVGS#18904	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0258	0.17	1.6	<3	129	2.0	0.27	0.13	10.6	26.4	1.37	43.6	8.1
ERP00076	E-159674	WVGS#11506	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	0.0009	0.05	1.3	1	41	1.4	0.09	0.02	3.3	5.9	0.05	10.9	1.6
ERP00076	E-159675	WVGS#11505	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	0.0022	<0.10	2.8	2	85	2.5	0.11	0.06	9.2	15.3	1.44	19.8	5.8
ERP00076	E-159676	WVGS#11503	West Virginia	Boone	Allegheny Formation	Upper No. 5 Block coal	0.0015	0.28	5.3	8	96	4.5	0.28	0.06	9.2	26.9	2.59	24.6	7.6
ERP00076	E-159677	WVGS#11502	West Virginia	Boone	Kanawha Formation	Stockton coal	<0.0050	<0.26	24.9	<5	187	8.6	0.28	0.18	13.3	33.9	4.11	32.4	12.0
ERP00076	E-159678	WVGS#11500	West Virginia	Boone	Kanawha Formation	Stockton coal	<0.0030	<0.15	12.2	4	104	1.4	0.13	0.06	6.7	21.9	2.50	13.5	6.3
ERP00076	E-159679	WVGS#11499	West Virginia	Boone	Kanawha Formation	Stockton coal	<0.0010	0.06	1.6	4	51	1.2	0.06	0.01	5.4	9.9	0.28	11.6	3.2
ERP00076	E-159680	WVGS#11498	West Virginia	Boone	Kanawha Formation	Stockton coal	<0.0010	0.05	0.7	3	25	0.8	0.06	0.03	8.4	7.0	0.05	14.8	1.3
ERP00076	E-159681	WVGS#18902	West Virginia	Boone	Kanawha Formation	Coalburg coal	<0.0050	0.25	9.8	7	160	6.6	0.24	0.08	9.4	36.3	4.53	19.1	9.4
ERP00076	E-159682	WVGS#18903	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0182	0.22	1.4	15	159	1.8	0.28	0.06	10.0	37.2	2.68	25.7	10.0
ERP00076	E-159683	WVGS#18991	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0329	0.20	1.1	10	472	1.4	0.30	0.11	5.5	34.4	2.05	25.9	9.7
ERP00076	E-159684	WVGS#18905	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0047	<0.24	3.8	<5	168	2.0	0.21	0.06	10.2	33.4	2.71	23.0	11.0
ERP00076	E-159685	WVGS#7798	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	<0.0040	<0.19	3.0	34	107	0.8	0.22	0.05	5.6	21.5	1.33	26.1	4.5
ERP00076	E-159686	WVGS#7767	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0055	0.07	7.0	31	270	0.5	0.16	0.03	4.1	13.5	0.73	19.8	3.6
ERP00076	E-159687	WVGS#7796	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0113	0.11	1.9	25	246	0.7	0.14	0.05	4.4	12.7	0.75	16.1	3.8
ERP00076	E-159688	WVGS#7784	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0031	<0.09	4.6	21	124	1.0	0.11	0.04	7.5	14.3	1.16	20.2	4.2
ERP00076	E-159689	WVGS#7782	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0231	0.13	4.7	24	214	1.0	0.23	0.06	6.9	21.1	0.20	38.2	4.0
ERP00076	E-159690	WVGS#7775	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0023	0.11	4.9	8	181	1.7	0.24	0.20	11.6	20.7	0.86	47.7	6.5
ERP00076	E-159691	WVGS#7792	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.0009	0.07	7.3	20	33	0.2	0.09	0.03	2.8	5.3	0.08	14.9	1.4
ERP00076	E-159692	WVGS#18610	West Virginia	Boone	Kanawha Formation	Winifrede coal	0.0005	0.05	0.7	1	40	9.5	0.11	0.02	3.1	5.6	0.29	18.0	2.6
ERP00076	E-159693	WVGS#9697	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	<0.0010	0.14	0.8	3	38	2.0	0.20	0.03	7.3	17.6	0.10	24.9	4.9
ERP00076	E-159694	WVGS#18902B	West Virginia	Boone	Kanawha Formation	Coalburg coal	<0.0050	0.27	9.4	<5	174	7.1	0.23	0.06	10.4	39.9	4.58	19.9	9.4
ERP00128	E-183433	WVGS#19478	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0043	<0.22	3.0	33	39	1.6	0.24	0.05	6.5	18.7	0.72	23.0	5.4
ERP00128	E-183434	WVGS#19479	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	0.0029	<0.33	2.4	32	56	2.1	0.26	0.07	7.3	26.7	0.90	24.1	8.4
ERP00128	E-183435	WVGS#19483	West Virginia	Lincoln	Allegheny Formation	No. 5 Block coal	0.0028	<0.21	1.7	39	39	1.5	0.15	0.04	9.0	19.7	0.78	21.4	5.8
ERP00128	E-183436	WVGS#19484	West Virginia	Lincoln	Allegheny Formation	No. 6 Block coal	0.0049	<0.76	5.2	41	237	2.4	0.22	0.06	9.6	39.5	3.57	26.1	13.6
ERP00128	E-183437	WVGS#19485	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0021	<0.32	5.9	39	65	2.1	0.22	0.04	7.9	25.6	1.15	24.6	7.6
ERP00128	E-183438	WVGS#19486	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0035	<0.23	1.1	39	41	5.6	0.16	0.03	17.1	21.3	0.71	18.1	9.2
ERP00128	E-183439	WVGS#19488	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	0.0036	<0.24	5.7	40	62	2.3	0.12	0.05	12.7	22.7	1.06	28.0	7.8
ERP00128	E-183440	WVGS#19489	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0029	<0.66	3.7	42	146	2.3	0.16	0.04	9.9	35.2	3.22	17.0	10.0
ERP00128	E-183441	WVGS#19491	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0037	<0.34	2.4	45	93	2.1	0.27	0.05	11.0	25.2	1.79	23.2	9.0
ERP00128	E-183442	WVGS#19492	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	0.0069	<0.46	8.4	35	122	2.6	0.36	0.08	9.9	31.6	2.33	28.9	11.2
ERP00128	E-183443	WVGS#19588	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0012	<0.28	2.3	21	88	1.1	0.21	0.05	7.7	27.7	1.43	13.4	8.1
ERP00128	E-183444	WVGS#19589	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0156	<0.48	2.3	25	161	1.3	0.13	0.04	8.3	27.7	2.49	12.7	8.2
ERP00128	E-183445	WVGS#19590	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0048	<0.23	1.6	15	58	1.0	0.17	0.02	6.7	14.8	0.73	15.2	5.0
ERP00128	E-183446	WVGS#19591	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0025	<0.58	3.4	28	170	1.9	0.18	0.06	10.8	39.5	4.03	20.2	11.8
ERP00128	E-183447	WVGS#19593A	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0014	<0.32	2.0	21	92	2.5	0.10	0.05	5.1	20.1	1.87	13.0	5.5
ERP00128	E-183448	WVGS#19594	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0004	<0.10	1.3	11	31	7.6	0.05	0.01	12.4	8.7	0.31	16.0	4.2
ERP00128	E-183449	WVGS#19595	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0020	<0.47	10.3	29	177	1.9	0.16	0.08	12.4	28.2	3.44	29.6	9.4
ERP00128	E-183450	WVGS#19596A	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0016	<0.36	4.2	22	168	1.7	0.20	0.09	9.9	25.2	2.48	26.6	8.1
ERP00128	E-183451	WVGS#19597	West Virginia	Logan	Allegheny Formation	Upper No. 5 Block coal	0.0007	<0.16	1.2	13	74	1.4	0.10	0.04	11.4	7.3	0.08	15.4	3.3
ERP00128	E-183452	WVGS#19598	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0017	<0.26	2.5	24	111	1.8	0.07	0.07	8.9	17.2	1.94	12.2	5.5
ERP00128	E-183453	WVGS#19599	West Virginia	Logan	Allegheny Formation	No. 5 Block coal	0.0021	<0.14	1.4	11	53	3.3	0.12	0.04	5.4	11.2	0.59	16.3	3.2
ERP00128	E-183454	WVGS#19600	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0015	<0.14	1.3	15	48	5.6	0.09	0.03	9.4	10.9	0.82	22.5	4.9
ERP00128	E-183455	WVGS#19601	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0028	<0.64	2.1	27	211	5.6	0.27	0.07	14.9	43.9	5.95	28.9	13.5
ERP00128	E-183456	WVGS#19602	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0038	<0.87	5.9	28	229	3.6	0.20	0.10	14.1	55.7	6.91	22.1	18.2
ERP00128	E-183457	WVGS#19603	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0009	<0.21	4.1	16	47	1.3	0.14	0.04	6.3	18.7	1.57	11.1	6.7
ERP00128	E-183458	WVGS#19604	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0028	<0.63	8.8	28	167	3.2	0.14	0.08	7.8	41.0	5.32	16.9	11.0

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00075	E-159660	WVGS#15986	West Virginia	Webster	Kanawha Formation	Winifrede coal	1.0	0.04	25.0	4.2	1.5	13.3	13.7	13.0	9.6	0.5	5.3	6.3	10.7
ERP00075	E-159661	WVGS#18873	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	3.7	0.05	84.0	19.0	1.0	16.8	19.0	10.9	34.5	0.8	6.7	3.7	3.0
ERP00075	E-159662	WVGS#18875	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	0.7	0.12	21.7	21.2	0.8	12.3	13.1	7.4	25.5	0.3	4.2	2.4	2.3
ERP00075	E-159663	WVGS#18857	West Virginia	Monongalia	Monongahela Group	Sewickley coal	1.4	0.29	24.6	42.5	0.5	10.7	8.9	5.9	13.1	0.3	4.1	6.9	2.3
ERP00075	E-159664	WVGS#18865	West Virginia	Monongalia	Monongahela Group	Sewickley coal	1.6	0.19	22.2	14.2	1.1	9.2	9.3	5.8	15.3	0.3	3.3	4.8	1.5
ERP00075	E-159665	WVGS#18862	West Virginia	Monongalia	Monongahela Group	Sewickley coal	2.4	0.28	24.3	11.8	1.0	9.0	9.4	5.0	13.8	0.4	3.1	3.4	1.7
ERP00075	E-159666	WVGS#18859	West Virginia	Harrison	Monongahela Group	Redstone coal	0.9	0.23	3.4	17.6	0.9	3.5	3.9	1.8	4.2	0.1	1.8	1.5	1.2
ERP00075	E-159667	WVGS#18866	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	5.9	0.10	151.0	32.0	2.1	32.8	19.0	16.3	57.6	1.0	11.0	14.2	4.3
ERP00075	E-159668	WVGS#18867	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	18.9	0.10	10.4	5.2	11.9	7.4	24.7	4.4	5.4	4.3	2.2	1.9	1.2
ERP00075	E-159669	WVGS#18868	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	6.6	0.73	27.5	69.6	5.0	15.8	27.3	10.1	24.5	1.0	5.1	1.9	1.8
ERP00075	E-159670	WVGS#18872	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	1.4	0.29	29.3	30.1	2.1	15.8	13.8	9.2	25.8	0.6	4.8	2.0	2.5
ERP00075	E-159671	WVGS#18870	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	1.6	0.39	20.7	28.7	1.7	6.2	17.4	6.3	13.5	0.5	3.3	2.8	1.2
ERP00075	E-159672	WVGS#18449B	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	2.7	0.16	19.2	17.4	1.1	7.0	6.2	7.7	7.8	0.7	3.0	5.6	1.9
ERP00076	E-159673	WVGS#18904	West Virginia	Boone	Kanawha Formation	Stockton coal	1.5	0.07	29.6	7.4	2.2	14.6	21.4	10.9	16.9	0.7	6.5	5.4	2.3
ERP00076	E-159674	WVGS#11506	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	0.2	0.02	10.7	1.9	0.7	4.0	11.5	4.0	0.9	0.2	1.4	4.6	1.4
ERP00076	E-159675	WVGS#11505	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	3.3	0.08	12.9	10.5	2.6	6.4	14.1	6.1	17.4	1.4	4.6	6.0	1.8
ERP00076	E-159676	WVGS#11503	West Virginia	Boone	Allegheny Formation	Upper No. 5 Block coal	2.7	0.08	42.0	9.2	2.3	19.2	16.6	9.9	28.5	1.0	5.8	8.9	2.8
ERP00076	E-159677	WVGS#11502	West Virginia	Boone	Kanawha Formation	Stockton coal	2.8	0.35	38.8	15.7	3.0	19.6	24.2	15.2	56.1	1.4	8.1	21.3	2.8
ERP00076	E-159678	WVGS#11500	West Virginia	Boone	Kanawha Formation	Stockton coal	0.9	0.20	25.6	9.8	2.0	13.2	15.7	7.3	>29.4	0.7	4.8	12.3	2.3
ERP00076	E-159679	WVGS#11499	West Virginia	Boone	Kanawha Formation	Stockton coal	0.7	0.06	7.4	2.4	1.0	5.9	17.7	4.2	4.0	0.5	2.7	4.2	1.5
ERP00076	E-159680	WVGS#11498	West Virginia	Boone	Kanawha Formation	Stockton coal	0.2	<0.02	7.3	0.9	0.7	4.7	18.2	3.4	0.7	0.2	1.5	3.0	1.3
ERP00076	E-159681	WVGS#18902	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.8	0.13	27.0	13.8	0.8	24.5	15.0	11.6	>49	0.5	7.6	7.3	2.9
ERP00076	E-159682	WVGS#18903	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.8	0.06	42.4	19.9	1.0	24.7	17.4	12.9	35.7	0.6	7.0	9.1	2.3
ERP00076	E-159683	WVGS#18991	West Virginia	Boone	Kanawha Formation	Stockton coal	1.3	0.04	35.9	10.2	1.5	21.0	11.2	13.1	25.3	0.7	6.3	6.2	2.6
ERP00076	E-159684	WVGS#18905	West Virginia	Boone	Kanawha Formation	Coalburg coal	2.7	0.06	70.3	12.0	1.5	23.2	19.0	13.1	37.8	1.0	7.7	7.2	2.4
ERP00076	E-159685	WVGS#7798	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.6	0.07	19.2	4.0	1.2	13.9	11.7	8.6	20.5	0.6	4.6	5.9	1.9
ERP00076	E-159686	WVGS#7767	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.4	0.27	15.4	2.5	3.3	7.5	9.6	6.1	10.8	1.5	2.4	5.2	1.3
ERP00076	E-159687	WVGS#7796	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.4	0.18	15.5	3.3	1.6	10.9	9.7	4.9	10.0	0.6	3.1	3.8	1.5
ERP00076	E-159688	WVGS#7784	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.6	0.10	12.5	3.2	2.6	6.7	16.4	5.9	14.3	1.5	3.5	5.2	1.7
ERP00076	E-159689	WVGS#7782	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.5	0.11	25.9	2.0	2.3	12.3	18.6	9.0	3.4	0.7	3.9	6.3	1.8
ERP00076	E-159690	WVGS#7775	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	1.2	0.14	25.8	3.4	2.7	11.1	19.1	10.8	13.7	1.3	4.0	7.7	2.4
ERP00076	E-159691	WVGS#7792	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	0.2	0.20	6.2	0.9	1.9	3.3	9.6	3.4	1.2	0.6	1.2	6.7	0.8
ERP00076	E-159692	WVGS#18610	West Virginia	Boone	Kanawha Formation	Winifrede coal	0.8	<0.02	5.9	3.0	1.2	4.0	6.8	3.6	3.5	0.5	1.4	2.5	1.4
ERP00076	E-159693	WVGS#9697	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	0.9	0.04	12.3	3.7	1.4	12.4	11.3	7.2	1.7	0.4	3.3	6.3	1.3
ERP00076	E-159694	WVGS#18902B	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.5	0.13	28.5	14.7	0.8	24.5	15.7	11.7	>49.2	0.5	7.2	8.5	2.5
ERP00128	E-183433	WVGS#19478	West Virginia	Boone	Kanawha Formation	Stockton coal	1.1	0.09	22.9	6.4	1.4	2.9	13.6	12.1	10.9	0.7	4.6	6.3	2.5
ERP00128	E-183434	WVGS#19479	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	2.4	0.05	43.2	9.6	1.4	5.0	12.7	16.0	13.4	0.9	7.2	7.1	5.1
ERP00128	E-183435	WVGS#19483	West Virginia	Lincoln	Allegheny Formation	No. 5 Block coal	1.0	0.13	23.9	4.2	2.1	3.4	9.7	9.8	10.6	0.7	4.1	8.3	2.5
ERP00128	E-183436	WVGS#19484	West Virginia	Lincoln	Allegheny Formation	No. 6 Block coal	1.8	0.20	38.7	14.1	1.8	6.5	22.5	21.0	51.1	0.9	8.5	8.3	5.2
ERP00128	E-183437	WVGS#19485	West Virginia	Boone	Kanawha Formation	Stockton coal	1.3	0.09	33.0	61.1	1.5	3.9	14.3	13.4	18.2	0.8	6.1	6.9	3.7
ERP00128	E-183438	WVGS#19486	West Virginia	Boone	Kanawha Formation	Stockton coal	3.5	0.03	23.6	4.6	1.2	3.1	16.6	10.1	10.8	1.5	6.0	4.5	3.1
ERP00128	E-183439	WVGS#19488	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	1.6	0.20	30.3	23.7	2.2	3.0	18.3	10.7	17.0	1.0	6.0	8.3	3.5
ERP00128	E-183440	WVGS#19489	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.3	0.08	52.3	25.8	1.6	4.8	18.8	13.9	49.7	0.8	7.7	6.2	2.9
ERP00128	E-183441	WVGS#19491	West Virginia	Boone	Kanawha Formation	Coalburg coal	1.5	0.05	57.5	14.6	1.7	3.1	16.1	13.8	23.7	1.0	6.6	4.8	2.8
ERP00128	E-183442	WVGS#19492	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	2.5	0.20	45.7	20.7	1.4	4.8	17.2	16.7	31.6	1.0	7.6	8.1	3.9
ERP00128	E-183443	WVGS#19588	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.8	0.04	39.3	20.3	1.2	4.8	18.2	9.9	19.9	0.3	5.5	5.7	3.3
ERP00128	E-183444	WVGS#19589	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.0	0.06	39.2	22.7	0.8	3.8	16.8	9.5	38.5	0.6	6.2	5.3	3.8
ERP00128	E-183445	WVGS#19590	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.9	0.04	17.8	18.6	1.1	3.1	14.8	8.7	11.3	0.3	3.4	6.2	2.7
ERP00128	E-183446	WVGS#19591	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.2	0.05	78.9	14.4	0.9	6.1	22.3	13.4	55.6	0.7	8.2	5.7	3.1
ERP00128	E-183447	WVGS#19593A	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.6	0.05	17.2	6.7	0.9	2.8	11.0	7.2	26.5	0.5	4.2	1.8	3.6
ERP00128	E-183448	WVGS#19594	West Virginia	Logan	Kanawha Formation	Stockton coal	1.4	<0.02	8.0	2.9	1.3	1.1	18.3	4.6	4.5	0.8	2.6	7.8	3.3
ERP00128	E-183449	WVGS#19595	West Virginia	Logan	Kanawha Formation	Stockton coal	1.1	0.25	20.7	24.9	2.6	3.0	26.6	15.0	51.1	1.5	6.5	7.0	2.8
ERP00128	E-183450	WVGS#19596A	West Virginia	Logan	Kanawha Formation	Stockton coal	1.0	0.12	19.1	13.1	1.5	4.3	16.7	13.7	38.9	0.9	6.1	7.2	3.2
ERP00128	E-183451	WVGS#19597	West Virginia	Logan	Allegheny Formation	Upper No. 5 Block coal	0.9	0.02	7.4	3.9	0.9	1.8	11.8	5.6	1.8	0.4	2.0	5.2	2.0
ERP00128	E-183452	WVGS#19598	West Virginia	Logan	Kanawha Formation	Stockton coal	1.0	0.09	17.3	19.9	1.9	2.2	12.9	6.5	28.9	0.8	4.3	4.4	2.1
ERP00128	E-183453	WVGS#19599	West Virginia	Logan	Allegheny Formation	No. 5 Block coal	1.0	0.04	14.7	6.6	1.0	1.8	11.4	6.5	8.1	0.4	2.6	2.4	2.0
ERP00128	E-183454	WVGS#19600	West Virginia	Logan	Kanawha Formation	Stockton coal	1.3	0.02	9.6	4.8	1.5	1.5	14.5	6.0	10.8	0.8	2.9	4.5	2.6
ERP00128	E-183455	WVGS#19601	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.8	0.04	36.9	31.8	0.9	5.6	33.7	17.5	>63.6	0.8	8.1	5.9	3.7
ERP00128	E-183456	WVGS#19602	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.8	0.11	39.9	43.2	1.2	10.3	27.1	17.0	85.1	1.2	8.4	4.4	4.3
ERP00128	E-183457	WVGS#19603	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.8	0.04	11.2	6.8	1.2	2.7	19.9	5.7	19.7	0.3	2.9	7.0	2.5
ERP00128	E-183458	WVGS#19604	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.1	0.09	21.8	15.8	0.9	6.3	19.1	12.5	>63	0.6	6.9	8.5	3.2

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00075	E-159660	WVGS#15986	West Virginia	Webster	Kanawha Formation	Winifrede coal	130	0.08	4.0	0.12	1.7	29.9	9.0	3.7	25.8
ERP00075	E-159661	WVGS#18873	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	241	0.12	4.6	0.42	1.4	57.0	8.0	19.4	45.1
ERP00075	E-159662	WVGS#18875	West Virginia	Monongalia	Monongahela Group	Waynesburg coal	89	0.09	3.9	0.50	1.0	30.2	5.5	23.7	28.9
ERP00075	E-159663	WVGS#18857	West Virginia	Monongalia	Monongahela Group	Sewickley coal	92	0.08	2.9	0.28	1.2	26.9	5.5	12.1	19.8
ERP00075	E-159664	WVGS#18865	West Virginia	Monongalia	Monongahela Group	Sewickley coal	99	0.09	3.2	0.44	0.8	25.7	4.7	17.3	22.2
ERP00075	E-159665	WVGS#18862	West Virginia	Monongalia	Monongahela Group	Sewickley coal	148	0.06	2.7	0.87	0.6	23.1	4.1	11.0	19.3
ERP00075	E-159666	WVGS#18859	West Virginia	Harrison	Monongahela Group	Redstone coal	88	0.03	1.2	0.75	0.2	8.4	2.4	7.6	8.5
ERP00075	E-159667	WVGS#18866	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	277	0.18	8.1	0.54	1.9	74.6	10.8	23.8	73.8
ERP00075	E-159668	WVGS#18867	West Virginia	Grant	Conemaugh Formation	Bakerstown coal	59	0.05	1.6	0.15	0.5	12.2	4.4	14.1	14.8
ERP00075	E-159669	WVGS#18868	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	98	0.08	3.9	1.49	1.1	35.6	8.3	37.0	32.3
ERP00075	E-159670	WVGS#18872	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	301	0.09	2.7	1.22	1.1	32.5	8.3	17.4	21.8
ERP00075	E-159671	WVGS#18870	West Virginia	Preston	Allegheny Formation	Upper Freeport coal	147	0.04	3.3	2.31	0.6	20.3	6.5	22.0	11.8
ERP00075	E-159672	WVGS#18449B	West Virginia	Kanawha	Kanawha Formation	Cedar Grove coal	109	0.07	2.4	0.41	0.9	20.8	6.2	7.7	17.1
ERP00076	E-159673	WVGS#18904	West Virginia	Boone	Kanawha Formation	Stockton coal	214	0.10	3.5	0.26	1.5	37.5	10.9	12.3	23.0
ERP00076	E-159674	WVGS#11506	West Virginia	Boone	Allegheny Formation	No. 6 Block coal	65	0.04	1.1	0.14	0.4	8.5	3.0	1.4	4.8
ERP00076	E-159675	WVGS#11505	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	56	0.08	2.8	0.33	1.0	30.1	9.6	20.0	12.6
ERP00076	E-159676	WVGS#11503	West Virginia	Boone	Allegheny Formation	Upper No. 5 Block coal	51	0.10	4.1	0.53	1.5	33.8	12.8	6.8	36.7
ERP00076	E-159677	WVGS#11502	West Virginia	Boone	Kanawha Formation	Stockton coal	49	0.14	6.6	2.91	2.2	70.1	9.9	37.0	38.8
ERP00076	E-159678	WVGS#11500	West Virginia	Boone	Kanawha Formation	Stockton coal	50	0.06	4.1	1.25	1.1	36.6	7.8	11.5	26.5
ERP00076	E-159679	WVGS#11499	West Virginia	Boone	Kanawha Formation	Stockton coal	45	0.04	1.6	0.25	0.5	14.8	6.4	1.9	11.4
ERP00076	E-159680	WVGS#11498	West Virginia	Boone	Kanawha Formation	Stockton coal	40	0.04	1.5	0.05	0.3	9.1	3.8	1.1	9.5
ERP00076	E-159681	WVGS#18902	West Virginia	Boone	Kanawha Formation	Coalburg coal	43	0.06	5.0	1.64	1.4	47.5	10.4	13.8	43.4
ERP00076	E-159682	WVGS#18903	West Virginia	Boone	Kanawha Formation	Coalburg coal	120	0.09	5.4	0.39	1.6	50.2	8.5	7.1	48.7
ERP00076	E-159683	WVGS#18991	West Virginia	Boone	Kanawha Formation	Stockton coal	244	0.08	6.1	0.18	1.6	43.3	8.3	9.8	38.4
ERP00076	E-159684	WVGS#18905	West Virginia	Boone	Kanawha Formation	Coalburg coal	104	0.07	5.2	0.37	1.6	57.1	11.0	17.8	37.8
ERP00076	E-159685	WVGS#7798	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	105	0.09	5.1	0.20	1.0	30.5	7.9	9.9	32.2
ERP00076	E-159686	WVGS#7767	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	206	0.07	1.7	0.35	2.0	30.6	3.7	9.9	11.2
ERP00076	E-159687	WVGS#7796	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	240	0.06	2.4	0.09	0.7	19.9	5.3	3.1	20.8
ERP00076	E-159688	WVGS#7784	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	162	0.09	1.7	0.18	0.8	28.4	7.9	13.7	10.8
ERP00076	E-159689	WVGS#7782	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	263	0.10	2.1	0.20	1.2	28.8	7.1	23.5	16.0
ERP00076	E-159690	WVGS#7775	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	79	0.11	3.2	0.37	1.3	36.3	10.3	10.3	23.0
ERP00076	E-159691	WVGS#7792	West Virginia	Nicholas	Kanawha Formation	Coalburg coal	119	0.06	0.7	0.40	0.4	9.8	2.6	3.8	6.2
ERP00076	E-159692	WVGS#18610	West Virginia	Boone	Kanawha Formation	Winifrede coal	48	0.04	0.7	0.05	0.5	9.4	6.8	3.5	6.4
ERP00076	E-159693	WVGS#9697	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	40	0.07	2.4	0.16	1.0	20.0	7.0	6.4	24.2
ERP00076	E-159694	WVGS#18902B	West Virginia	Boone	Kanawha Formation	Coalburg coal	50	0.06	4.2	1.57	1.4	49.2	10.9	14.9	45.3
ERP00128	E-183433	WVGS#19478	West Virginia	Boone	Kanawha Formation	Stockton coal	30	0.07	3.9	0.29	1.5	27.1	6.7	6.5	32.9
ERP00128	E-183434	WVGS#19479	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	28	0.09	5.6	0.20	2.0	40.4	9.1	8.5	50.0
ERP00128	E-183435	WVGS#19483	West Virginia	Lincoln	Allegheny Formation	No. 5 Block coal	28	0.07	3.8	0.21	1.3	27.9	7.0	7.2	34.9
ERP00128	E-183436	WVGS#19484	West Virginia	Lincoln	Allegheny Formation	No. 6 Block coal	34	0.10	7.0	0.90	2.4	57.2	2.0	18.8	145.0
ERP00128	E-183437	WVGS#19485	West Virginia	Boone	Kanawha Formation	Stockton coal	42	0.08	5.3	0.38	1.7	36.2	6.4	12.9	44.5
ERP00128	E-183438	WVGS#19486	West Virginia	Boone	Kanawha Formation	Stockton coal	43	0.06	3.1	0.13	1.1	33.7	16.3	7.9	25.5
ERP00128	E-183439	WVGS#19488	West Virginia	Boone	Allegheny Formation	No. 5 Block coal	51	0.07	4.0	0.46	1.4	39.9	9.6	13.3	29.4
ERP00128	E-183440	WVGS#19489	West Virginia	Boone	Kanawha Formation	Coalburg coal	5	0.08	6.1	0.43	1.7	56.9	8.5	16.4	79.6
ERP00128	E-183441	WVGS#19491	West Virginia	Boone	Kanawha Formation	Coalburg coal	40	0.10	4.5	0.32	2.0	39.4	11.9	14.4	36.7
ERP00128	E-183442	WVGS#19492	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	47	0.11	6.4	0.86	2.2	52.0	7.3	17.8	56.5
ERP00128	E-183443	WVGS#19588	West Virginia	Logan	Kanawha Formation	Coalburg coal	164	0.06	4.6	0.27	1.5	31.9	3.2	27.7	36.4
ERP00128	E-183444	WVGS#19589	West Virginia	Logan	Kanawha Formation	Coalburg coal	117	0.05	4.3	0.38	1.3	42.5	5.5	39.0	51.4
ERP00128	E-183445	WVGS#19590	West Virginia	Logan	Kanawha Formation	Coalburg coal	76	0.07	3.0	0.11	0.9	20.2	2.4	8.6	32.3
ERP00128	E-183446	WVGS#19591	West Virginia	Logan	Kanawha Formation	Coalburg coal	129	0.07	6.5	0.52	1.6	57.0	6.5	19.4	62.5
ERP00128	E-183447	WVGS#19593A	West Virginia	Logan	Kanawha Formation	Coalburg coal	88	0.04	3.3	0.34	0.9	28.7	4.6	13.0	33.1
ERP00128	E-183448	WVGS#19594	West Virginia	Logan	Kanawha Formation	Stockton coal	67	0.03	1.3	0.07	0.7	15.4	13.0	7.1	8.2
ERP00128	E-183449	WVGS#19595	West Virginia	Logan	Kanawha Formation	Stockton coal	91	0.10	4.8	0.88	2.5	56.8	8.3	39.3	37.2
ERP00128	E-183450	WVGS#19596A	West Virginia	Logan	Kanawha Formation	Stockton coal	120	0.10	4.7	0.47	1.9	45.4	6.5	25.9	44.6
ERP00128	E-183451	WVGS#19597	West Virginia	Logan	Allegheny Formation	Upper No. 5 Block coal	94	0.04	1.3	0.11	0.6	10.9	3.8	3.9	22.6
ERP00128	E-183452	WVGS#19598	West Virginia	Logan	Kanawha Formation	Stockton coal	100	0.05	2.8	0.28	1.0	29.5	8.9	21.3	24.4
ERP00128	E-183453	WVGS#19599	West Virginia	Logan	Allegheny Formation	No. 5 Block coal	67	0.06	1.9	0.20	0.7	18.1	4.4	5.2	17.3
ERP00128	E-183454	WVGS#19600	West Virginia	Logan	Kanawha Formation	Stockton coal	61	0.05	1.7	0.15	0.7	21.7	13.9	8.6	13.2
ERP00128	E-183455	WVGS#19601	West Virginia	Logan	Kanawha Formation	Coalburg coal	241	0.08	5.6	0.48	2.3	65.2	6.7	49.0	51.5
ERP00128	E-183456	WVGS#19602	West Virginia	Logan	Kanawha Formation	Coalburg coal	236	0.10	5.7	0.69	1.9	77.8	4.5	52.7	92.0
ERP00128	E-183457	WVGS#19603	West Virginia	Logan	Kanawha Formation	Coalburg coal	76	0.05	2.1	0.21	0.9	26.0	3.5	12.1	21.9
ERP00128	E-183458	WVGS#19604	West Virginia	Logan	Kanawha Formation	Coalburg coal	136	0.07	3.5	0.60	1.6	53.2	3.6	27.0	69.3

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00128	E-183459	WVGS#19633	West Virginia	Braxton	Kanawha Formation	Coalburg coal	0.6	26.1	6.61	4.50	0.21	0.157	0.093	0.693	0.68	0.266		0.167
ERP00128	E-183460	WVGS#19634	West Virginia	Braxton	Kanawha Formation	Coalburg coal	0.7	14.2	3.29	1.80	0.35	0.073	0.038	0.236	0.95	0.145		0.170
ERP00128	E-183461	WVGS#20000	West Virginia	Braxton	Kanawha Formation	Stockton coal	0.6	21.9	6.22	2.75	0.42	0.042	0.042	0.145	0.83	0.315		0.088
ERP00128	E-183462	WVGS#20001	West Virginia	Upshur	Allegheny Formation	Middle Kittanning coal	0.4	23.1	3.97	3.33	0.86	0.134	0.050	0.460	2.47	0.235		0.111
ERP00128	E-183463	WVGS#19593B	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.8	15.5	4.47	2.19	0.04	0.084	0.032	0.412	0.31	0.130		0.090
ERP00128	E-183464	WVGS#19596B	West Virginia	Logan	Kanawha Formation	Stockton coal	0.6	17.9	4.64	2.99	0.04	0.119	0.037	0.624	0.38	0.182		0.069
ERP00369	E-218036	WVGS#20003	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	1.6	9.9	2.38	1.28	0.09	0.056	0.014	0.205	0.83	0.094	1.58	0.156
ERP00369	E-218037	WVGS#20009	West Virginia	Logan	Kanawha Formation	Dean (Fireclay) coal	2.2	11.0	2.58	1.86	0.13	0.082	0.024	0.242	0.58	0.103	0.96	0.175
ERP00369	E-218038	WVGS#20008	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	1.6	6.5	1.25	0.74	0.19	0.040	0.029	0.046	1.02	0.034	1.66	0.184
ERP00369	E-218039	WVGS#20048	West Virginia	Logan	Kanawha Formation	Winifrede coal	1.8	5.4	1.11	0.88	0.08	0.041	0.014	0.141	0.29	0.039	0.87	0.156
ERP00369	E-218040	WVGS#20047	West Virginia	Logan	Kanawha Formation	Winifrede coal	1.8	3.5	0.73	0.53	0.10	0.028	0.012	0.047	0.16	0.022	0.76	0.184
ERP00369	E-218041	WVGS#21554	West Virginia	Raleigh	New River Formation	Sewell coal	1.1	11.3	2.12	1.69	0.03	0.074	0.032	0.299	1.78	0.061	2.56	0.085
ERP00369	E-218042	WVGS#19481	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	2.5	8.4	1.93	1.63	0.06	0.036	0.017	0.122	0.17	0.096	0.89	0.138
ERP00369	E-218043	WVGS#21517	West Virginia	Upshur	New River Formation	Sewell coal	1.1	25.5	6.21	3.89	0.15	0.249	0.087	0.923	1.16	0.174	0.98	0.154
ERP00369	E-218044	WVGS#21509	West Virginia	Upshur	Kanawha Formation	No. 2 Gas coal	1.2	11.1	2.43	1.70	0.24	0.110	0.036	0.394	0.46	0.076	0.88	0.209
ERP00369	E-218045	WVGS#21536	West Virginia	Upshur	Allegheny Formation	Upper Kittanning coal	1.4	18.4	3.40	2.17	0.09	0.068	0.058	0.362	3.82	0.137	5.23	0.084
ERP00369	E-218046	WVGS#19490	West Virginia	Boone	Kanawha Formation	Coalburg coal	2.1	13.5	3.74	2.20	0.06	0.040	0.015	0.126	0.21	0.131	0.82	0.085
ERP00369	E-218047	WVGS#21626	West Virginia	Boone	Kanawha Formation	Eagle coal	2.1	16.9	4.10	2.70	0.26	0.138	0.066	0.467	0.40	0.154	0.64	0.204
ERP00369	E-218048	WVGS#21547	West Virginia	Raleigh	New River Formation	Welch coal	1.0	29.2	6.96	5.35	0.19	0.101	0.053	0.417	0.38	0.401	0.54	0.074
ERP00369	E-218049	WVGS#21692	West Virginia	Logan	Kanawha Formation	Peerless coal	1.7	10.7	2.33	1.33	0.11	0.057	0.029	0.258	1.59	0.109	2.60	0.178
ERP00369	E-218050	WVGS#21724	West Virginia	Lewis	Kanawha Formation	No. 2 Gas coal	1.2	14.4	2.93	2.03	0.19	0.134	0.051	0.552	1.39	0.096	1.77	0.185
ERP00369	E-218051	WVGS#21983	West Virginia	Lewis	Allegheny Formation	Middle Kittanning coal	1.4	25.1	5.16	4.80	0.75	0.112	0.056	0.406	0.50	0.200	0.77	0.043
ERP00369	E-218052	WVGS#21966	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	1.3	16.9	2.28	2.50	0.77	0.058	0.022	0.152	2.66	0.084	4.00	0.097
ERP00369	E-218053	WVGS#21965	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	1.1	24.4	4.93	3.82	0.39	0.057	0.031	0.275	2.73	0.199	4.14	0.082
ERP00369	E-218054	WVGS#21700	West Virginia	Monongalia	Monongahela Group	Redstone coal	1.8	10.7	2.00	1.31	0.16	0.038	0.018	0.140	1.95	0.071	3.32	0.081
ERP00369	E-218055	WVGS#9687	West Virginia	Nicholas	Allegheny Formation	Middle Kittanning coal	2.0	23.8	5.84	3.92	0.05	0.155	0.032	0.802	0.54	0.241	0.87	0.024
ERP00369	E-218056	WVGS#25242	West Virginia	Monongalia	Monongahela Group	Sewickley coal	1.4	15.8	3.40	2.07	0.11	0.062	0.080	0.273	2.00	0.117	3.31	0.041
ERP00369	E-218057	WVGS#25239	West Virginia	Monongalia	Monongahela Group	Redstone coal	1.2	13.0	2.83	1.61	0.15	0.050	0.029	0.214	1.99	0.073	4.01	0.048
ERP00369	E-218058	WVGS#25237	West Virginia	Monongalia	Monongahela Group	Pittsburgh coal	1.0	10.5	1.84	1.12	0.48	0.072	0.071	0.111	1.59	0.066	3.86	0.090
ERP00369	E-218059	WVGS#22193	West Virginia	Harrison	Monongahela Group	Pittsburgh coal	1.5	8.2	1.09	0.68	0.55	0.065	0.056	0.070	1.56	0.038	3.88	0.036
ERP00369	E-218060	WVGS#22169	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	1.4	16.2	3.06	2.49	1.05	0.079	0.020	0.239	0.75	0.122	1.25	0.105
ERP00369	E-218061	WVGS#22167	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	1.5	24.9	5.45	4.80	0.08	0.086	0.036	0.436	1.20	0.251	1.79	0.087
ERP00369	E-218062	WVGS#22066	West Virginia	Boone	Kanawha Formation	Stockton coal	2.0	23.5	6.33	3.59	0.07	0.130	0.039	0.620	0.38	0.217	0.71	0.074
ERP00369	E-218063	WVGS#22295	West Virginia	Boone	Kanawha Formation	Little Chilton coal	1.5	9.1	2.19	1.62	0.05	0.052	0.020	0.178	0.28	0.094	0.74	0.156
ERP00369	E-218064	WVGS#22280	West Virginia	Boone	Kanawha Formation	No. 2 Gas coal	1.3	9.6	2.60	1.43	0.04	0.039	0.024	0.170	0.40	0.110	0.98	0.144
ERP00369	E-218065	WVGS#22188	West Virginia	Boone	Kanawha Formation	Lower Powellton coal	1.1	5.6	1.36	0.78	0.06	0.021	0.022	0.066	0.33	0.072	0.65	0.131
ERP00369	E-218066	WVGS#21673	West Virginia	Raleigh	New River Formation	Sewell coal	1.0	17.8	4.64	2.47	0.03	0.171	0.068	0.609	1.04	0.113	1.09	0.083
ERP00369	E-218067	WVGS#22126	West Virginia	Mingo	Kanawha Formation	Powellton coal	1.3	5.4	1.16	0.95	0.06	0.036	0.023	0.086	0.18	0.064	0.59	0.159
ERP00369	E-218068	WVGS#22100	West Virginia	Kanawha	Kanawha Formation	Stockton coal	2.4	9.6	2.42	1.70	0.06	0.034	0.011	0.090	0.17	0.119	0.76	0.094
ERP00454	E-245990	WVGS#28476D	West Virginia	Marion	Monogahela Group	Pittsburgh coal	1.0	9.2	1.80	0.99	0.14	0.049	0.047	0.085	1.77	0.058	3.15	0.073
ERP00454	E-245991	WVGS#22047	West Virginia	Braxton	Kanawha Formation	Stockton coal	1.1	25.3	6.80	3.71	0.09	0.152	0.052	0.632	1.25	0.179	1.45	0.100
ERP00454	E-245992	WVGS#22049	West Virginia	Braxton	Allegheny Formation	Stockton coal	1.4	11.3	2.87	1.72	0.23	0.041	0.019	0.177	0.30	0.077	0.80	0.138
ERP00454	E-245993	WVGS#22140	West Virginia	Braxton	Allegheny Formation	Little No. 5 Block coal	1.1	6.4	1.51	1.01	0.11	0.020	0.008	0.070	0.25	0.045	1.09	0.121
ERP00454	E-245994	WVGS#22186	West Virginia	Braxton	Allegheny Formation	Lower Kittanning coal	1.4	18.6	3.38	2.53	0.11	0.043	0.014	0.158	3.43	0.097	4.94	0.092
ERP00454	E-245995	WVGS#22205	West Virginia	Braxton	New River Formation	Sewell coal	0.7	15.6	4.24	2.56	0.20	0.038	0.070	0.091	0.52	0.057	1.00	0.244
ERP00454	E-245996	WVGS#22215	West Virginia	Braxton	New River Formation	Sewell coal	0.8	39.2	12.70	4.50	0.31	0.148	0.083	0.690	0.57	0.210	0.37	0.167
ERP00454	E-245997	WVGS#22225	West Virginia	Braxton	New River Formation	Sewell coal	1.2	8.0	1.59	1.28	0.39	0.062	0.048	0.134	0.25	0.042	0.50	0.271
ERP00454	E-245998	WVGS#22253	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	1.0	21.7	4.68	2.89	0.18	0.036	0.022	0.119	2.72	0.228	4.08	0.105
ERP00454	E-245999	WVGS#22254	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	1.1	32.0	9.39	4.18	0.59	0.098	0.033	0.453	0.50	0.439	0.74	0.064
ERP00454	E-246000	WVGS#22256	West Virginia	Braxton	Allegheny Formation	Upper Kittanning coal	1.5	17.6	2.13	0.98	0.17	0.071	0.012	0.205	6.58	0.050	8.09	0.028
ERP00454	E-246001	WVGS#22264	West Virginia	Braxton	Conemaugh Formation	Brush Creek coal	1.8	48.6	11.01	4.86	0.14	0.360	0.051	1.077	7.68	0.244	7.88	0.012
ERP00454	E-246002	WVGS#25150	West Virginia	Monongalia	Kanawha Formation	Lower Mercer coal	0.8	30.4	9.24	3.84	0.06	0.037	0.047	0.137	2.09	0.410	2.73	0.078
ERP00454	E-246003	WVGS#25151	West Virginia	Monongalia	Kanawha Formation	Upper Mercer coal	1.1	11.2	2.90	2.03	0.08	0.080	0.024	0.312	0.27	0.077	1.04	0.186
ERP00454	E-246004	WVGS#25190	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	0.7	28.1	6.05	3.64	0.12	0.193	0.658	0.747	4.17	0.137	4.49	0.125
ERP00454	E-246005	WVGS#25192	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	0.5	31.8	2.57	1.30	0.10	0.032	0.013	0.149	15.22	0.077	16.80	0.064
ERP00454	E-246006	WVGS#28252	West Virginia	Marshall	Monogahela Group	Sewickley coal	2.0	18.7	4.75	1.96	0.32	0.165	0.080	0.404	1.63	0.092	3.27	0.033
ERP00454	E-246007	WVGS#28261	West Virginia	Marshall	Monogahela Group	Waynesburg coal	2.3	16.9	3.37	1.81	0.08	0.073	0.041	0.276	3.18	0.091	4.73	0.024
ERP00454	E-246008	WVGS#28293	West Virginia	Marshall	Monogahela Group	Waynesburg coal	2.2	21.8	5.03	2.56	0.07	0.116	0.057	0.478	3.36	0.120	4.72	0.028
ERP00454	E-246009	WVGS#28347	West Virginia	Marshall	Monogahela Group	Sewickley coal	1.8	13.9	2.72	1.33	0.56	0.293	0.050	0.245	1.85	0.081	3.89	0.036
ERP00454	E-246010	WVGS#28451	West Virginia	Monongalia	Monogahela Group	Pittsburgh coal	2.5	9.3	2.54	1.20	0.12	0.034	0.054	0.135	0.59	0.076	1.99	0.093
ERP00454	E-246011	WVGS#28452	West Virginia	Harrison	Monogahela Group	Pittsburgh coal	1.5	7.7	1.76	1.01	0.08	0.034	0.021	0.097	1.02	0.050	2.09	0.055

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00128	E-183459	WVGS#19633	West Virginia	Braxton	Kanawha Formation	Coalburg coal	0.0046	<0.53	3.5	30	205	4.4	0.24	0.11	17.1	46.7	2.40	23.2	13.8
ERP00128	E-183460	WVGS#19634	West Virginia	Braxton	Kanawha Formation	Coalburg coal	0.0037	<0.29	8.5	29	93	2.2	0.19	0.05	9.9	24.4	0.82	13.5	6.5
ERP00128	E-183461	WVGS#20000	West Virginia	Braxton	Kanawha Formation	Stockton coal	0.0096	<0.44	12.2	15	55	3.5	0.35	0.07	12.3	39.4	0.46	21.1	8.1
ERP00128	E-183462	WVGS#20001	West Virginia	Upshur	Allegheny Formation	Middle Kittanning coal	0.0655	<0.47	33.5	29	101	2.1	0.16	0.06	9.5	40.2	2.03	12.7	9.2
ERP00128	E-183463	WVGS#19593B	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0034	<0.31	2.2	20	90	3.4	0.11	0.05	5.8	22.2	1.97	10.7	5.5
ERP00128	E-183464	WVGS#19596B	West Virginia	Logan	Kanawha Formation	Stockton coal	0.0016	<0.36	4.2	22	166	2.3	0.18	0.08	10.9	27.7	2.45	20.9	8.1
ERP00369	E-218036	WVGS#20003	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	0.0043	<0.20	15.4	21	78	5.2	0.15	0.09	13.9	14.0	1.37	24.5	7.2
ERP00369	E-218037	WVGS#20009	West Virginia	Logan	Kanawha Formation	Dean (Fireclay) coal	0.0102	<0.22	8.6	30	138	2.2	0.12	0.09	7.2	18.7	1.28	16.1	6.5
ERP00369	E-218038	WVGS#20008	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	0.0025	<0.13	44.4	32	55	3.0	0.06	0.03	3.3	5.3	0.09	11.4	5.6
ERP00369	E-218039	WVGS#20048	West Virginia	Logan	Kanawha Formation	Winifrede coal	0.0029	0.12	2.1	10	72	19.6	0.12	0.07	4.4	6.9	0.73	15.3	7.3
ERP00369	E-218040	WVGS#20047	West Virginia	Logan	Kanawha Formation	Winifrede coal	0.0015	<0.07	2.4	10	42	3.6	0.06	0.05	14.4	4.8	0.19	13.9	2.3
ERP00369	E-218041	WVGS#21554	West Virginia	Raleigh	New River Formation	Sewell coal	0.0055	<0.23	58.9	16	77	2.9	0.11	0.09	7.4	20.3	1.83	41.8	7.1
ERP00369	E-218042	WVGS#19481	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	0.0050	<0.17	0.8	40	31	1.3	0.14	0.05	8.1	20.2	0.64	17.8	6.0
ERP00369	E-218043	WVGS#21517	West Virginia	Upshur	New River Formation	Sewell coal	0.0079	<0.51	11.5	28	230	2.8	0.46	0.22	10.3	34.2	3.34	70.1	11.0
ERP00369	E-218044	WVGS#21509	West Virginia	Upshur	Kanawha Formation	No. 2 Gas coal	0.0055	<0.23	7.7	18	77	1.8	0.27	0.08	5.1	15.2	1.39	36.3	6.1
ERP00369	E-218045	WVGS#21536	West Virginia	Upshur	Allegheny Formation	Upper Kittanning coal	0.0073	<0.37	13.0	48	66	2.8	0.51	0.13	7.7	21.5	2.32	56.5	9.6
ERP00369	E-218046	WVGS#19490	West Virginia	Boone	Kanawha Formation	Coalburg coal	0.0035	0.33	1.5	21	40	3.9	0.31	0.03	10.5	24.3	0.34	29.6	7.7
ERP00369	E-218047	WVGS#21626	West Virginia	Boone	Kanawha Formation	Eagle coal	0.0041	<0.34	2.9	42	93	1.7	0.20	0.04	8.7	24.2	2.75	22.6	7.5
ERP00369	E-218048	WVGS#21547	West Virginia	Raleigh	New River Formation	Welch coal	0.1000	0.90	2.2	<6	415	5.4	0.55	0.15	8.7	66.9	1.75	148.0	14.0
ERP00369	E-218049	WVGS#21692	West Virginia	Logan	Kanawha Formation	Peerless coal	0.0046	0.23	34.7	28	108	3.5	0.12	0.03	2.8	14.4	0.96	16.1	5.9
ERP00369	E-218050	WVGS#21724	West Virginia	Lewis	Kanawha Formation	No. 2 Gas coal	0.0094	<0.29	13.7	26	116	3.6	0.24	0.14	5.4	17.0	1.84	35.4	9.4
ERP00369	E-218051	WVGS#21983	West Virginia	Lewis	Allegheny Formation	Middle Kittanning coal	0.0690	0.58	3.5	23	126	2.3	0.33	0.13	8.9	41.4	1.82	49.2	15.5
ERP00369	E-218052	WVGS#21966	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	0.1150	<0.34	59.8	56	125	1.4	0.13	0.17	7.0	31.9	0.66	18.8	8.1
ERP00369	E-218053	WVGS#21965	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	0.0088	0.51	17.7	42	169	3.4	0.24	0.47	14.8	85.6	1.08	36.8	14.3
ERP00369	E-218054	WVGS#21700	West Virginia	Monongalia	Monongahela Group	Redstone coal	0.0210	<0.22	5.8	31	72	1.8	0.08	0.05	3.5	13.5	0.92	5.7	4.0
ERP00369	E-218055	WVGS#9687	West Virginia	Nicholas	Allegheny Formation	Middle Kittanning coal	0.0069	<0.48	5.4	24	147	5.5	0.19	0.08	10.2	33.6	3.64	18.4	9.5
ERP00369	E-218056	WVGS#25242	West Virginia	Monongalia	Monongahela Group	Sewickley coal	0.0376	<0.32	17.2	55	124	1.2	0.12	0.10	5.9	20.1	1.74	11.1	5.5
ERP00369	E-218057	WVGS#25239	West Virginia	Monongalia	Monongahela Group	Redstone coal	0.0078	<0.26	3.2	34	54	1.5	0.12	0.11	3.8	15.6	1.40	7.1	4.3
ERP00369	E-218058	WVGS#25237	West Virginia	Monongalia	Monongahela Group	Pittsburgh coal	0.0106	<0.21	4.4	69	98	0.7	0.16	0.08	3.1	12.5	0.66	6.1	2.9
ERP00369	E-218059	WVGS#22193	West Virginia	Harrison	Monongahela Group	Pittsburgh coal	0.0090	<0.17	26.3	103	127	0.7	0.10	0.04	1.8	7.6	0.46	4.5	2.0
ERP00369	E-218060	WVGS#22169	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	0.0070	0.46	26.2	31	56	1.1	0.23	0.10	11.2	28.4	1.22	23.3	11.1
ERP00369	E-218061	WVGS#22167	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	0.0061	0.51	25.1	33	88	3.0	0.47	0.13	18.7	50.8	1.99	41.6	15.0
ERP00369	E-218062	WVGS#22066	West Virginia	Boone	Kanawha Formation	Stockton coal	0.0042	<0.47	1.6	16	132	4.4	0.35	0.06	9.1	37.6	3.55	26.8	8.9
ERP00369	E-218063	WVGS#22295	West Virginia	Boone	Kanawha Formation	Little Chilton coal	0.0025	<0.19	3.1	11	69	1.6	0.17	0.08	5.7	13.8	0.77	18.2	5.8
ERP00369	E-218064	WVGS#22280	West Virginia	Boone	Kanawha Formation	No. 2 Gas coal	0.0023	0.22	10.3	13	71	4.1	0.20	0.08	8.8	15.2	0.63	22.8	6.7
ERP00369	E-218065	WVGS#22188	West Virginia	Boone	Kanawha Formation	Lower Powellton coal	0.0026	0.14	2.5	9	37	3.8	0.12	0.01	6.0	8.6	0.19	17.1	4.1
ERP00369	E-218066	WVGS#21673	West Virginia	Raleigh	New River Formation	Sewell coal	0.0047	<0.36	24.9	16	139	1.5	0.12	0.07	11.5	24.7	2.49	23.0	6.2
ERP00369	E-218067	WVGS#22126	West Virginia	Mingo	Kanawha Formation	Powellton coal	0.0012	0.12	1.1	7	59	3.7	0.17	0.02	6.3	8.9	0.23	17.8	4.2
ERP00369	E-218068	WVGS#22100	West Virginia	Kanawha	Kanawha Formation	Stockton coal	0.0047	0.22	0.7	24	73	1.6	0.19	0.03	8.1	21.5	0.32	22.0	5.2
ERP00454	E-245990	WVGS#28476D	West Virginia	Marion	Monogahela Group	Pittsburgh coal	0.0042	<0.19	13.1		156	0.5	0.11	0.05	3.0	10.8	0.48	6.9	2.7
ERP00454	E-245991	WVGS#22047	West Virginia	Braxton	Kanawha Formation	Stockton coal	0.0058	<0.50	13.1		122	3.8	0.16	0.11	11.6	37.5	3.34	22.7	11.6
ERP00454	E-245992	WVGS#22049	West Virginia	Braxton	Allegheny Formation	Stockton coal	0.0032	0.38	3.9		43	11.2	0.12	0.12	10.7	25.9	1.87	29.9	9.5
ERP00454	E-245993	WVGS#22140	West Virginia	Braxton	Allegheny Formation	Little No. 5 Block coal	0.0027	0.29	4.8		29	25.4	0.10	0.15	22.1	18.6	0.27	63.5	13.6
ERP00454	E-245994	WVGS#22186	West Virginia	Braxton	Allegheny Formation	Lower Kittanning coal	0.0385	0.41	122.0		147	3.3	0.19	0.35	10.9	58.6	1.10	28.3	14.2
ERP00454	E-245995	WVGS#22205	West Virginia	Braxton	New River Formation	Sewell coal	0.0121	0.33	23.5		52	3.7	0.14	0.16	18.2	24.1	0.46	50.1	8.5
ERP00454	E-245996	WVGS#22215	West Virginia	Braxton	New River Formation	Sewell coal	0.0058	<0.78	3.1		155	2.0	0.13	0.09	18.8	43.9	3.05	21.8	13.3
ERP00454	E-245997	WVGS#22225	West Virginia	Braxton	New River Formation	Sewell coal	0.0056	<0.16	2.0		60	1.1	0.06	0.06	9.1	13.3	0.69	12.2	3.9
ERP00454	E-245998	WVGS#22253	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	0.0695	0.72	68.0		343	2.2	0.40	0.26	81.0	54.5	0.40	41.7	12.9
ERP00454	E-245999	WVGS#22254	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	0.0346	0.91	3.6		187	2.7	0.39	0.09	16.2	61.5	1.55	37.5	20.9
ERP00454	E-246000	WVGS#22256	West Virginia	Braxton	Allegheny Formation	Upper Kittanning coal	0.0326	<0.35	242.4		40	3.4	0.06	0.14	3.9	13.6	1.15	11.2	7.3
ERP00454	E-246001	WVGS#22264	West Virginia	Braxton	Conemaugh Formation	Brush Creek coal	0.0070	<0.97	232.3		154	7.6	0.24	0.19	17.3	50.1	4.86	26.4	14.9
ERP00454	E-246002	WVGS#25150	West Virginia	Monongalia	Kanawha Formation	Lower Mercer coal	0.0039	0.66	30.7		56	5.9	0.55	0.26	17.5	62.0	0.36	38.3	15.5
ERP00454	E-246003	WVGS#25151	West Virginia	Monongalia	Kanawha Formation	Upper Mercer coal	0.0051	<0.22	5.2		45	9.0	0.27	0.25	16.9	31.8	2.22	102.3	15.0
ERP00454	E-246004	WVGS#25190	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	0.0077	<0.56	68.6		128	3.1	0.57	0.16	13.4	40.8	3.09	75.6	19.7
ERP00454	E-246005	WVGS#25192	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	0.0067	<0.64	1351.2		32	2.2	0.12	0.20	9.1	22.6	0.81	120.5	20.7
ERP00454	E-246006	WVGS#28252	West Virginia	Marshall	Monogahela Group	Sewickley coal	0.0028	<0.37	4.1		84	0.8	0.09	0.10	4.9	19.0	2.11	8.3	4.0
ERP00454	E-246007	WVGS#28261	West Virginia	Marshall	Monogahela Group	Waynesburg coal	0.0180	<0.34	7.6		101	1.2	0.09	0.06	6.2	20.6	2.30	7.6	5.1
ERP00454	E-246008	WVGS#28293	West Virginia	Marshall	Monogahela Group	Waynesburg coal	0.0088	<0.44	37.1		113	1.5	0.10	0.07	6.3	26.2	2.32	12.3	6.5
ERP00454	E-246009	WVGS#28347	West Virginia	Marshall	Monogahela Group	Sewickley coal	0.0020	<0.28	4.7		76	0.8	0.08	0.07	4.1	22.5	1.27	7.2	3.4
ERP00454	E-246010	WVGS#28451	West Virginia	Monongalia	Monogahela Group	Pittsburgh coal	0.0077	<0.19	6.3		81	0.7	0.13	0.02	2.8	14.6	0.76	6.4	3.6
ERP00454	E-246011	WVGS#28452	West Virginia	Harrison	Monogahela Group	Pittsburgh coal	0.0069	<0.15	5.7		91	0.5	0.10	0.04	2.7	11.4	0.50	6.9	2.4

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00128	E-183459	WVGS#19633	West Virginia	Braxton	Kanawha Formation	Coalburg coal	3.5	0.05	60.3	53.8	2.7	6.6	31.1	16.5	39.2	1.4	7.9	6.2	4.7
ERP00128	E-183460	WVGS#19634	West Virginia	Braxton	Kanawha Formation	Coalburg coal	1.1	0.23	20.2	23.4	1.6	3.3	15.8	9.4	13.6	0.6	4.1	8.7	2.7
ERP00128	E-183461	WVGS#20000	West Virginia	Braxton	Kanawha Formation	Stockton coal	2.6	0.35	30.0	18.7	1.5	7.2	22.6	19.5	7.6	0.9	6.8	8.9	3.4
ERP00128	E-183462	WVGS#20001	West Virginia	Upshur	Allegheny Formation	Middle Kittanning coal	2.3	1.10	67.2	47.6	2.2	5.3	13.8	12.8	24.5	0.6	6.5	5.7	3.1
ERP00128	E-183463	WVGS#19593B	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.7	0.05	13.7	7.2	1.0	3.4	14.5	7.4	27.6	0.5	3.7	7.2	4.1
ERP00128	E-183464	WVGS#19596B	West Virginia	Logan	Kanawha Formation	Stockton coal	1.1	0.11	14.5	13.4	1.5	4.2	18.4	13.1	37.2	0.8	5.3	7.3	3.0
ERP00369	E-218036	WVGS#20003	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	6.3	0.15	17.6	11.1	1.5	1.9	28.2	8.8	14.1	3.1	3.9	3.9	1.3
ERP00369	E-218037	WVGS#20009	West Virginia	Logan	Kanawha Formation	Dean (Fireclay) coal	1.4	0.12	30.5	16.2	1.7	2.2	12.2	7.7	15.2	1.3	5.2	7.5	2.0
ERP00369	E-218038	WVGS#20008	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	1.5	0.23	8.9	14.7	1.2	0.7	6.3	6.1	2.1	0.4	1.4	3.3	1.1
ERP00369	E-218039	WVGS#20048	West Virginia	Logan	Kanawha Formation	Winifrede coal	3.5	<0.02	8.7	10.0	2.3	0.9	7.4	5.7	8.8	1.4	2.1	3.1	1.7
ERP00369	E-218040	WVGS#20047	West Virginia	Logan	Kanawha Formation	Winifrede coal	1.5	0.04	5.3	6.8	1.6	0.5	16.5	2.6	2.9	0.9	1.5	3.8	1.5
ERP00369	E-218041	WVGS#21554	West Virginia	Raleigh	New River Formation	Sewell coal	8.1	<0.02	21.4	7.0	4.4	1.5	31.8	6.6	19.5	3.8	4.3	4.0	1.2
ERP00369	E-218042	WVGS#19481	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	1.1	<0.02	22.2	5.7	1.9	2.3	17.3	7.0	9.1	1.0	3.9	4.6	3.0
ERP00369	E-218043	WVGS#21517	West Virginia	Upshur	New River Formation	Sewell coal	4.4	0.14	47.7	41.8	5.5	3.3	29.8	21.0	53.0	4.7	9.1	2.2	2.5
ERP00369	E-218044	WVGS#21509	West Virginia	Upshur	Kanawha Formation	No. 2 Gas coal	3.5	0.04	15.8	29.3	2.8	1.6	16.1	10.3	22.9	2.0	4.6	4.1	1.3
ERP00369	E-218045	WVGS#21536	West Virginia	Upshur	Allegheny Formation	Upper Kittanning coal	5.5	0.30	25.6	48.8	4.3	2.6	25.0	16.0	37.7	3.1	7.4	4.1	2.8
ERP00369	E-218046	WVGS#19490	West Virginia	Boone	Kanawha Formation	Coalburg coal	2.1	0.03	19.4	8.6	1.3	2.5	18.1	16.3	6.4	1.4	9.7	4.8	25.7
ERP00369	E-218047	WVGS#21626	West Virginia	Boone	Kanawha Formation	Eagle coal	0.9	0.02	44.4	24.2	0.9	2.9	16.4	10.2	31.6	0.7	5.8	5.2	2.7
ERP00369	E-218048	WVGS#21547	West Virginia	Raleigh	New River Formation	Welch coal	6.9	0.02	155.0	12.2	2.1	8.3	23.0	32.7	21.7	2.2	23.4	6.9	4.6
ERP00369	E-218049	WVGS#21692	West Virginia	Logan	Kanawha Formation	Peerless coal	4.0	0.28	16.5	12.8	0.5	2.0	4.9	6.1	13.3	0.6	3.8	3.1	3.1
ERP00369	E-218050	WVGS#21724	West Virginia	Lewis	Kanawha Formation	No. 2 Gas coal	3.6	0.20	25.2	27.4	2.3	2.0	14.5	10.5	30.2	1.8	5.3	3.5	2.2
ERP00369	E-218051	WVGS#21983	West Virginia	Lewis	Allegheny Formation	Middle Kittanning coal	1.6	0.13	66.8	55.2	3.7	4.8	20.6	20.0	23.3	1.2	11.2	14.3	21.6
ERP00369	E-218052	WVGS#21966	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	1.1	0.54	19.9	25.4	2.5	2.9	12.3	8.3	10.0	1.2	6.4	22.3	8.5
ERP00369	E-218053	WVGS#21965	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	12.4	0.51	21.1	28.8	3.1	4.6	36.4	18.4	17.0	1.9	15.0	23.2	17.9
ERP00369	E-218054	WVGS#21700	West Virginia	Monongalia	Monongahela Group	Redstone coal	2.8	0.12	15.8	18.4	0.9	1.6	6.2	3.7	9.5	0.3	4.4	3.3	1.5
ERP00369	E-218055	WVGS#9687	West Virginia	Nicholas	Allegheny Formation	Middle Kittanning coal	2.2	0.04	26.7	12.2	1.3	4.9	15.1	12.6	55.0	0.7	7.4	8.0	2.3
ERP00369	E-218056	WVGS#25242	West Virginia	Monongalia	Monongahela Group	Sewickley coal	4.3	0.16	25.9	34.0	3.2	2.4	13.2	6.5	18.8	0.7	4.4	4.1	4.6
ERP00369	E-218057	WVGS#25239	West Virginia	Monongalia	Monongahela Group	Redstone coal	5.3	0.04	13.7	13.4	0.8	2.5	10.4	4.1	15.3	0.6	3.2	2.3	3.0
ERP00369	E-218058	WVGS#25237	West Virginia	Monongalia	Monongahela Group	Pittsburgh coal	1.8	0.09	12.8	29.4	0.5	1.2	5.1	3.4	7.3	0.3	2.3	2.0	2.5
ERP00369	E-218059	WVGS#22193	West Virginia	Harrison	Monongahela Group	Pittsburgh coal	3.8	0.07	8.2	27.8	0.6	0.8	3.9	2.4	4.9	0.1	1.4	0.5	4.6
ERP00369	E-218060	WVGS#22169	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	1.7	0.64	36.3	36.5	2.7	5.2	19.1	9.7	14.6	1.8	6.2	18.8	10.1
ERP00369	E-218061	WVGS#22167	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	2.5	0.66	65.0	8.7	4.0	5.5	42.6	28.6	27.4	1.4	12.1	21.5	7.3
ERP00369	E-218062	WVGS#22066	West Virginia	Boone	Kanawha Formation	Stockton coal	2.1	<0.02	36.7	9.7	1.4	3.9	20.2	14.0	42.3	0.8	7.4	4.1	11.8
ERP00369	E-218063	WVGS#22295	West Virginia	Boone	Kanawha Formation	Little Chilton coal	1.5	0.02	17.0	4.2	0.8	1.9	9.7	6.8	10.1	0.7	3.2	4.3	6.7
ERP00369	E-218064	WVGS#22280	West Virginia	Boone	Kanawha Formation	No. 2 Gas coal	3.0	0.02	16.3	4.7	1.0	2.3	14.4	11.4	8.7	2.6	3.8	4.6	10.6
ERP00369	E-218065	WVGS#22188	West Virginia	Boone	Kanawha Formation	Lower Powellton coal	2.4	<0.02	8.8	77.3	0.5	1.5	15.1	6.0	3.2	1.0	1.9	3.4	6.5
ERP00369	E-218066	WVGS#21673	West Virginia	Raleigh	New River Formation	Sewell coal	3.1	0.26	31.0	21.5	1.4	2.1	31.3	6.6	33.5	1.1	4.8	2.0	1.7
ERP00369	E-218067	WVGS#22126	West Virginia	Mingo	Kanawha Formation	Powellton coal	1.5	<0.02	9.2	6.7	0.5	1.3	10.5	5.3	4.4	0.6	2.4	3.7	4.0
ERP00369	E-218068	WVGS#22100	West Virginia	Kanawha	Kanawha Formation	Stockton coal	1.3	<0.02	21.7	3.3	1.3	2.4	14.8	8.1	4.9	0.4	4.2	5.8	12.0
ERP00454	E-245990	WVGS#28476D	West Virginia	Marion	Monogahela Group	Pittsburgh coal	2.5	0.24	13.7	18.9	0.7	1.3	6.6	3.6	5.4	0.2	2.1	1.6	1.6
ERP00454	E-245991	WVGS#22047	West Virginia	Braxton	Kanawha Formation	Stockton coal	6.5	0.22	31.6	65.0	2.9	4.5	19.6	12.1	52.6	1.3	8.1	6.2	5.1
ERP00454	E-245992	WVGS#22049	West Virginia	Braxton	Allegheny Formation	Stockton coal	6.0	0.05	27.0	11.9	1.5	1.8	13.3	9.5	13.2	0.6	4.9	5.2	6.9
ERP00454	E-245993	WVGS#22140	West Virginia	Braxton	Allegheny Formation	Little No. 5 Block coal	20.5	0.07	9.3	4.3	10.8	1.4	31.0	5.4	4.2	3.3	6.4	6.8	5.5
ERP00454	E-245994	WVGS#22186	West Virginia	Braxton	Allegheny Formation	Lower Kittanning coal	13.1	1.17	24.9	21.8	8.1	3.3	25.1	13.9	12.9	2.7	12.9	10.0	5.3
ERP00454	E-245995	WVGS#22205	West Virginia	Braxton	New River Formation	Sewell coal	7.7	0.35	21.1	12.8	5.5	1.4	29.2	8.7	5.2	1.8	7.1	6.1	5.7
ERP00454	E-245996	WVGS#22215	West Virginia	Braxton	New River Formation	Sewell coal	3.6	0.01	31.6	45.1	2.1	5.3	31.2	11.4	43.9	1.0	9.1	2.0	9.8
ERP00454	E-245997	WVGS#22225	West Virginia	Braxton	New River Formation	Sewell coal	0.8	3.83	12.8	21.7	1.9	0.9	22.1	3.6	8.8	0.4	2.7	1.3	3.4
ERP00454	E-245998	WVGS#22253	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	6.6	3.77	20.8	25.4	5.8	5.3	74.7	16.9	7.2	2.4	9.5	17.5	7.5
ERP00454	E-245999	WVGS#22254	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	4.0	0.14	48.7	75.6	2.4	10.7	20.3	24.5	25.9	1.3	12.9	13.8	9.0
ERP00454	E-246000	WVGS#22256	West Virginia	Braxton	Allegheny Formation	Upper Kittanning coal	11.1	0.54	10.8	27.9	7.8	1.2	16.3	6.7	15.4	1.4	4.0	1.3	7.1
ERP00454	E-246001	WVGS#22264	West Virginia	Braxton	Conemaugh Formation	Brush Creek coal	41.0	1.98	141.9	91.4	31.4	5.8	36.5	15.5	78.2	2.1	10.0	7.4	4.9
ERP00454	E-246002	WVGS#25150	West Virginia	Monongalia	Kanawha Formation	Lower Mercer coal	14.8	1.09	38.9	19.3	4.8	9.2	43.8	35.6	7.3	1.9	12.9	13.1	6.7
ERP00454	E-246003	WVGS#25151	West Virginia	Monongalia	Kanawha Formation	Upper Mercer coal	33.8	0.09	14.7	6.0	4.9	1.9	49.8	18.2	24.5	4.2	10.5	8.3	2.6
ERP00454	E-246004	WVGS#25190	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	9.4	0.35	48.9	141.2	9.9	2.8	40.5	24.5	43.6	3.5	11.1	4.9	4.9
ERP00454	E-246005	WVGS#25192	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	21.4	4.88	41.6	16.4	11.9	2.0	43.6	161.2	9.3	3.0	6.1	2.5	3.7
ERP00454	E-246006	WVGS#28252	West Virginia	Marshall	Monogahela Group	Sewickley coal	7.0	0.15	17.9	34.3	2.6	2.2	10.5	5.2	23.1	0.2	3.5	4.4	2.4
ERP00454	E-246007	WVGS#28261	West Virginia	Marshall	Monogahela Group	Waynesburg coal	6.8	0.19	49.1	44.5	1.5	2.4	11.5	5.4	20.0	0.2	4.1	5.0	2.7
ERP00454	E-246008	WVGS#28293	West Virginia	Marshall	Monogahela Group	Waynesburg coal	5.2	0.12	43.9	41.5	2.6	3.0	12.6	7.0	30.8	0.7	5.0	2.5	2.7
ERP00454	E-246009	WVGS#28347	West Virginia	Marshall	Monogahela Group	Sewickley coal	7.0	0.25	12.3	30.4	3.8	1.9	9.4	4.2	13.1	0.2	3.6	8.2	2.7
ERP00454	E-246010	WVGS#28451	West Virginia	Monongalia	Monogahela Group	Pittsburgh coal	2.9	0.11	15.3	5.2	0.9	1.8	4.7	4.6	9.4	0.4	2.7	2.6	2.5
ERP00454	E-246011	WVGS#28452	West Virginia	Harrison	Monogahela Group	Pittsburgh coal	0.6	0.10	11.1	9.5	1.0	1.2	6.2	3.0	6.2	0.2	2.1	1.1	1.6

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00128	E-183459	WVGS#19633	West Virginia	Braxton	Kanawha Formation	Coalburg coal	146	0.10	5.9	0.34	2.3	59.8	8.4	31.8	72.3
ERP00128	E-183460	WVGS#19634	West Virginia	Braxton	Kanawha Formation	Coalburg coal	85	0.08	3.1	0.54	1.1	28.8	6.6	19.9	37.5
ERP00128	E-183461	WVGS#20000	West Virginia	Braxton	Kanawha Formation	Stockton coal	71	0.11	6.6	0.57	2.0	35.9	10.7	15.7	86.3
ERP00128	E-183462	WVGS#20001	West Virginia	Upshur	Allegheny Formation	Middle Kittanning coal	171	0.07	4.6	1.06	1.4	47.8	5.5	20.6	64.2
ERP00128	E-183463	WVGS#19593B	West Virginia	Logan	Kanawha Formation	Coalburg coal	55	0.05	3.4	0.36	1.0	29.5	4.4	12.8	36.3
ERP00128	E-183464	WVGS#19596B	West Virginia	Logan	Kanawha Formation	Stockton coal	57	0.08	4.0	0.45	1.9	47.1	5.7	26.1	48.0
ERP00369	E-218036	WVGS#20003	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	54	0.07	2.2	1.47	1.8	24.1	14.5	16.9	22.9
ERP00369	E-218037	WVGS#20009	West Virginia	Logan	Kanawha Formation	Dean (Fireclay) coal	105	0.04	2.9	0.61	1.9	31.5	9.8	25.5	23.7
ERP00369	E-218038	WVGS#20008	West Virginia	Logan	Kanawha Formation	Cedar Grove coal	127	0.04	1.5	1.88	0.8	9.4	9.6	7.5	14.3
ERP00369	E-218039	WVGS#20048	West Virginia	Logan	Kanawha Formation	Winifrede coal	57	0.05	1.7	0.20	0.8	16.7	10.8	4.8	10.4
ERP00369	E-218040	WVGS#20047	West Virginia	Logan	Kanawha Formation	Winifrede coal	77	0.03	1.0	0.14	0.4	12.8	8.1	14.3	5.5
ERP00369	E-218041	WVGS#21554	West Virginia	Raleigh	New River Formation	Sewell coal	44	0.06	2.2	3.98	3.3	58.5	6.8	15.1	18.3
ERP00369	E-218042	WVGS#19481	West Virginia	Lincoln	Kanawha Formation	Coalburg coal	33	0.06	3.3	0.22	1.3	31.4	8.2	7.0	22.4
ERP00369	E-218043	WVGS#21517	West Virginia	Upshur	New River Formation	Sewell coal	69	0.17	6.3	0.72	3.6	104.0	12.4	46.4	44.4
ERP00369	E-218044	WVGS#21509	West Virginia	Upshur	Kanawha Formation	No. 2 Gas coal	70	0.11	3.3	0.39	1.8	46.4	8.7	17.3	20.4
ERP00369	E-218045	WVGS#21536	West Virginia	Upshur	Allegheny Formation	Upper Kittanning coal	110	0.20	5.2	0.59	2.8	71.2	14.0	27.4	34.4
ERP00369	E-218046	WVGS#19490	West Virginia	Boone	Kanawha Formation	Coalburg coal	28	0.08	5.6	0.17	2.6	57.4	23.0	10.0	30.9
ERP00369	E-218047	WVGS#21626	West Virginia	Boone	Kanawha Formation	Eagle coal	55	0.06	4.1	0.31	2.1	33.6	7.7	15.1	36.0
ERP00369	E-218048	WVGS#21547	West Virginia	Raleigh	New River Formation	Welch coal	435	0.20	19.8	0.29	7.2	108.0	20.1	5.9	91.4
ERP00369	E-218049	WVGS#21692	West Virginia	Logan	Kanawha Formation	Peerless coal	86	0.03	2.4	2.09	1.0	20.8	9.5	6.2	30.2
ERP00369	E-218050	WVGS#21724	West Virginia	Lewis	Kanawha Formation	No. 2 Gas coal	116	0.08	3.5	1.81	1.5	46.4	8.8	18.4	29.4
ERP00369	E-218051	WVGS#21983	West Virginia	Lewis	Allegheny Formation	Middle Kittanning coal	261	0.15	7.5	0.37	2.6	103.0	10.0	21.7	49.4
ERP00369	E-218052	WVGS#21966	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	370	0.04	3.1	0.34	1.5	55.1	11.8	14.4	36.0
ERP00369	E-218053	WVGS#21965	West Virginia	Lewis	Allegheny Formation	Lower Kittanning coal	53	0.12	8.3	1.36	3.2	107.0	24.4	47.3	89.1
ERP00369	E-218054	WVGS#21700	West Virginia	Monongalia	Monongahela Group	Redstone coal	129	0.03	1.1	0.58	0.5	20.3	6.6	10.4	20.8
ERP00369	E-218055	WVGS#9687	West Virginia	Nicholas	Allegheny Formation	Middle Kittanning coal	51	0.06	5.5	0.56	1.6	50.5	11.1	17.7	55.9
ERP00369	E-218056	WVGS#25242	West Virginia	Monongalia	Monongahela Group	Sewickley coal	169	0.07	2.4	0.53	1.8	36.2	6.5	18.3	32.1
ERP00369	E-218057	WVGS#25239	West Virginia	Monongalia	Monongahela Group	Redstone coal	69	0.22	1.4	0.56	0.8	21.7	5.2	29.3	21.5
ERP00369	E-218058	WVGS#25237	West Virginia	Monongalia	Monongahela Group	Pittsburgh coal	137	0.08	1.5	0.21	0.5	18.2	3.4	12.1	18.0
ERP00369	E-218059	WVGS#22193	West Virginia	Harrison	Monongahela Group	Pittsburgh coal	133	0.04	0.6	0.31	0.4	10.8	3.3	9.8	10.2
ERP00369	E-218060	WVGS#22169	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	82	0.43	4.3	1.60	1.6	44.9	9.5	14.5	30.3
ERP00369	E-218061	WVGS#22167	West Virginia	Braxton	Allegheny Formation	No. 5 Block coal	52	0.14	8.4	2.81	4.4	78.9	14.3	29.6	56.0
ERP00369	E-218062	WVGS#22066	West Virginia	Boone	Kanawha Formation	Stockton coal	68	0.11	7.0	0.45	2.1	51.9	10.0	8.3	50.8
ERP00369	E-218063	WVGS#22295	West Virginia	Boone	Kanawha Formation	Little Chilton coal	67	0.05	2.3	0.16	1.0	20.5	5.4	5.2	21.2
ERP00369	E-218064	WVGS#22280	West Virginia	Boone	Kanawha Formation	No. 2 Gas coal	68	0.07	3.5	0.26	2.1	24.6	8.4	7.1	28.9
ERP00369	E-218065	WVGS#22188	West Virginia	Boone	Kanawha Formation	Lower Powellton coal	47	0.05	1.4	0.11	1.0	12.4	4.8	4.1	18.6
ERP00369	E-218066	WVGS#21673	West Virginia	Raleigh	New River Formation	Sewell coal	46	0.05	2.8	0.80	1.4	41.1	5.8	15.5	31.0
ERP00369	E-218067	WVGS#22126	West Virginia	Mingo	Kanawha Formation	Powellton coal	91	0.04	2.2	0.07	0.7	14.6	6.5	7.0	13.6
ERP00369	E-218068	WVGS#22100	West Virginia	Kanawha	Kanawha Formation	Stockton coal	49	0.07	3.1	0.10	1.0	32.5	8.7	3.8	26.6
ERP00454	E-245990	WVGS#28476D	West Virginia	Marion	Monogahela Group	Pittsburgh coal	120	0.05	1.6	0.37	0.4	15.7	2.8	7.9	
ERP00454	E-245991	WVGS#22047	West Virginia	Braxton	Kanawha Formation	Stockton coal	67	0.06	5.3	0.86	2.0	53.6	13.8	30.9	
ERP00454	E-245992	WVGS#22049	West Virginia	Braxton	Allegheny Formation	Stockton coal	35	0.06	2.7	0.54	0.9	32.1	14.0	21.4	
ERP00454	E-245993	WVGS#22140	West Virginia	Braxton	Allegheny Formation	Little No. 5 Block coal	47	0.11	1.9	0.52	1.1	59.5	18.9	12.2	
ERP00454	E-245994	WVGS#22186	West Virginia	Braxton	Allegheny Formation	Lower Kittanning coal	183	0.10	6.1	3.03	3.6	97.8	17.8	30.9	
ERP00454	E-245995	WVGS#22205	West Virginia	Braxton	New River Formation	Sewell coal	91	0.08	1.9	1.41	0.9	49.5	13.4	51.9	
ERP00454	E-245996	WVGS#22215	West Virginia	Braxton	New River Formation	Sewell coal	66	0.07	5.6	0.38	2.4	62.0	11.9	42.4	
ERP00454	E-245997	WVGS#22225	West Virginia	Braxton	New River Formation	Sewell coal	105	0.03	1.4	0.13	0.4	14.4	6.3	6.7	
ERP00454	E-245998	WVGS#22253	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	287	0.21	8.2	2.78	4.0	67.7	20.5	92.5	
ERP00454	E-245999	WVGS#22254	West Virginia	Braxton	Allegheny Formation	Middle Kittanning coal	192	0.11	11.6	0.34	3.2	73.6	16.1	29.1	
ERP00454	E-246000	WVGS#22256	West Virginia	Braxton	Allegheny Formation	Upper Kittanning coal	39	0.03	1.5	3.65	1.3	27.6	16.2	40.2	
ERP00454	E-246001	WVGS#22264	West Virginia	Braxton	Conemaugh Formation	Brush Creek coal	43	0.10	7.7	14.58	3.2	76.3	18.7	62.7	
ERP00454	E-246002	WVGS#25150	West Virginia	Monongalia	Kanawha Formation	Lower Mercer coal	37	0.13	13.9	0.97	3.7	54.1	21.6	52.9	
ERP00454	E-246003	WVGS#25151	West Virginia	Monongalia	Kanawha Formation	Upper Mercer coal	40	0.16	5.3	0.38	2.3	104.4	16.9	71.2	
ERP00454	E-246004	WVGS#25190	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	64	0.23	7.3	1.48	3.1	106.0	16.9	43.3	
ERP00454	E-246005	WVGS#25192	West Virginia	Monongalia	Kanawha Formation	Quakertown coal	32	0.14	2.4	15.58	0.9	66.4	5.3	91.6	
ERP00454	E-246006	WVGS#28252	West Virginia	Marshall	Monogahela Group	Sewickley coal	78	0.04	2.8	0.76	1.7	24.8	6.3	24.5	
ERP00454	E-246007	WVGS#28261	West Virginia	Marshall	Monogahela Group	Waynesburg coal	124	0.04	2.5	1.44	1.0	33.2	7.4	10.2	
ERP00454	E-246008	WVGS#28293	West Virginia	Marshall	Monogahela Group	Waynesburg coal	83	0.05	3.6	0.92	1.2	43.5	7.4	23.8	
ERP00454	E-246009	WVGS#28347	West Virginia	Marshall	Monogahela Group	Sewickley coal	165	0.05	4.1	1.40	4.5	45.8	8.3	11.5	
ERP00454	E-246010	WVGS#28451	West Virginia	Monongalia	Monogahela Group	Pittsburgh coal	93	0.12	2.2	0.18	0.6	22.2	3.5	7.6	
ERP00454	E-246011	WVGS#28452	West Virginia	Harrison	Monogahela Group	Pittsburgh coal	90	0.04	1.4	0.15	0.9	19.6	3.4	6.4	

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Moisture % (remnant)	Ash % (525°C)	Si %	Al %	Ca %	Mg %	Na %	K %	Fe %	Ti %	S %	Cl %
ERP00454	E-246012	WVGS#28476	West Virginia	Marion	Monogahela Group	Pittsburgh coal	0.9	9.4	1.95	0.98	0.14	0.050	0.048	0.088	1.89	0.058	3.37	0.072
ERP00455	E-246013	WVGS#16733	West Virginia	Grant	Allegheny Formation	Lower Freeport coal	1.5	24.0	5.05	3.23	0.10	0.075	0.020	0.344	3.69	0.196	4.67	0.055
ERP00455	E-246014	WVGS#16748	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	1.2	17.1	3.81	1.99	0.07	0.047	0.018	0.201	2.98	0.100	3.69	0.062
ERP00455	E-246015	WVGS#16760	West Virginia	Grant	Allegheny Formation	Lower Kittanning coal	1.2	32.6	8.69	5.03	0.07	0.093	0.038	0.495	2.04	0.403	2.67	0.062
ERP00455	E-246016	WVGS#17242	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.9	3.9	0.91	0.83	0.06	0.025	0.012	0.019	0.13	0.014	0.72	0.135
ERP00455	E-246017	WVGS#17243	West Virginia	Mingo	Kanawha Formation	Coalburg coal	2.1	15.3	4.68	2.29	0.05	0.059	0.023	0.193	0.19	0.148	0.62	0.064
ERP00455	E-246018	WVGS#17245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	2.3	13.1	3.73	2.21	0.06	0.080	0.031	0.280	0.21	0.105	0.87	0.059
ERP00455	E-246019	WVGS#17246	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.9	7.6	2.68	0.75	0.05	0.020	0.013	0.019	0.21	0.061	0.86	0.115
ERP00455	E-246020	WVGS#17247	West Virginia	Mingo	Kanawha Formation	Coalburg coal	2.2	3.8	0.98	0.66	0.06	0.021	0.008	0.050	0.11	0.020	0.96	0.141
ERP00455	E-246021	WVGS#17248	West Virginia	Mingo	Kanawha Formation	Coalburg coal	2.1	31.4	9.38	4.53	0.06	0.225	0.040	1.067	0.49	0.222	0.51	0.022
ERP00455	E-246022	WVGS#17259	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.9	14.1	4.13	2.05	0.05	0.083	0.015	0.354	0.27	0.093	0.89	0.096
ERP00455	E-246023	WVGS#17261	West Virginia	Logan	Kanawha Formation	Coalburg coal	2.3	44.7	13.24	6.15	0.08	0.326	0.066	1.405	0.81	0.319	0.33	0.016
ERP00455	E-246024	WVGS#17262	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.7	4.7	1.20	0.87	0.04	0.021	0.012	0.056	0.12	0.025	0.65	0.162
ERP00455	E-246025	WVGS#17264	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.3	10.6	3.09	1.89	0.05	0.035	0.012	0.151	0.12	0.115	0.57	0.126
ERP00455	E-246026	WVGS#18052	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	4.1	8.1	2.16	1.31	0.05	0.042	0.015	0.179	0.31	0.056	0.68	0.069
ERP00455	E-246027	WVGS#18055	West Virginia	Wayne	Kanawha Formation	Coalburg coal	3.1	7.8	2.21	1.21	0.07	0.041	0.013	0.130	0.10	0.079	0.70	0.155
ERP00455	E-246028	WVGS#18057	West Virginia	Wayne	Kanawha Formation	Coalburg coal	3.4	8.0	2.23	1.42	0.04	0.035	0.013	0.144	0.10	0.055	0.64	0.085
ERP00455	E-246029	WVGS#18059	West Virginia	Wayne	Kanawha Formation	Coalburg coal	3.2	4.8	1.30	0.78	0.07	0.034	0.010	0.076	0.16	0.026	0.59	0.139
ERP00455	E-246030	WVGS#18406	West Virginia	Wayne	Allegheny Formation	Upper Freeport coal	2.5	34.6	8.96	4.27	0.12	0.114	0.039	0.476	3.78	0.349	4.06	0.023
ERP00455	E-246031	WVGS#18408	West Virginia	Wayne	Allegheny Formation	Upper No. 5 Block coal	3.1	28.7	3.44	1.79	0.19	0.066	0.020	0.244	10.77	0.073	15.10	0.023
ERP00455	E-246032	WVGS#21939	West Virginia	Lewis	Allegheny Formation	Clarion coal	1.2	26.2	6.42	3.40	0.25	0.075	0.038	0.354	2.33	0.261	3.10	0.062
ERP00455	E-246033	WVGS#22014	West Virginia	Braxton	Kanawha Formation	Chilton coal	1.4	18.2	3.63	2.12	0.10	0.095	0.037	0.283	3.16	0.090	4.14	0.175
ERP00455	E-246034	WVGS#22038	West Virginia	Braxton	Kanawha Formation	Coalburg coal	1.1	13.5	3.60	1.81	0.08	0.083	0.025	0.289	0.89	0.113	1.48	0.151
ERP00455	E-246035	WVGS#17261D	West Virginia	Logan	Kanawha Formation	Coalburg coal	2.1	45.0	13.40	6.29	0.09	0.336	0.067	1.426	0.84	0.326	0.32	0.016
						AVERAGE	5.2	15.7	3.5	1.9	0.4	0.1	0.1	0.3	1.5	0.1	1.9	0.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	P %	Ag ppm	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Ga ppm
ERP00454	E-246012	WVGS#28476	West Virginia	Marion	Monogahela Group	Pittsburgh coal	0.0043	<0.19	12.8		155	0.5	0.11	0.05	3.1	11.2	0.51	7.2	2.8
ERP00455	E-246013	WVGS#16733	West Virginia	Grant	Allegheny Formation	Lower Freeport coal	0.0524	0.55	37.2		157	1.4	0.29	0.28	25.5	42.3	2.23	31.2	11.7
ERP00455	E-246014	WVGS#16748	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	0.0126	<0.34	35.1		67	1.7	0.14	0.18	12.5	37.3	1.21	18.3	7.9
ERP00455	E-246015	WVGS#16760	West Virginia	Grant	Allegheny Formation	Lower Kittanning coal	0.0221	0.86	20.3		242	1.7	0.43	0.21	14.7	65.3	2.62	39.2	16.3
ERP00455	E-246016	WVGS#17242	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0014	<0.08	2.4		52	2.8	0.04	0.03	22.4	8.3	0.08	11.7	5.3
ERP00455	E-246017	WVGS#17243	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0048	<0.31	0.8		57	1.0	0.17	0.04	7.4	27.8	1.33	16.0	5.7
ERP00455	E-246018	WVGS#17245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0025	<0.26	0.8		68	0.6	0.13	0.13	4.8	23.9	1.77	15.4	6.0
ERP00455	E-246019	WVGS#17246	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0018	<0.15	2.8		27	1.4	0.11	0.03	4.0	10.4	0.08	8.8	3.4
ERP00455	E-246020	WVGS#17247	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0010	0.09	1.3		21	2.6	0.04	0.04	7.6	8.7	0.35	11.5	2.7
ERP00455	E-246021	WVGS#17248	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.0055	<0.63	1.0		151	7.2	0.15	<.0.03	11.0	45.2	6.12	17.9	10.5
ERP00455	E-246022	WVGS#17259	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0056	<0.28	2.4		94	5.1	0.11	0.09	10.5	24.9	2.46	14.9	5.8
ERP00455	E-246023	WVGS#17261	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0074	<0.89	1.3		304	1.9	0.22	<.0.05	12.3	62.2	8.95	20.3	15.6
ERP00455	E-246024	WVGS#17262	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0015	<0.19	1.6		34	0.7	0.08	0.04	7.8	9.5	0.30	11.6	2.5
ERP00455	E-246025	WVGS#17264	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0032	0.23	1.1		43	5.0	0.18	0.04	14.1	25.4	0.95	29.8	6.8
ERP00455	E-246026	WVGS#18052	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	0.0033	<0.16	5.0		39	1.2	0.11	0.06	7.9	16.2	0.87	15.2	4.7
ERP00455	E-246027	WVGS#18055	West Virginia	Wayne	Kanawha Formation	Coalburg coal	0.0019	<0.16	1.1		27	14.2	0.10	0.04	12.6	16.1	0.76	16.2	8.6
ERP00455	E-246028	WVGS#18057	West Virginia	Wayne	Kanawha Formation	Coalburg coal	0.0021	<0.16	0.7		30	1.4	0.07	0.03	9.5	14.2	1.08	9.6	4.4
ERP00455	E-246029	WVGS#18059	West Virginia	Wayne	Kanawha Formation	Coalburg coal	0.0017	<0.10	0.8		19	2.3	0.04	0.02	17.5	9.6	0.34	14.0	3.3
ERP00455	E-246030	WVGS#18406	West Virginia	Wayne	Allegheny Formation	Upper Freeport coal	0.0376	0.74	146.9		800	2.3	0.30	0.19	21.0	54.1	2.48	35.7	19.9
ERP00455	E-246031	WVGS#18408	West Virginia	Wayne	Allegheny Formation	Upper No. 5 Block coal	0.0492	<0.57	109.5		86	3.8	0.09	0.25	22.2	34.8	1.91	35.3	8.9
ERP00455	E-246032	WVGS#21939	West Virginia	Lewis	Allegheny Formation	Clarion coal	0.2484	0.55	53.4		723	2.9	0.32	0.20	17.7	55.8	1.54	36.9	22.9
ERP00455	E-246033	WVGS#22014	West Virginia	Braxton	Kanawha Formation	Chilton coal	0.0048	<0.36	100.7		91	2.2	0.16	0.26	7.6	21.6	1.76	33.0	9.2
ERP00455	E-246034	WVGS#22038	West Virginia	Braxton	Kanawha Formation	Coalburg coal	0.0038	0.30	49.0		78	3.8	0.20	0.16	24.6	25.8	1.39	33.6	10.3
ERP00455	E-246035	WVGS#17261D	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.0071	<0.90	1.5		277	1.9	0.22	<0.05	12.4	62.1	9.32	20.9	15.7
						AVERAGE	0.0	0.3	24.0	97.8	165.5	3.2	0.2	0.8	9.1	24.4	1.4	22.0	7.1

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Ge ppm	Hg ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Ni ppm	Pb ppm	Rb ppm	Sb ppm	Sc ppm	Se ppm	Sn ppm
ERP00454	E-246012	WVGS#28476	West Virginia	Marion	Monogahela Group	Pittsburgh coal	2.8	0.26	14.2	19.2	0.7	1.4	6.8	3.4	5.6	0.2	2.2	2.1	1.7
ERP00455	E-246013	WVGS#16733	West Virginia	Grant	Allegheny Formation	Lower Freeport coal	1.4	1.18	44.0	14.1	3.0	4.6	37.7	14.8	24.3	0.6	7.2	6.4	4.7
ERP00455	E-246014	WVGS#16748	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	7.5	0.53	23.6	16.6	3.0	2.6	31.7	8.8	14.3	0.9	8.1	4.0	3.3
ERP00455	E-246015	WVGS#16760	West Virginia	Grant	Allegheny Formation	Lower Kittanning coal	2.8	0.75	41.8	14.9	2.9	10.1	24.5	20.7	34.9	0.8	11.7	13.8	7.7
ERP00455	E-246016	WVGS#17242	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.6	0.02	9.8	2.8	1.3	0.4	23.7	2.9	1.2	0.6	2.6	4.1	2.8
ERP00455	E-246017	WVGS#17243	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.8	0.02	30.5	5.5	1.0	3.6	15.4	8.0	16.3	0.3	5.3	6.1	3.6
ERP00455	E-246018	WVGS#17245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.8	0.03	25.2	7.7	2.1	2.5	12.9	6.1	21.6	0.8	4.2	4.2	3.2
ERP00455	E-246019	WVGS#17246	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.6	0.19	7.2	3.0	1.8	1.4	17.2	3.8	1.2	0.8	2.6	3.7	2.9
ERP00455	E-246020	WVGS#17247	West Virginia	Mingo	Kanawha Formation	Coalburg coal	0.6	0.03	4.8	2.3	3.2	0.6	10.7	3.2	3.8	0.6	2.5	3.3	2.2
ERP00455	E-246021	WVGS#17248	West Virginia	Mingo	Kanawha Formation	Coalburg coal	1.9	0.03	33.3	22.4	1.0	6.0	14.0	11.5	86.6	0.5	8.7	5.8	3.7
ERP00455	E-246022	WVGS#17259	West Virginia	Logan	Kanawha Formation	Coalburg coal	3.6	0.04	15.2	8.0	2.3	2.3	15.7	6.2	31.2	2.0	5.3	3.4	3.1
ERP00455	E-246023	WVGS#17261	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.8	0.03	34.9	46.1	0.7	8.6	16.1	14.4	125.3	0.6	12.1	8.6	5.3
ERP00455	E-246024	WVGS#17262	West Virginia	Logan	Kanawha Formation	Coalburg coal	0.6	0.03	8.9	1.8	1.1	0.6	14.3	4.0	4.0	0.4	2.0	3.4	3.6
ERP00455	E-246025	WVGS#17264	West Virginia	Logan	Kanawha Formation	Coalburg coal	3.1	0.02	19.3	4.5	1.0	2.8	16.9	9.1	10.9	1.0	5.4	5.4	5.7
ERP00455	E-246026	WVGS#18052	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	0.9	0.24	9.1	11.2	1.8	1.3	19.6	6.2	12.3	0.6	3.1	8.2	5.8
ERP00455	E-246027	WVGS#18055	West Virginia	Wayne	Kanawha Formation	Coalburg coal	2.6	0.02	12.3	14.4	1.3	2.0	24.7	6.8	9.6	1.0	3.8	4.7	3.7
ERP00455	E-246028	WVGS#18057	West Virginia	Wayne	Kanawha Formation	Coalburg coal	1.3	0.02	15.3	5.5	1.2	1.3	13.9	5.3	12.6	0.4	2.9	4.7	3.8
ERP00455	E-246029	WVGS#18059	West Virginia	Wayne	Kanawha Formation	Coalburg coal	1.6	0.01	8.4	11.6	1.6	0.7	17.0	4.1	5.1	0.5	2.4	4.2	2.9
ERP00455	E-246030	WVGS#18406	West Virginia	Wayne	Allegheny Formation	Upper Freeport coal	13.1	2.04	90.4	14.8	8.5	8.4	31.7	24.8	30.0	3.5	9.6	11.0	10.4
ERP00455	E-246031	WVGS#18408	West Virginia	Wayne	Allegheny Formation	Upper No. 5 Block coal	8.6	1.01	22.1	111.8	13.2	2.7	50.6	10.9	24.6	2.7	6.3	6.6	8.7
ERP00455	E-246032	WVGS#21939	West Virginia	Lewis	Allegheny Formation	Clarion coal	22.6	1.65	43.8	12.2	8.6	6.4	39.6	18.7	22.2	2.9	11.3	14.3	14.0
ERP00455	E-246033	WVGS#22014	West Virginia	Braxton	Kanawha Formation	Chilton coal	3.8	0.53	31.6	12.7	4.4	2.5	14.2	8.6	20.0	1.3	5.8	4.6	6.4
ERP00455	E-246034	WVGS#22038	West Virginia	Braxton	Kanawha Formation	Coalburg coal	5.3	0.46	16.0	15.0	3.4	3.1	40.6	14.1	20.0	1.9	8.1	6.2	7.3
ERP00455	E-246035	WVGS#17261D	West Virginia	Logan	Kanawha Formation	Coalburg coal	1.8	0.03	35.8	46.4	0.6	8.3	15.8	15.0	122.0	0.6	12.1	8.5	5.6
						AVERAGE	10.9	0.2	20.5	44.0	6.8	3.6	27.7	17.4	18.6	2.0	5.4	5.2	2.9

Table 9. -- Contents of moisture, ash and major, minor and trace elements (remnant moisture basis) for 729 National Coal Quality Inventory samples.
[blank space indicates no data or not analyzed]

Job number	Laboratory number	Field number	State	County	Formation	Coal	Sr ppm	Te ppm	Th ppm	Tl ppm	U ppm	V ppm	Y ppm	Zn ppm	Zr ppm
ERP00454	E-246012	WVGS#28476	West Virginia	Marion	Monogahela Group	Pittsburgh coal	125	0.06	1.7	0.37	0.4	16.3	3.0	7.8	
ERP00455	E-246013	WVGS#16733	West Virginia	Grant	Allegheny Formation	Lower Freeport coal	163	0.11	5.7	1.24	1.7	54.5	6.1	67.7	
ERP00455	E-246014	WVGS#16748	West Virginia	Grant	Allegheny Formation	Upper Freeport coal	52	0.07	3.7	1.42	1.6	57.0	8.3	91.7	
ERP00455	E-246015	WVGS#16760	West Virginia	Grant	Allegheny Formation	Lower Kittanning coal	104	0.14	10.9	0.54	2.6	70.2	13.9	22.7	
ERP00455	E-246016	WVGS#17242	West Virginia	Mingo	Kanawha Formation	Coalburg coal	64	0.03	0.9	0.07	0.3	16.7	11.9	2.6	
ERP00455	E-246017	WVGS#17243	West Virginia	Mingo	Kanawha Formation	Coalburg coal	84	0.05	4.4	0.23	1.0	29.5	8.1	7.8	
ERP00455	E-246018	WVGS#17245	West Virginia	Mingo	Kanawha Formation	Coalburg coal	74	0.06	3.6	0.37	1.0	28.0	5.2	15.0	
ERP00455	E-246019	WVGS#17246	West Virginia	Mingo	Kanawha Formation	Coalburg coal	71	0.04	1.7	0.37	0.6	13.4	11.2	3.2	
ERP00455	E-246020	WVGS#17247	West Virginia	Mingo	Kanawha Formation	Coalburg coal	51	0.04	1.0	0.10	0.7	19.7	10.9	8.7	
ERP00455	E-246021	WVGS#17248	West Virginia	Mingo	Kanawha Formation	Coalburg coal	48	0.05	6.8	0.50	1.9	57.4	10.7	9.8	
ERP00455	E-246022	WVGS#17259	West Virginia	Logan	Kanawha Formation	Coalburg coal	88	0.05	3.2	0.38	1.1	33.4	10.5	27.4	
ERP00455	E-246023	WVGS#17261	West Virginia	Logan	Kanawha Formation	Coalburg coal	84	0.05	10.1	0.86	2.2	78.7	12.7	24.4	
ERP00455	E-246024	WVGS#17262	West Virginia	Logan	Kanawha Formation	Coalburg coal	71	0.04	1.4	0.11	0.5	16.6	6.7	3.2	
ERP00455	E-246025	WVGS#17264	West Virginia	Logan	Kanawha Formation	Coalburg coal	52	0.07	4.2	0.20	1.3	39.5	13.7	5.6	
ERP00455	E-246026	WVGS#18052	West Virginia	Wayne	Allegheny Formation	No. 5 Block coal	35	0.04	2.4	0.49	1.0	26.5	8.4	23.6	
ERP00455	E-246027	WVGS#18055	West Virginia	Wayne	Kanawha Formation	Coalburg coal	27	0.04	2.4	0.14	1.1	20.3	12.3	16.3	
ERP00455	E-246028	WVGS#18057	West Virginia	Wayne	Kanawha Formation	Coalburg coal	23	0.03	1.5	0.12	0.8	19.6	7.5	7.5	
ERP00455	E-246029	WVGS#18059	West Virginia	Wayne	Kanawha Formation	Coalburg coal	23	0.02	1.0	0.09	0.5	15.4	11.7	9.0	
ERP00455	E-246030	WVGS#18406	West Virginia	Wayne	Allegheny Formation	Upper Freeport coal	181	0.09	7.4	5.02	2.5	72.8	13.3	25.0	
ERP00455	E-246031	WVGS#18408	West Virginia	Wayne	Allegheny Formation	Upper No. 5 Block coal	66	0.06	3.2	9.51	3.2	75.9	26.4	72.1	
ERP00455	E-246032	WVGS#21939	West Virginia	Lewis	Allegheny Formation	Clarion coal	886	0.16	8.3	2.75	2.3	70.7	18.9	41.7	
ERP00455	E-246033	WVGS#22014	West Virginia	Braxton	Kanawha Formation	Chilton coal	77	0.12	3.5	1.74	1.3	45.7	13.0	88.0	
ERP00455	E-246034	WVGS#22038	West Virginia	Braxton	Kanawha Formation	Coalburg coal	73	0.09	4.3	2.19	2.3	47.5	16.6	54.4	
ERP00455	E-246035	WVGS#17261D	West Virginia	Logan	Kanawha Formation	Coalburg coal	86	0.05	9.8	0.86	2.3	78.4	13.2	26.1	
						AVERAGE	133.0	0.1	5.2	1.3	2.8	48.6	13.2	63.8	47.3

Appendix A

BRRTS #03-16-000721 Murphy Oil Marine Terminal Tank #2 Soil Sample Results

Gannett Fleming

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

TABLE 1

SOIL ANALYTICAL RESULTS FOR CALUMET WEST RELEASE SITE

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.																					NR 720 Soil to Groundwater Pathway Standard	NR 720 Industrial Direct Contact Standard
Sample ID	UST	UST	B-1	B-1	B-1	GP-1	GP-1	GP-2	GP-2	GP-3	GP-3	GP-4	GP-4	GP-5	GP-5	GP-6	GP-6	GP-7	GP-7	GP-8	GP-8		
Sample depth (ft bgs)	7.5-9.5	12-14	14-16	18-20	23-25	8-10	24-26	4-6	24-26	8-10	17-19	8-10	24-26	8-10	24-26	2-4	8-10	10-12	20-22	2-4	20-22		
Saturated/Unsaturated	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Sat.	Unsat.	Sat.		
Sample Date	07/14/93	07/14/93	09/06/94	09/06/94	09/06/94	08/18/95	08/18/95	08/18/95	08/18/95	08/19/95	08/19/95	08/19/95	08/19/95	08/19/95	08/19/95	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96		
Organic vapors (ppmv)	nm	nm	nm	nm	nm	>1,000	200	700	32	500	<0.2	620	18	>1,000	10	0.2	<0.2	30	<0.2	0.8	<0.2	na	na
Diesel range organics	<5.0	na	na	na	na	37.4	6.15	58.4	<5.0	6.5	6.66	212	<5.0	549	<5.0	<5.0	<5.0	<5.0	<5.0	25.2	5.54	NS	NS
Gasoline range organics	9.51	14	261	14.5	<5.0	29.1	8.5	29.8	<5.0	17.9	8.7	43.7	<5.0	2,480	<5.0	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6	NS	NS
Petroleum volatile organic compounds (PVOCs)																							
Benzene	na	na	3.4	1.4	0.81	4.52	1.83	2.27	<0.067	3.25	1.18	5.76	<0.067	30	0.0809	<0.031	<0.030	0.294	<0.035	*<0.032*	<0.037	0.00512	7.41
Toluene	na	na	1.2	<0.4	0.46	1.02	1.67	<0.31	<0.27	<0.3	<0.3	<0.27	<0.27	<14.0	<0.27	<0.031	<0.030	<0.034	<0.035	<0.032	<0.037	1.1072	818
Ethylbenzene	na	na	4.7	0.7	0.32	1.1	0.426	2.61	<0.13	1.18	0.554	2.19	<0.13	61.5	<0.13	<0.031	<0.030	<0.034	<0.035	0.038	<0.037	1.57	37
Xylenes	na	na	13.9	1.5	0.57	2.276	1.658	2.13	<0.13	1.17	0.496	2.36	<0.13	188	<0.13	<0.031	<0.030	<0.034	<0.035	<0.032	<0.037	3.94	258
1,2,4-TMB	na	na	13.4	0.9	0.25	2.29	0.358	2.09	<0.13	1.97	0.783	3.77	<0.13	107	<0.13	<0.031	<0.030	0.645	<0.035	<0.032	<0.037	NS	219
1,3,5-TMB	na	na	4.1	0.3	<0.13	0.685	<0.13	1.1	<0.13	0.533	<0.15	1.06	<0.13	30.9	<0.13	<0.031	<0.030	<0.034	<0.035	<0.032	<0.037	NS	182
TMBs (combined)	na	na	17.5	1.2	<0.28	2.975	<0.488	3.19	<0.26	2.503	0.933	4.83	<0.26	137.9	<0.26	<0.062	<0.060	<0.079	<0.070	<0.064	<0.074	1.382069	NS
Methyl tert butyl ether	na	na	<0.8	<0.4	<0.26	<0.27	<0.27	<0.31	<0.27	<0.3	<0.3	<0.27	<0.27	<14.0	<0.27	<0.031	<0.030	<0.034	<0.035	*<0.032*	<0.037	0.027021	293
Detected polycyclic aromatic hydrocarbons (PAHs)																							
1-Methyl naphthalene	na	na	na	na	na	0.389	na	na	na	0.214	na	na	na	na	na	na	na	<0.001	<0.001	na	na	NS	53.1
2-Methyl naphthalene	na	na	na	na	na	0.669	na	na	na	0.351	na	na	na	na	na	na	na	<0.0027	<0.0028	na	na	NS	2,200
Acenaphthylene	na	na	na	na	na	<0.0048	na	na	na	<0.0048	na	na	na	na	na	na	na	<0.0046	<0.0047	na	na	NS	NS
Benzo(a)pyrene	na	na	na	na	na	<0.0044	na	na	na	<0.0044	na	na	na	na	na	na	na	<0.0033	<0.0034	na	na	0.47	0.211
Benzo(b)fluoranthene	na	na	na	na	na	<0.0035	na	na	na	<0.0035	na	na	na	na	na	na	na	<0.0019	<0.002	na	na	0.4793	2.11
Fluorene	na	na	na	na	na	<0.0035	na	na	na	<0.0035	na	na	na	na	na	na	na	<0.0027	<0.0028	na	na	14.80272	22,000
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	<0.0074	na	na	na	<0.0074	na	na	na	na	na	na	na	<0.0054	<0.0056	na	na	NS	2.11
Naphthalene	na	na	na	na	na	0.392	na	na	na	0.158	na	na	na	na	na	na	na	<0.0014	<0.0014	na	na	0.658182	26

NOTES:
Results are in milligrams per kilogram (mg/kg) on a dry weight basis, except as indicated.
Results in italics are at or above applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).
Results in bold are at or above applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).
Organic Vapor readings in parts per million, volume (ppmv) measured with flame ionization detector (FID) at GP-1 through GP-5 and with photoionization detector (PID) at GP-6 through GP-21 and MW-1 through MW-6.
na = Not analyzed/not applicable.
nm = Not measured.
NQ = Not quantifiable due to sample interference.
NS = No standard.
TMB = Trimethylbenzene.
TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

FOOTNOTE:
(1) Samples analyzed on site by mobile laboratory.

Gannett Fleming

TABLE 1

SOIL ANALYTICAL RESULTS FOR CALUMET WEST SITE

Parameter / Sample ID	GP-9	GP-9	GP-10	GP-10	GP-10	GP-11	GP-11	GP-11	GP-12	GP-12	GP-12	GP-12	GP-12	GP-12	GP-13	GP-13	GP-13	GP-13	GP-13	GP-13	NR 720 Soil to Groundwater Pathway Standard	NR 720 Industrial Direct Contact Standard
Sample depth (ft bgs)	6-8	20-22	10-12	20-22	24-25	2-4	10-12	20-22	0-2[1]	8-10[1]	8-10	16-18[1]	24-26[1]	24-26	0-2[1]	8-10[1]	8-10	16-18[1]	24-26[1]	24-26		
Saturated/Unsaturated	Sat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Sat.	Sat.	Sat.		
Sample Date	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96	06/20/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96	10/02/96		
PID (ppmv)	>1000	>200	>1000	70	40	300	3.2	0.2	1,500	2,000	2,000	450	4	4	1,400	1,900	1,900	1,700	140	140	na	na
Diesel range organics	731	9.15	17.9	<5.0	<5.0	30.2	12.2	<5.0	na	na	149	na	na	<5.0	na	na	399	na	na	<5.0	NS	NS
Gasoline range organics	836	24.5	24.8	<6.6	<6.6	15.1	<6.6	<6.6	na	na	217	na	na	<6.6	na	na	59.1	na	na	<6.6	NS	NS
Petroleum volatile organic compounds (PVOCs)																						
Benzene	8.82	1.62	1.47	0.334	0.044	*<0.033*	<0.033	<0.033	**8.6**	2.4	9.68	0.80	<0.005	0.043	NQ	1.2	2.84	0.4	<0.005	<0.029	0.00512	7.41
Toluene	4.62	2.93	0.096	0.078	<0.029	<0.033	<0.033	<0.033	*4.1*	0.79	1.87	1.9	<0.005	<0.032	NQ	0.68	0.138	0.58	<0.005	<0.029	1.1072	818
Ethylbenzene	14.7	1.3	1.18	0.195	<0.029	<0.033	<0.033	<0.033	*7.5*	2.7	7.51	0.40	<0.005	<0.032	NQ	1.3	2.62	0.25	<0.005	<0.029	1.57	37
Xylenes	17.28	4.92	0.896	0.28	<0.029	<0.033	<0.033	<0.033	*22*	8.3	22.3	1.6	<0.005	<0.032	NQ	2.7	2.74	0.91	<0.005	0.07	3.94	258
1,2,4-TMB	35.1	1.45	1.26	0.061	<0.029	<0.033	<0.033	<0.033	NQ	1.0	12.9	0.061	<0.005	<0.032	NQ	NQ	5.35	0.31	<0.005	<0.029	NS	219
1,3,5-TMB	9.12	0.295	0.302	<0.032	<0.029	<0.033	<0.033	<0.033	NQ	NQ	3.79	0.40	<0.005	<0.032	NQ	NQ	1.58	0.39	<0.005	<0.029	NS	182
TMBs (combined)	44.22	1.745	1.562	<0.093	<0.058	<0.066	<0.066	<0.066	NQ	NQ	16.69	0.461	<0.010	<0.064	NQ	NQ	6.93	0.7	<0.010	<0.058	1.382069	NS
Methyl tert butyl ether	<2.884	<0.064	<0.033	<0.032	<0.029	*<0.033*	<0.033	<0.033	NQ	NQ	0.334	<0.050	<0.050	<0.032	NQ	NQ	0.054	<0.050	<0.050	<0.029	0.027021	293
Detected polycyclic aromatic hydrocarbons (PAHs)																						
1-Methyl naphthalene	1.33	<0.0011	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	53.1
2-Methyl naphthalene	2.03	<0.003	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2,200
Acenaphthylene	<0.0045	<0.0052	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	NS
Benzo(a)pyrene	<0.0032	<0.0036	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.47	0.211
Benzo(b)fluoranthene	<0.0019	<0.0021	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.4793	2.11
Fluorene	0.114	<0.003	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	14.80272	22,000
Indeno(1,2,3-cd)pyrene	<0.0053	<0.0061	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2.11
Naphthalene	0.873	0.0308	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.658182	26

NOTES:

Results are in milligrams per kilogram (mg/kg) on a dry weight basis, except as indicated.

Results in italics are at or above applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold are at or above applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

PID = photoionization detector readings in parts per million, volume (ppmv)

na = Not analyzed/not applicable.

nm = Not measured.

NQ = Not quantifiable due to sample interference.

NS = No standard.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

FOOTNOTE:

(1) Samples analyzed on site by mobile laboratory.

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TABLE 1

SOIL ANALYTICAL RESULTS FOR CALUMET WEST SITE

Parameter / Sample ID	GP-14	GP-14	GP-14	GP-14	GP-14	GP-14	GP-15	GP-15	GP-15	GP-15	GP-15	GP-16	GP-16	GP-16	GP-16	GP-17	GP-17	GP-17	GP-17	GP-17	NR 720 Soil to	NR 720 Industrial
Sample depth (ft bgs)	0-2(1)	8-10(1)	8-10	20-22(1)	24-26(1)	24-26	0-2(1)	5-7(1)	5-7	13-15(1)	13-15	0-2(1)	0-2	8-10(1)	8-10	0-2(1)	0-2	8-10(1)	18-20(1)	18-20	Groundwater	Direct
Saturated/Unsaturated	Unsat.	Sat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Unsat.	Sat.	Sat.	Unsat.	Unsat.	Sat.	Sat.	Sat.	Pathway	Contact
Sample Date	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	Standard	Standard
PID (ppmv)	1,500	1,100	1,100	700	3	3	600	90	90	5.5	5.5	120	120	350	350	220	220	51	55	55	na	na
Diesel range organics	na	na	430	na	na	<5.0	na	na	32.9	na	<5.0	na	528	na	<5.0	na	380	na	na	<5.0	NS	NS
Gasoline range organics	na	na	122	na	na	<6.6	na	na	13.1	na	<6.6	na	41.6	na	<6.6	na	105	na	na	14.6	NS	NS
Petroleum volatile organic compounds (PVOCs)																						
Benzene	*2.3*	*2.1*	*6.79*	*0.71*	<0.005	*<0.030*	NQ	<0.005	*<0.034*	<0.005	*<0.035*	<0.005	*0.077*	<0.005	*<0.033*	*0.18*	*0.204*	*0.02*	*0.35*	*1.53*	0.00512	7.41
Toluene	NQ	0.92	6.73	1.1	<0.005	<0.030	NQ	<0.005	<0.034	<0.005	<0.035	<0.005	0.139	<0.005	<0.033	0.059	0.149	<0.005	0.017	0.111	1.1072	818
Ethylbenzene	*8.8*	0.4	*3.8*	0.45	<0.005	<0.030	NQ	<0.005	<0.034	<0.005	0.035	<0.005	0.125	<0.005	<0.033	0.084	0.581	<0.005	0.069	0.882	1.57	37
Xylenes	*7.4*	1.4	*14.43*	1.7	<0.005	<0.030	NQ	<0.005	<0.034	<0.005	<0.035	<0.005	0.349	<0.005	<0.033	0.15	0.455	<0.005	0.061	0.812	3.94	258
1,2,4-TMB	NQ	0.55	7.83	0.49	<0.005	<0.030	NQ	<0.005	<0.034	<0.005	<0.035	<0.005	0.215	<0.005	<0.033	<0.005	0.684	<0.005	0.036	0.965	NS	219
1,3,5-TMB	NQ	0.72	2.35	0.63	<0.005	<0.030	NQ	<0.005	<0.034	<0.005	<0.035	<0.005	0.138	<0.005	<0.033	<0.005	0.365	<0.005	0.050	0.263	NS	182
TMBs (combined)	NQ	1.27	*10.18*	1.12	<0.010	<0.060	NQ	<0.010	<0.064	<0.010	<0.070	<0.010	0.353	<0.010	<0.066	<0.010	1.049	<0.010	0.086	1.228	1.382069	NS
Methyl tert butyl ether	NQ	NQ	*0.118*	*<0.050*	*<0.050*	*<0.030*	NQ	*<0.050*	*<0.034*	*<0.050*	*<0.035*	*<0.050*	*<0.031*	*<0.050*	*<0.033*	*<0.050*	*0.041*	*<0.050*	*<0.050*	*<0.034*	0.027021	293
Detected polycyclic aromatic hydrocarbons (PAHs)																						
1-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	53.1
2-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2,200
Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	NS
Benzo(a)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.47	0.211
Benzo(b)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.4793	2.11
Fluorene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	14.80272	22,000
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2.11
Naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.658182	26

NOTES:

Results are in milligrams per kilogram (mg/kg) on a dry weight basis, except as indicated.

Results in italics are at or above applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold are at or above applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

PID = photoionization detector readings in parts per million, volume (ppmv)

na = Not analyzed/not applicable.

nm = Not measured.

NQ = Not quantifiable due to sample interference.

NS = No standard.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

FOOTNOTE:

(1) Samples analyzed on site by mobile laboratory.

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TABLE 1

SOIL ANALYTICAL RESULTS FOR CALUMET WEST SITE

Parameter / Sample ID	GP-18	GP-18	GP-19	GP-19	GP-19	GP-19	GP-20	GP-20	GP-20	GP-20	GP-20	GP-20	GP-21	GP-21	GP-21	GP-21	GP-21	GP-21	NR 720 Soil to	NR 720 Industrial
Sample depth (ft bgs)	13-15[1]	13-15	0-2[1]	0-2	4-6[1]	4-6	0-2[1]	0-2	12-14[1]	12-14	22-24[1]	22-24	0-2[1]	4-6	12-14[1]	12-14	24-26[1]	24-26	Groundwater	Direct
Saturated/Unsaturated	Sat.	Sat.	Unsat.	Unsat.	Sat.	Sat.	Unsat.	Unsat.	Sat.	Sat.	Sat.	Sat.	Unsat.	Sat.	Sat.	Sat.	Sat.	Sat.	Pathway	Contact
Sample Date	10/03/96	10/03/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	Standard	Standard
PID (ppmv)	10	10	125	125	25	25	1,500	1,500	500	500	46	46	145	>2500	2,000	2,000	9	9	na	na
Diesel range organics	na	<5.0	na	2,900	na	<5.0	na	1,020	na	50.9	na	<5.0	na	360	na	133	na	<5.0	NS	NS
Gasoline range organics	na	<6.6	na	132	na	<6.6	na	569	na	73	na	<6.9	na	514	na	58.7	na	<6.9	NS	NS
Petroleum volatile organic compounds (PVOCs)																				
Benzene	<0.005	*<0.034*	<0.005	*<0.039*	<0.005	*<0.033*	*0.38*	*1.04*	*0.43*	*1.58*	*0.022*	*0.128*	<0.005	*5.04*	*1.3*	*4.92*	<0.005	*<0.030*	0.00512	7.41
Toluene	<0.005	<0.034	<0.005	<0.039	<0.005	<0.033	0.14	0.349	0.8	2.94	<0.005	<0.029	<0.005	1.31	1.9	7.22	<0.005	<0.030	1.1072	818
Ethylbenzene	<0.005	<0.034	<0.005	0.205	<0.005	0.037	0.84	*3.12*	0.36	1.32	0.018	0.166	<0.005	*13.7*	0.39	*1.75*	<0.005	0.031	1.57	37
Xylenes	<0.005	<0.034	0.3	0.321	<0.005	<0.033	1.3	2.942	1.5	*5.4*	<0.005	0.07	<0.005	*33.5*	1.7	*5.83*	<0.005	<0.030	3.94	258
1,2,4-TMB	<0.005	<0.034	NQ	1.21	<0.005	<0.033	NQ	10.8	0.8	2.78	<0.005	<0.029	<0.005	26.3	0.58	2.05	<0.005	<0.030	NS	219
1,3,5-TMB	<0.005	<0.034	NQ	0.858	<0.005	<0.033	NQ	3.55	0.9	0.744	<0.005	0.035	<0.005	8.19	0.48	0.524	<0.005	<0.030	NS	182
TMBs (combined)	<0.010	<0.068	NQ	*2.068*	<0.010	<0.066	NQ	*14.35*	*1.7*	*3.524*	<0.010	<0.064	<0.010	*34.49*	1.06	*2.574*	<0.010	<0.060	1.382069	NS
Methyl tert butyl ether	*<0.050*	*<0.034*	*<0.050*	*<0.039*	*<0.050*	*<0.033*	*<0.050*	*<0.300*	*<0.050*	*<0.036*	*<0.050*	*<0.029*	*<0.050*	*<0.263*	*<0.050*	*<0.035*	*<0.050*	*<0.030*	0.027021	293
Detected polycyclic aromatic hydrocarbons (PAHs)																				
1-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	53.1
2-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2,200
Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	NS
Benzo(a)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.47	0.211
Benzo(b)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.4793	2.11
Fluorene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	14.80272	22,000
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	NS	2.11
Naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.658182	26

NOTES:

Results are in milligrams per kilogram (mg/kg) on a dry weight basis, except as indicated.

Results in italics are at or above applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold are at or above applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

PID = photoionization detector readings in parts per million, volume (ppmv)

na = Not analyzed/not applicable.

nm = Not measured.

NQ = Not quantifiable due to sample interference.

NS = No standard.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

FOOTNOTE:

(1) Samples analyzed on site by mobile laboratory.

Gannett Fleming

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

TABLE 2

UNSATURATED SOIL ANALYTICAL RESULTS FOR CALUMET WEST RELEASE SITE

Parameter / Sample ID	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.																				NR 720 Soil to Groundwater Pathway Standard	NR 720 Industrial Direct Contact Standard
Sample ID	GP-6	GP-8	GP-11	GP-12	GP-13	GP-14	GP-15	GP-16	GP-16	GP-17	GP-17	GP-19	GP-19	GP-20	GP-20	GP-21	MW-2	MW-3	MW-4	MW-6		
Sample depth (ft bgs)	2-4	2-4	2-4	0-2(1)	0-2(1)	0-2(1)	0-2(1)	0-2(1)	0-2	0-2(1)	0-2	0-2(1)	0-2	0-2(1)	0-2	0-2(1)	2.5-4	2.5-4	2.5-4	2.5-4		
Saturated/Unsaturated	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
Sample Date	06/20/96	06/20/96	06/20/96	10/02/96	10/02/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/03/96	10/04/96	10/04/96	10/04/96	10/04/96	10/04/96	11/03/04	11/04/04	11/04/04	11/04/04		
Organic vapors	0.2	0.8	300	1,500	1,400	1,500	600	120	120	220	220	125	125	1,500	1,500	145	1,200	47	1,675	<0.1	na	na
Diesel range organics	<5.0	25.2	30.2	na	na	na	na	na	528	na	380	na	2,900	na	1,020	na	1,290	2,770	4,040	<6.53	NS	NS
Gasoline range organics	<6.6	<6.6	15.1	na	na	na	na	na	41.6	na	105	na	132	na	569	na	739	492	570	<6.53	NS	NS
Petroleum volatile organic compounds (PVOCs)																						
Benzene	*<0.031*	*<0.032*	*<0.033*	**8.6**	NQ	*2.3*	NQ	<0.005	*0.077*	*0.18*	*0.204*	<0.005	*<0.039*	*0.38*	*1.04*	<0.005	**13.9**	*0.61*	**11.7**	*<0.025*	0.00512	7.41
Toluene	<0.031	<0.032	<0.033	*4.1*	NQ	NQ	NQ	<0.005	0.139	0.059	0.149	<0.005	<0.039	0.14	0.349	<0.005	<1.04	<0.2	*15.9*	<0.025	1.1072	818
Ethylbenzene	<0.031	0.038	<0.033	*7.5*	NQ	*8.8*	NQ	<0.005	0.125	0.084	0.581	<0.005	0.205	0.84	*3.12*	<0.005	*34.5*	0.626	*26.8*	<0.025	1.57	37
Xylenes	<0.031	<0.032	<0.033	*22*	NQ	*7.4*	NQ	<0.005	0.349	0.15	0.455	0.3	0.321	1.3	2.942	<0.005	*30.4*	1.2	*77.3*	<0.050	3.94	258
1,2,4-TMB	<0.031	<0.032	<0.033	NQ	NQ	NQ	NQ	<0.005	0.215	<0.005	0.684	NQ	1.21	NQ	10.8	<0.005	71.0	4.80	65.1	<0.025	NS	219
1,3,5-TMB	<0.031	<0.032	<0.033	NQ	NQ	NQ	NQ	<0.005	0.138	<0.005	0.365	NQ	0.858	NQ	3.55	<0.005	21.5	5.94	19.3	<0.025	NS	182
TMBs (combined)	<0.062	<0.064	<0.066	NQ	NQ	NQ	NQ	<0.010	0.353	<0.010	1.049	NQ	*2.068*	NQ	*14.35*	<0.010	*92.5*	*10.74*	*84.4*	<0.050	1.382069	NS
Methyl tert butyl ether	*<0.031*	*<0.032*	*<0.033*	NQ	NQ	NQ	NQ	*<0.050*	*<0.031*	*<0.050*	*0.041*	*<0.050*	*<0.039*	*<0.050*	*<0.300*	*<0.050*	*<1.04*	<0.2	*<1.00*	<0.025	0.027021	293
Detected polycyclic aromatic hydrocarbons (PAHs)																						
1-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.18	1.52	2.05	<0.00457	NS	53.1
2-Methyl naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	3.06	1.81	3.69	<0.00535	NS	2,200
Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	<0.107	<0.00612	<0.00614	<0.00614	NS	NS
Benzo(a)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.127	<0.00299	<0.00301	<0.003	0.47	0.211
Benzo(b)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.0696	<0.00273	<0.00275	<0.00274	0.4793	2.11
Fluorene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	<0.0457	0.259	<0.00261	<0.00261	14.80272	22,000
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0.0541	<0.00208	<0.00209	<0.00209	NS	2.11
Naphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	*1.23*	0.427	*1.37*	<0.00209	0.658182	26

NOTES:
Results are in milligrams per kilogram (mg/kg) on a dry weight basis.
Results in italics are at or above applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).
Results in bold are at or above applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).
Organic Vapor readings in parts per million, volume (ppmv) measured with flame ionization detector (FID) at GP-1 through GP-5 and with photoionization detector (PID) at GP-6 through GP-21 and MW-1 through MW-7.
na = Not analyzed/not applicable.
nm = Not measured.
NQ = Not quantifiable due to sample interference.
NS = No standard.
TMB = Trimethylbenzene.
TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

FOOTNOTE:
(1) Samples analyzed on site by mobile laboratory.

Appendix B

BRRTS #03-16-000721 Murphy Oil Marine Terminal Tank #2 Progress Report

(Aug. 2015 – Dec. 2016)

Gannett Fleming

Excellence Delivered As Promised

May 11, 2017
File #34265.003

Mr. John Hunt
Wisconsin Department of Natural Resources
Superior Service Center
1701 North 4th Street
Superior, WI 54880

Re: Remediation Progress Report for the Calumet West Release Site (Aug. 2015 – Dec. 2016)
Superior, Wisconsin
WDNR BRRTS No. 03-16-000721

Dear John:

On behalf of Calumet Superior LLC (Calumet), Gannett Fleming, Inc. is submitting this remediation progress report for the Calumet West (fka Murphy Oil Marine Terminal #2 and Murphy Oil Marine Terminal Tank #2) release site (WDNR BRRTS# 03-16-000721) in Superior. The report presents analytical results from groundwater samples collected at the site between August 2015 and December 2016. In addition, it includes background information on the site and a "bullet-point" summary of its investigation and remedial history for reference. Note that our September 2014 remediation progress report also provided a historical summary of state agency correspondence. For brevity, three figures presented in that submittal are not reproduced here. Periodic reporting of remediation site progress to the Wisconsin Department of Natural Resources (WDNR) is required pursuant to ss. NR 700.11(1) and 724.13(3), Wisconsin Administrative Code. A completed certification page for the report is attached as well.

Pertinent Site Background Information

The Calumet West site is located approximately 1,500 feet north of Winter Street and 100 feet east of Ajax Road in the City of Superior. Attached Figure 1 is a site location map. The site is located in the NW 1/4 of the NW 1/4 of Section 15, Township 49 North, Range 14 West, Douglas County. Attached Figure 2 is an aerial photo of the property and the surrounding area.

Calumet leases the property from Burlington Northern Railroad Company (BN) and uses the property to store and transport petroleum products. The previous lessee, Murphy Oil, constructed a pumping station and three aboveground storage tanks (ASTs) as part of its operations. Figure 3 is a site plan. Two of the three ASTs have capacities of 25,000 barrels and

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store fuel oil, while the third AST has a capacity of 53,870 barrels and stores unleaded gasoline. The pumping station is on a concrete pad, with pumps and piping both above and adjacent to the pad. The ASTs receive product from offsite through an underground pipeline that enters the site at the south end of the property. Product is transferred to and from the ASTs through pipelines that are both above and below grade. All product from the ASTs that leaves the site passes through the pumping station.

An underground storage tank (UST) that collected pumping station spills was located beneath the pumping station pad. The UST had a 430-gallon capacity, was 6 feet long and 3.5 feet in diameter, and was removed by J.R. Jensen of Superior in March 1993. On October 1, 2011, the Murphy Superior Refinery, including Marine Terminal #2 (nka Calumet West), was acquired by Calumet.

Midwest Energy Resources Company (MERC) owns the property north of the site, and the closest surface water is a ship slip providing access to St. Louis Bay (Lake Superior) located approximately 1,200 feet west-northwest, as shown on Figure 1. The site is located on relatively level land. North of the perimeter fence, however, the ground surface slopes to the north (approximately 30 percent grade), down to a set of railroad tracks (see Figures 2 and 3).

The ground surface at the site is unpaved. As described in more detail below, the site is underlain by native clay; the depth to groundwater ranges from approximately 1 to 7 feet below ground surface (bgs), based on location and time of year; and the assumed local direction of shallow groundwater flow is to the north.

Summary of Site Investigation and Remedial Work

- Between July 1993 and October 2006, a multiphase investigation was conducted to determine the estimated extent of impacted soil and groundwater in the vicinity of the former UST, and a total of 79 soil and 12 groundwater samples were collected. Select samples were analyzed for volatile organic compounds (VOCs), petroleum volatile organic compounds (PVOCs), polycyclic aromatic hydrocarbons (PAHs), and gasoline and diesel range organics (GRO/DRO). As summarized in our September 2014 report to the WDNR, 8 of the 16 unsaturated soil samples contained concentrations of petroleum-related compounds above applicable Wisconsin Administrative Code NR 720 residual contaminant levels (RCLs). Attached Figure 3 shows the estimated horizontal extent of soil at or above an applicable NR 720 RCL.

- Subsurface conditions in general consist of 11 to 25 feet of clay overlying silty sand. In our September 2014 report, Figures 4 and 5 are east-west and north-south geologic cross sections, respectively, showing the estimated vertical extent of soil at or above an applicable NR 720 RCL.

- The six monitoring wells (MW-1 through MW-6) installed in November 2004 were also used to assess groundwater flow direction. Between July and November 2005, three rounds of groundwater elevation measurements were completed, as shown in Table 1. Based on measurements collected on November 10, 2005, the shallow groundwater flow direction was to the north (see Figure 6 in our September 2014 report).

  Since January 2005, the six monitoring wells were also gauged and bailed dry at least once prior to each sampling round to check for free product. Due to slow recharge in the clayey soil after purging and/or sampling, water levels in the wells typically did not have sufficient time to reach static conditions. As a result, groundwater contour maps of the release site were not routinely prepared. Regardless, based on surface topography and the location of St. Louis Bay (Lake Superior), it is assumed that the local direction of shallow groundwater flow is to the north. Please see our August 2015 report for more details.

- Table 2 summarizes historical groundwater analytical results for detected VOCs and dissolved lead. Other than naphthalene, PAH compounds are not included in Table 2 because 1-methyl naphthalene and 2-methyl naphthalene (at maximum concentrations of 123 and 210 micrograms per liter [µg/ℓ], respectively, in MW-2) were the only two PAHs detected, and they have no standards.

  Concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX); trimethylbenzenes (TMBs); and naphthalene have been above their applicable Wisconsin Administrative Code NR 140 enforcement standards (ES) in groundwater samples collected from the three wells downgradient of the pumping pad (MW-2 through MW-4). Groundwater samples collected from the two upgradient wells (MW-5 and MW-6) and a sidegradient well (MW-1) have not contained concentrations above applicable NR 140 ESs or NR 140 preventative action limits (PALs). In the impacted, downgradient wells MW-2 through MW-4, BTEX, TMB, and naphthalene concentrations decreased from 23 to 93 percent between March 2005 and April 2006. Based on this preliminary finding, biannual to annual groundwater monitoring is

ongoing to document the improvement in groundwater quality over time as a result of remediation through natural attenuation (RNA). However, additional downgradient monitoring wells were not installed off site because the railroad, another tank farm, and a large coal pile to the north (see Figure 2) presented logistical challenges.

Groundwater Monitoring Activities and Results (August 2015 through December 2016)

Between August 2015 and December 2016, there were three groundwater sampling events at Calumet West. Appendix A includes copies of the laboratory analytical reports and chain of custody records for the groundwater samples collected in October 2015 and May and October 2016. Prior to the start of purging and sampling, groundwater elevations were measured to track seasonal changes in water levels. Table 1 includes the depth to water and groundwater elevation data since July 2005.

Table 2 includes the October 2015 and May and October 2016 analytical results. Based on shallow groundwater flow to the north:

- The most recent sample collected from side-gradient monitoring well MW-1 in October 2016 did not contain any analyzed compounds above method detection levels, and no samples collected from the well since March 2005 have had a single petroleum-related compound measured at or above an NR 140 PAL.

- In downgradient monitoring well MW-2: benzene, xylenes, and TMB concentrations remained at or above NR 140 ES values, but decreased from 68 to 90 percent between March 2005 and October 2016.

- In downgradient monitoring well MW-3: benzene, ethylbenzene, xylene, and TMB concentrations remained at or above NR 140 ES values, but decreased from 83 to 91 percent between March 2005 and October 2016.

- In downgradient monitoring well MW-4: benzene, ethylbenzene, xylene, TMB, and naphthalene concentrations remained at or above NR 140 ES values, but decreased from 52 to 93 percent between March 2005 and October 2016.

- Figures 4 through 7 present plots of historical benzene, BTEX, TMBs, and naphthalene concentrations, respectively, in monitoring wells MW-2 through MW-4 for reference.

Proposed Pathway Forward to Site Closure

Based on the site investigation results, limited access to impacted soil, and documented improvement in groundwater quality as a result of RNA since March 2005, we propose to:

- Access the property immediately north of the site to define the degree and extent of off-site impacts. Calumet has been in contact with MERC, the owner of the property, and an access agreement is under review.

- Collect soil and groundwater samples from up to five locations on MERC's property with a direct-push rig. Analyze the samples collected for PVOCs and naphthalene.

- Continue to monitor the groundwater in MW-1 through MW-4 for PVOCs and naphthalene semi-annually.

If the WDNR approves the proposed off-site investigation as outlined above, then please let Matt Turner at Calumet and/or me know, and we will promptly submit a work plan for the sampling once MERC grants access to its property. Should MERC deny Calumet access to the property, Calumet will notify the WDNR and proceed accordingly.

Feel free to contact me if you have any comments, questions, or need additional information.

Sincerely,

GANNETT FLEMING, INC.

Clifford C. Wright, P.E., P.G.
Project Engineer

CCW/jec
Enc.

Electronic cc: Matt Turner (Calumet)

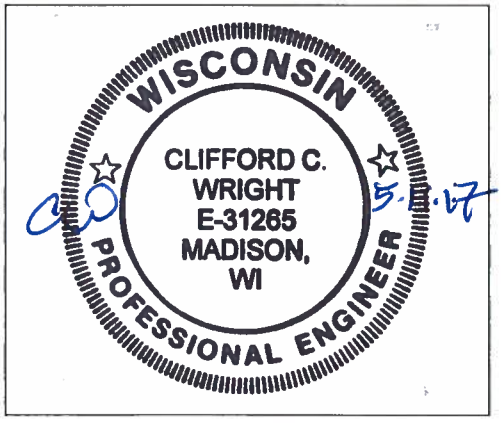
CERTIFICATION

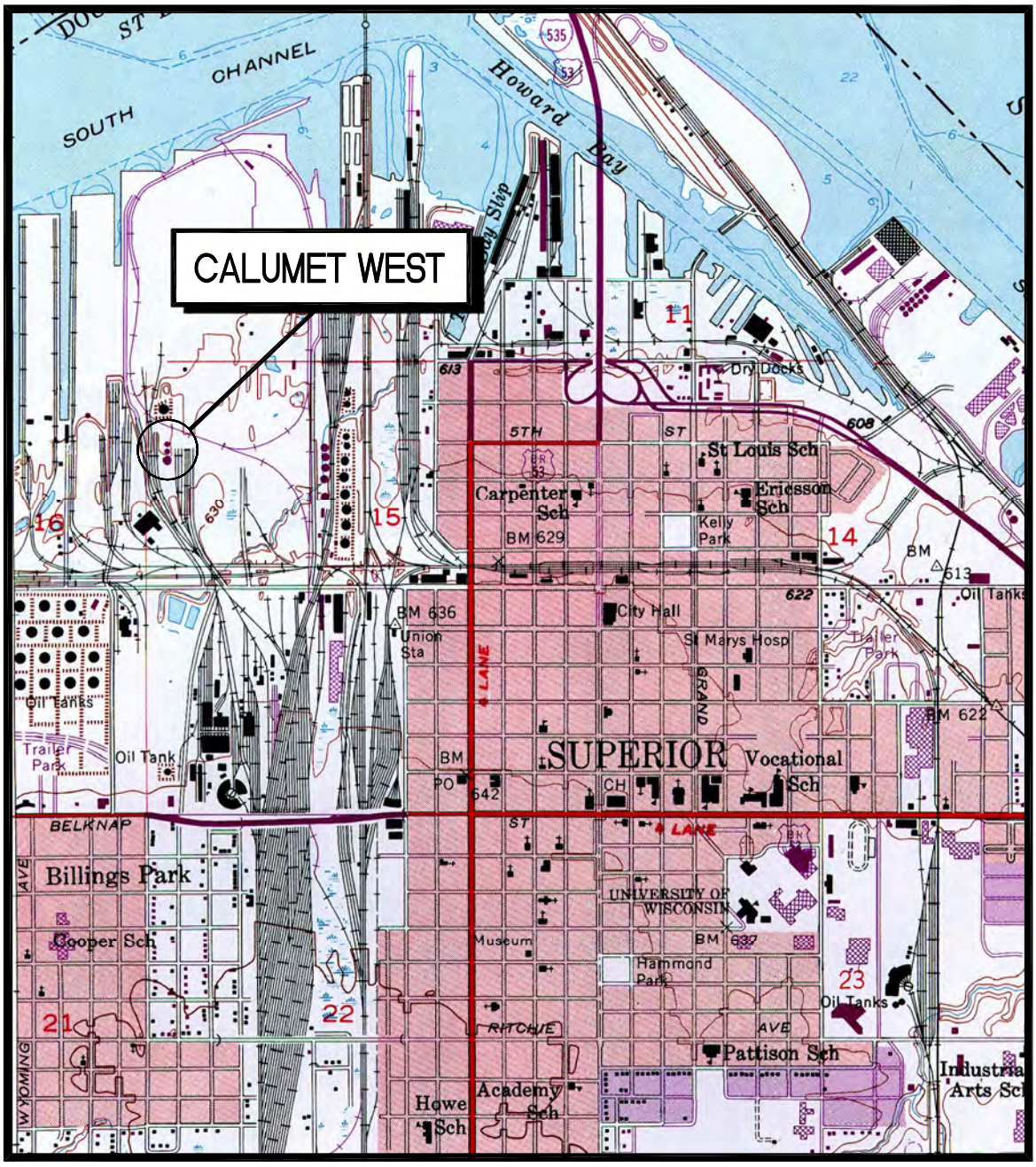
Only persons qualified to submit reports under ch. NR 712 Wis. Adm. Code are to sign this form for sites with any ongoing active remediation, monitoring, or an investigation. Other persons may sign this form for sites with no response activities during the six month reporting period.

I hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print Name Clifford C. Wright	Title Project engineer
Signature Clifford C. Wright	Date 5.11.17

Professional Seal, if applicable:





SCALE: 1 INCH = 2000 FEET
CONTOUR INTERVAL = 10 FEET

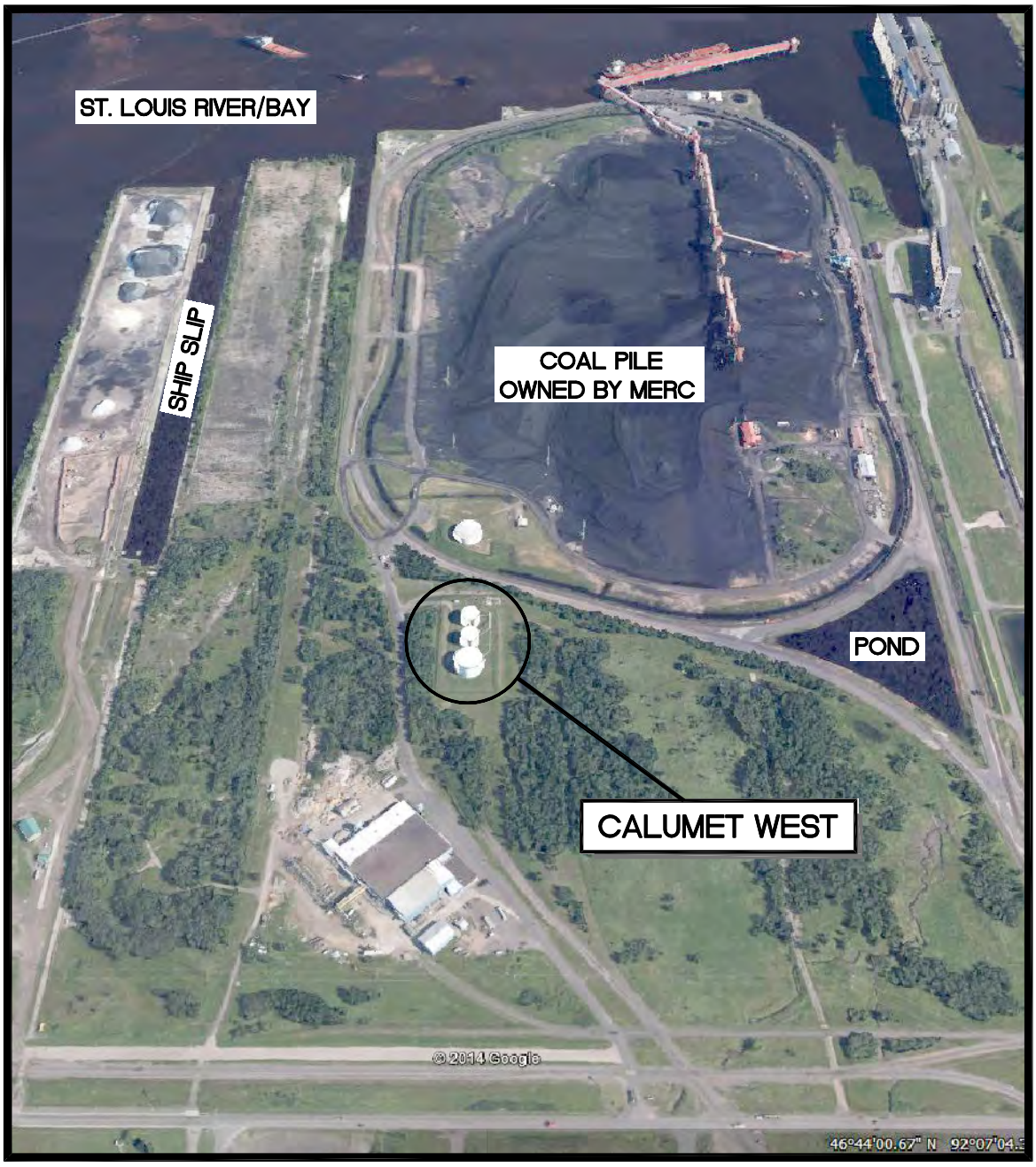
7.5 MIN TOPOGRAPHIC MAP
SUPERIOR, WISCONSIN
1954
PHOTOREVISED 1983

LOCATION MAP

CALUMET WEST
CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

081714
ccw_L34265-003_2014_0815_F01

L:\DRAFTING\GIS\20\34265\34265.003\ccw_L34265-003_2014_0815_F01.dwg, 8/17/2014 5:41:28 PM, PDFMK



NOT TO SCALE

AERIAL PHOTOGRAPH OBTAINED
FROM GOOGLE EARTH

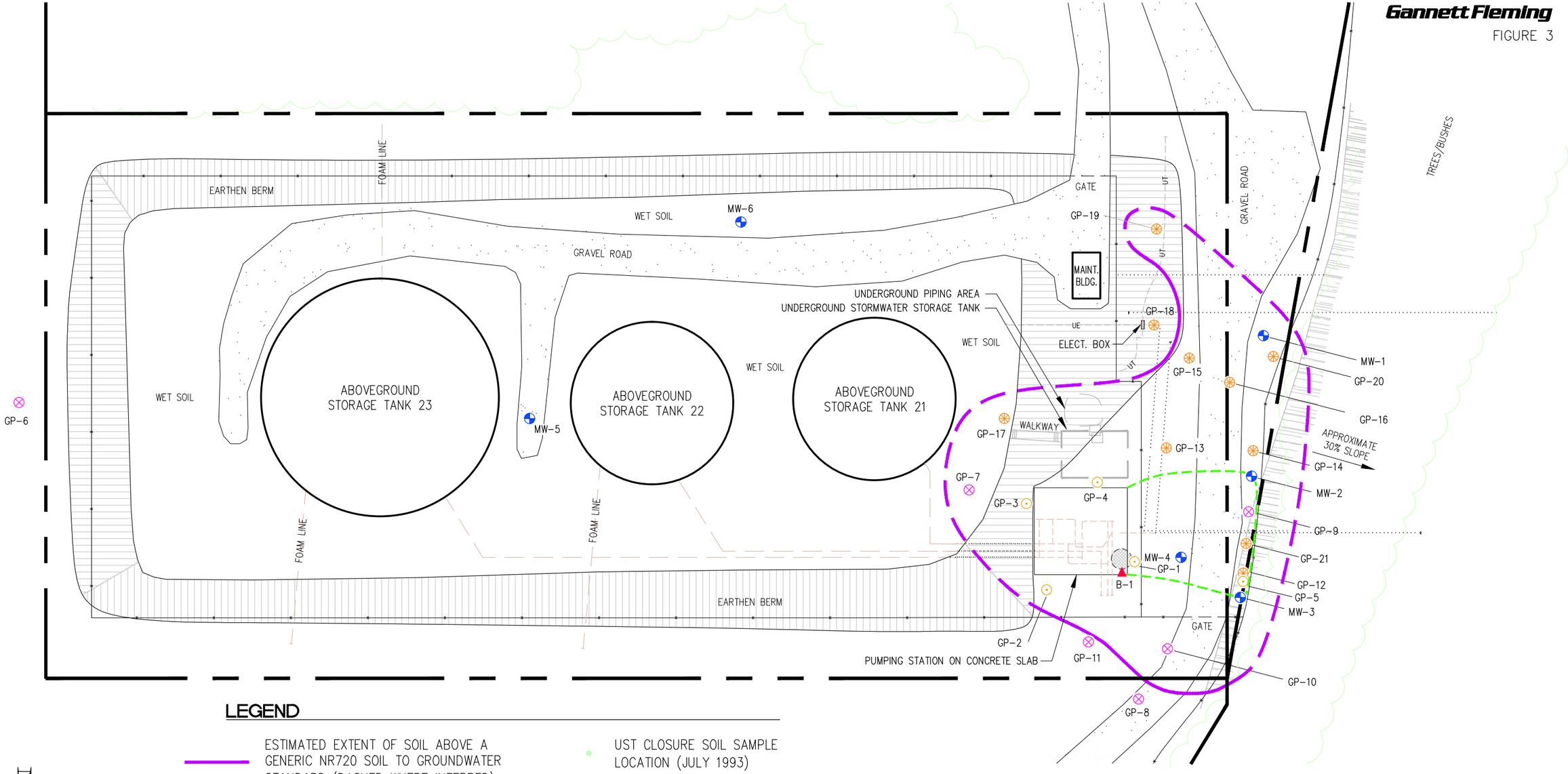
AERIAL PHOTO

CALUMET WEST
CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

051017
ccw_L34265-003_2017_0510_F02

Gannett Fleming

FIGURE 3



LEGEND

- ESTIMATED EXTENT OF SOIL ABOVE A GENERIC NR720 SOIL TO GROUNDWATER STANDARD (DASHED WHERE INFERRED)
- ESTIMATED EXTENT OF SOIL ABOVE AN NR720 INDUSTRIAL DIRECT CONTACT STANDARD (DASHED WHERE INFERRED)
- MONITORING WELL LOCATION (NOVEMBER 2004)
- GEOPROBE LOCATION (OCTOBER 1996)
- GEOPROBE LOCATION (JUNE 1996)
- GEOPROBE LOCATION (SEPTEMBER 1995)
- SAMPLE LOCATION (SEPTEMBER 1993)
- UST CLOSURE SOIL SAMPLE LOCATION (JULY 1993)
- FORMER LOCATION OF 430-GALLON UST/TANK #2 (REMOVED MARCH 1993) BRRTS NO. 03-16-000721
- APPROXIMATE LOCATION OF ABOVEGROUND PIPING
- APPROXIMATE LOCATION OF UNDERGROUND PIPING
- FENCE
- UE — UNDERGROUND ELECTRICAL
- UT — UNDERGROUND TELEPHONE

0 40

Approximate Scale In Feet

NOTES

1. THE SOUTHERN THREE-QUARTERS OF THE AST BASIN SITE PLAN WAS OBTAINED FROM CERTIFIED SURVEY MAP PREPARED BY AYRES ASSOCIATES IN OCTOBER 1994.
2. PROPERTY BOUNDARY LOCATIONS ESTIMATED FROM AERIAL PHOTO OBTAINED FROM DOUGLAS COUNTY AND FROM LAND LEASED MAP PREPARED BY BURLINGTON NORTHERN RAILROAD COMPANY.

SITE PLAN

CALUMET WEST
CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

081814
ccw_L34265-003_2014_0815_F03

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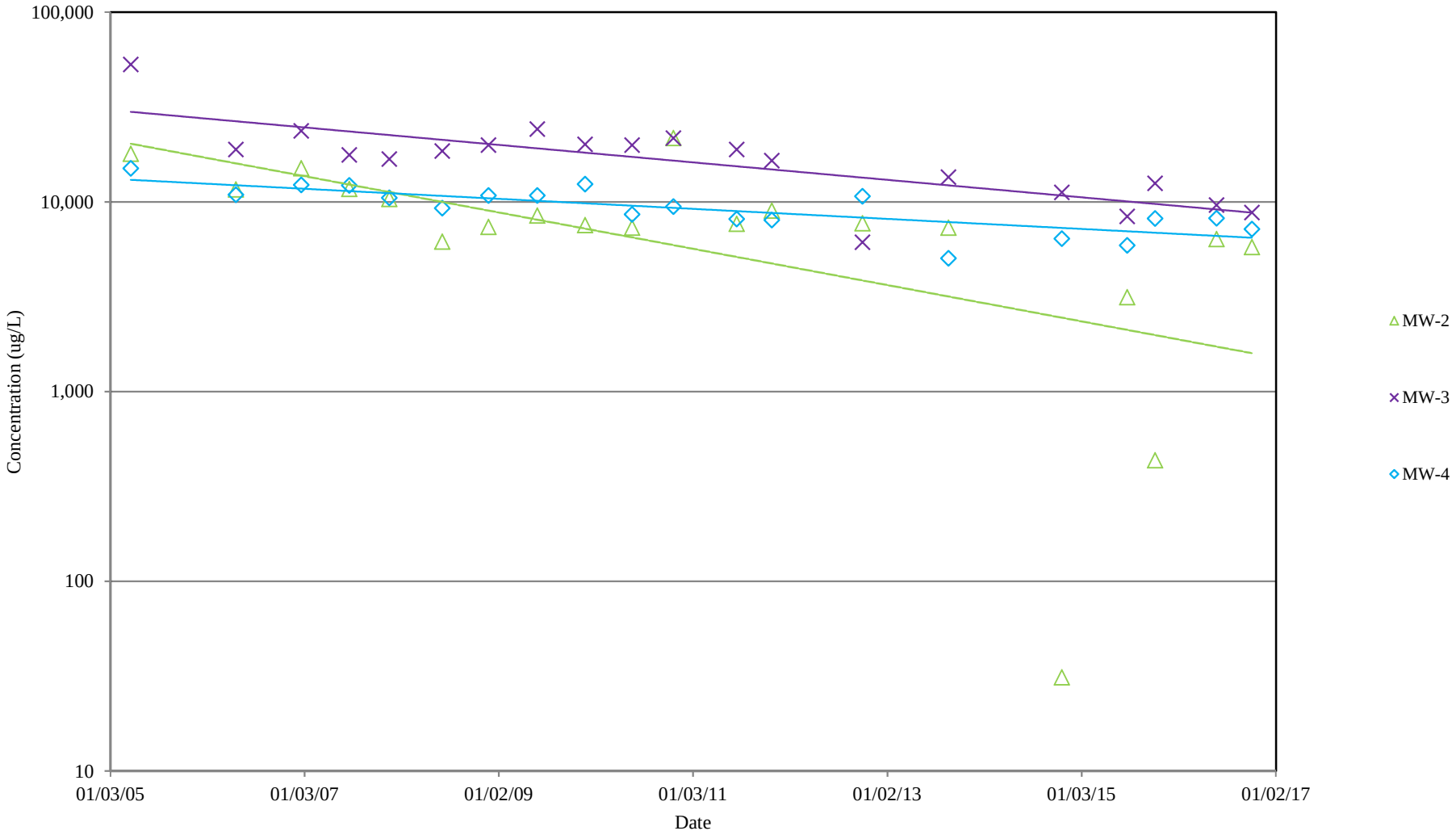
FIGURE 4



Note: Best-fit exponential trend lines generated using Excel.

BENZENE GROUNDWATER CONCENTRATIONS - CALUMET WEST

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

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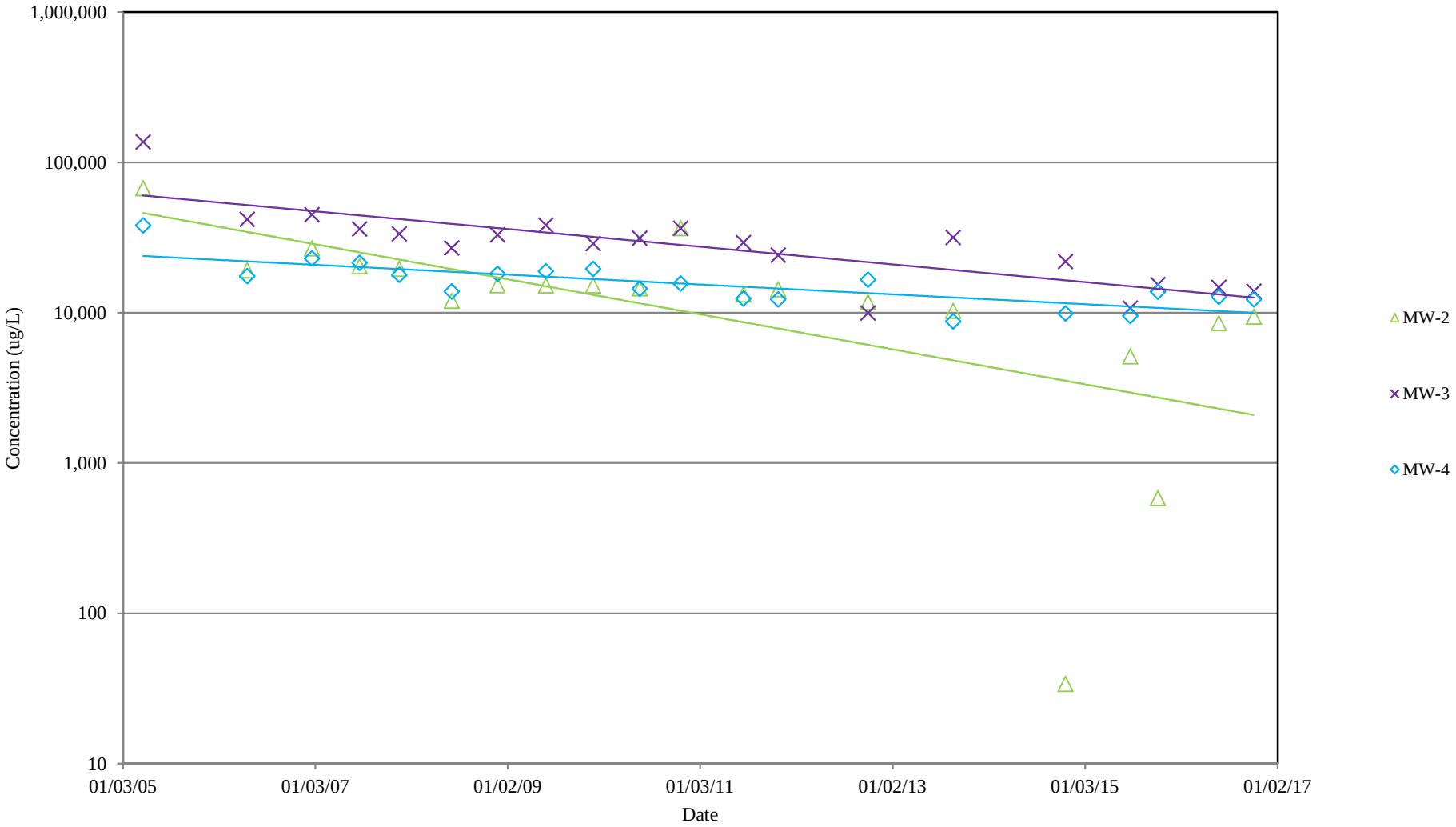
FIGURE 5



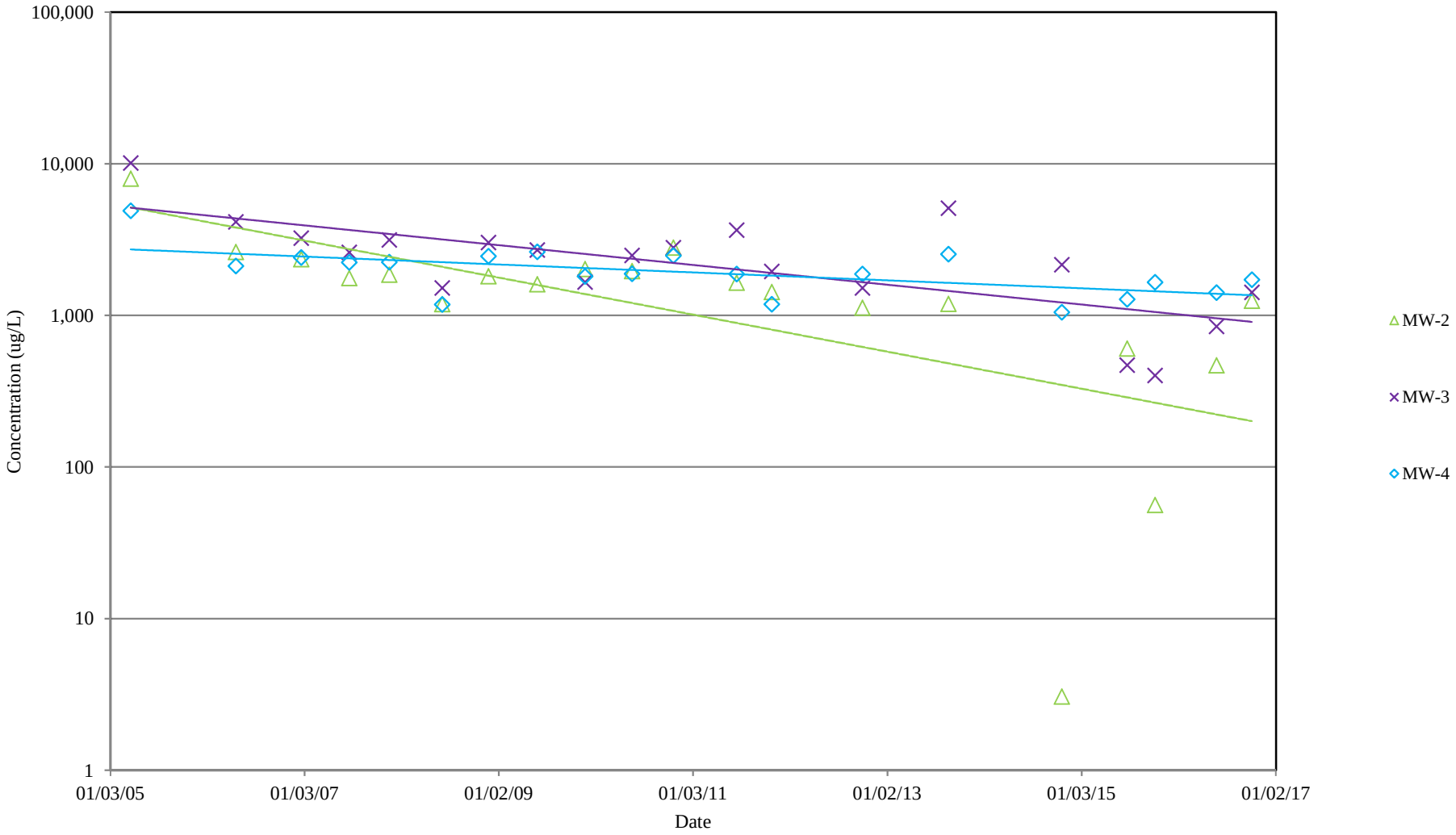
Note: Best-fit exponential trend lines generated using Excel.

BTEX GROUNDWATER CONCENTRATIONS - CALUMET WEST

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

Gannett Fleming

FIGURE 6



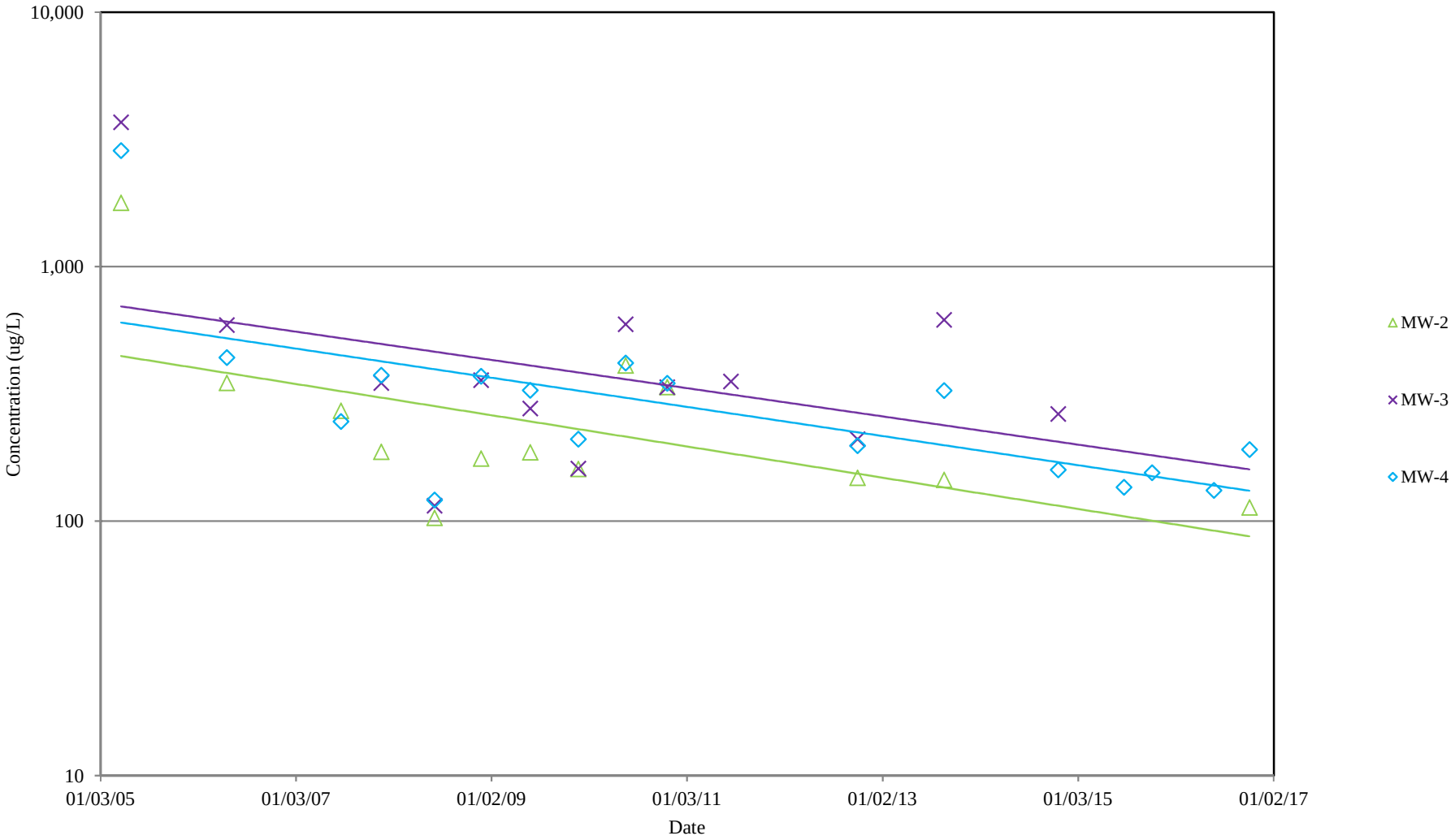
Note: Best-fit exponential trend lines generated using Excel.

TMBs GROUNDWATER CONCENTRATIONS - CALUMET WEST

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

Gannett Fleming

FIGURE 7



Note: Best-fit exponential trend lines generated using Excel and non-detect concentrations are not included.

NAPHTHALENE GROUNDWATER CONCENTRATIONS - CALUMET WEST

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

TABLE 1

WATER LEVEL ELEVATION DATA FOR CALUMET WEST

	Monitoring Well ID and Reference Information					
Description	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Top of casing (ft ASD)	96.80	96.72	97.77	97.39	98.50	98.89
Ground surface (ft ASD)	94.38	94.29	94.94	94.80	96.52	96.38
Top of screen (ft ASD)	89.4	89.3	89.9	89.8	90.5	89.4
Bottom of well (ft ASD)	74.4	74.3	74.9	74.8	80.5	79.4
Measurement Date	Depth to Water from Top of Casing (feet)					
07/13/05	7.12	5.84	7.10	6.31	7.66	6.02
08/01/05	7.51	6.39	7.50	7.09	9.78	7.41
11/10/05	8.05	7.76	8.53	8.02	9.00	5.27
04/13/06	7.70	6.25	7.68	7.67	7.20	4.52
08/21/06	7.59	6.82	7.44	7.24	11.59	8.59
11/27/06	6.96	6.72	7.84	8.40	12.23	6.79
06/06/07	5.11	4.87	6.60	5.40	4.67	7.95
11/01/07	5.12	6.53	6.87	6.73	6.97	5.07
05/12/08	4.92	7.65	6.06	4.77	5.82	4.42
11/05/08	4.30	5.90	6.48	6.93	6.36	4.71
05/04/09	5.47	7.35	6.31	5.16	6.99	4.78
11/04/09	4.33	7.18	5.56	6.58	6.81	4.75
04/28/10	5.74	5.80	7.17	5.71	6.24	9.86
09/30/10	5.27	5.73	6.86	6.83	6.58	4.76
05/31/11	4.85	3.01	6.07	3.97	5.38	4.35
10/26/11	8.43	7.75	8.93	8.55	11.38	9.18
10/01/12	9.03	8.21	10.14	8.39	12.79	10.87
08/20/13	7.74	7.07	8.35	7.15	11.95	9.45
09/25/14	5.32	5.13	7.39	6.96	8.49	7.95
06/05/15	5.22	5.04	6.65	4.70	5.35	7.20
09/04/15	5.05	5.04	8.46	5.48	10.95	5.87
05/05/16	5.02	4.62	6.19	5.46	5.00	4.41
09/09/16	4.30	5.50	5.43	10.08	4.46	4.46

TABLE 1

WATER LEVEL ELEVATION DATA FOR CALUMET WEST

Description	Monitoring Well ID and Reference Information					
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Top of casing (ft ASD)	96.80	96.72	97.77	97.39	98.50	98.89
Ground surface (ft ASD)	94.38	94.29	94.94	94.80	96.52	96.38
Top of screen (ft ASD)	89.4	89.3	89.9	89.8	90.5	89.4
Bottom of well (ft ASD)	74.4	74.3	74.9	74.8	80.5	79.4
Measurement Date	Water Elevation (feet ASD)					
07/13/05	89.68	90.88	90.67	91.08	90.84	92.87
08/01/05	89.29	90.33	90.27	90.30	88.72	91.48
11/10/05	88.75	88.96	89.24	89.37	89.50	93.62
04/13/06	89.10	90.47	90.09	89.72	91.30	94.37
08/21/06	89.21	89.90	90.33	90.15	86.91	90.30
11/27/06	89.84	90.00	89.93	88.99	86.27	92.10
06/06/07	91.69	91.85	91.17	91.99	93.83	90.94
11/01/07	91.68	90.19	90.90	90.66	91.53	93.82
05/12/08	91.88	89.07	91.71	92.62	92.68	94.47
11/05/08	92.50	90.82	91.29	90.46	92.14	94.18
05/04/09	91.33	89.37	91.46	92.23	91.51	94.11
11/04/09	92.47	89.54	92.21	90.81	91.69	94.14
04/28/10	91.06	90.92	90.60	91.68	92.26	89.03
09/30/10	91.53	90.99	90.91	90.56	91.92	94.13
05/31/11	91.95	93.71	91.70	93.42	93.12	94.54
10/26/11	88.37	88.97	88.84	88.84	87.12	89.71
10/01/12	87.77	88.51	87.63	89.00	85.71	88.02
08/20/13	89.06	89.65	89.42	90.24	86.55	89.44
09/25/14	91.48	91.59	90.38	90.43	90.01	90.94
06/05/15	91.58	91.68	91.12	92.69	93.15	91.69
09/04/15	91.75	91.68	89.31	91.91	87.55	93.02
05/05/16	91.78	92.10	91.58	91.93	93.50	94.48
09/09/16	92.50	91.22	92.34	87.31	94.04	94.43

NOTES:

Water level data are only for measurement dates outside of time periods when the wells were being purged prior to sample collection.

ASD = Above site datum with datum=100.00 feet (ft) at lower metal bracket of cyclone fence at NW corner of AST basin perimeter fence.

MW-5 is screened through different soils than the other 5 wells.

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID / Date	Substance											
	GRO	Benzene	RQ	Ethylbenzene	RQ	Toluene	RQ	Xylenes	RQ	TMBs	RQ	MTBE	RQ	Isopropyl-benzene	Naphthalene	RQ	n-Propyl-benzene	Dissolved Lead	RQ
NR 140 PAL	**NS**	**0.5**		**140**		**160**		**400**		**96**		**12**		**NS**	**10**		**NS**	**1.5**	
NR 140 ES	**NS**	**5**		**700**		**800**		**2,000**		**480**		**60**		**NS**	**100**		**NS**	**15**	
MW-1																			
03/20/05	na	<0.15		<0.1		<0.4		<0.5		<0.30		<0.1		<0.1	<1.00		<0.1	<0.6	
04/20/06	na	<0.31		<0.5		<0.3		1.2	J	1.4	J	<0.3		na	<0.8		na	na	
12/21/06	<50	<0.31		<0.5		<0.3		<0.92		<0.71		<0.300		na	na		na	na	
06/20/07	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	<0.60	
11/18/07	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	na	
06/04/08	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	na	
11/25/08	<50.0	<0.310		<0.500		<0.300		1.48	J	1.4025	J	<0.300		na	<0.800		na	na	
05/27/09	<50.0	<0.310		<0.500		<0.370		<1.39		<0.420		<0.300		na	<0.800		na	na	
11/23/09	<50.0	<0.310		14.09		<0.370		92.8		1.56	J	<0.300		na	<0.800		na	na	
05/19/10	<50	<0.310		<0.500		<0.370		<1.390		<0.840		<0.300		na	<0.800		na	na	
10/21/10	<50.0	<0.310		<0.500		0.985		1.2015		3.62		<0.300		na	<2.00		na	na	
06/16/11	na	<0.20		<0.20		<0.40		<0.60		<0.40		<0.50		na	<1.00		na	na	
10/26/11	na	<0.20		<0.20		<0.40		<0.60		<0.40		<0.50		na	<1.00		na	na	
10/01/12	na	<0.41		<0.54		<0.67		<2.63		<1.80		<0.61		na	<0.89		na	na	
08/20/13	na	<0.50		<0.50		<0.44		<1.32		<3.07		<0.49		na	<2.5		na	na	
10/21/14	na	<0.40		0.53	J	<0.39		5.03	J	23.6		<0.48		na	3.2		na	na	
06/23/15	na	<0.50		<0.50		<0.50		<1.50		<1.00		<0.17		na	<2.5		na	na	
10/06/15	na	<0.50		<0.50		<0.50		<1.50		<1.00		<0.17		na	<2.5		na	na	
05/24/16	na	<0.50		<0.50		<0.50		<1.50		<1.00		<0.17		na	<2.5		na	na	
10/04/16	na	<0.50		<0.50		<0.50		<1.50		<1.00		<0.17		na	<2.5		na	na	

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID / Date	Substance											
	GRO	Benzene	RQ	Ethylbenzene	RQ	Toluene	RQ	Xylenes	RQ	TMBs	RQ	MTBE	RQ	Isopropyl-benzene	Naphthalene	RQ	n-Propyl-benzene	Dissolved Lead	RQ
NR 140 PAL	**NS**	**0.5**		**140**		**160**		**400**		**96**		**12**		**NS**	**10**		**NS**	**1.5**	
NR 140 ES	**NS**	**5**		**700**		**800**		**2,000**		**480**		**60**		**NS**	**100**		**NS**	**15**	
MW-2																			
03/20/05	na	**17,900**		**4,510**		**20,100**		**24,770**		**7,950**		**<100**		253	**1,780**		581	*2.20*	
04/20/06	na	**11,600**		**1,540**		**1,320**		**4,664**		**2,612**		*<15.0*		na	**349**		na	na	
12/21/06	28,900	**15,000**		**1,710**		**3,820**		**6,250**		**2,346**		**<75.0**		na	na		na	na	
06/20/07	29,500	**11,700**		**1,440**		**2,640**		**4,598**		**1,757**		**<75.0**		na	**271**		na	0.86	J
11/18/07	32,050	**10,350**		**1,350**		**2,905**		**4,921**		**1,850**		*24.0*		na	**187**		na	na	
06/04/08	19,300	**6,160**		*677*		**1,860**		**3,301**		**1,185**		*<15.0*		na	**103**	J	na	na	
11/25/08	26,200	**7,370**		**941**		**2,650**		**4,270**		**1,809**		*<15.0*		na	**176**		na	na	
05/27/09	26,300	**8,460**		**1,210**		**1,340**		**4,156**		**1,601**		*34.4*	J	na	**186**		na	na	
11/23/09	25,400	**7,540**		**1,010**		**2,020**		**4,560**		**2,015**		*23.9*	J	na	**160**		na	na	
05/19/10	26,400	**7,300**		**1,110**		**1,650**		**4,439**		**1,953**		*<30.0*		na	**408**		na	na	
10/21/10	27,800	**21,700**		**3,100**		**1,650**		**10,000**		**2,799**		*<30.0*		na	**336**		na	na	
06/16/11	na	**7,660**		*459*		**1,770**		**3,302**		**1,642**		*<50.0*		na	*100*	U	na	na	
10/26/11	na	**8,965**		**820**	J	**1,405**		**3,095**	J	**1,421**	J	**<500**		na	**1,000**	U	na	na	
10/01/12	na	**7,690**		**1,020**		*232*		**2,811**		**1,122**		*<30.5*		na	**148**	J	na	na	
08/20/13	na	**7,310**		**1,040**		159		*1,788*		**1,191**		*<24.7*		na	**145**	J	na	na	
10/21/14	na	**31.1**		0.53	J	0.39	U	1.85	J	3.06	J	<0.48		na	0.42	U	na	na	
06/23/15	na	**3,140**		*481*		85.3		*1,402*		**602.5**		<7.0		na	*100*	U	na	na	
10/06/15	na	**434**		61.9		6.3		81.2		56.1	J	<0.87		na	*12.5*	U	na	na	
05/24/16	na	**6,360**		*451*		140		*1,563*		*467.4*		<7.0		na	*100*	U	na	na	
10/04/16	na	**5,770**		*581*		*451*		**2,580**		**1,245**		<7.0		na	**113**	J	na	na	

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID	Substance											
Date	GRO	Benzene	RQ	Ethylbenzene	RQ	Toluene	RQ	Xylenes	RQ	TMBs	RQ	MTBE	RQ	Isopropyl-benzene	Naphthalene	RQ	n-Propyl-benzene	Dissolved Lead	RQ
NR 140 PAL	**NS**	**0.5**		**140**		**160**		**400**		**96**		**12**		**NS**	**10**		**NS**	**1.5**	
NR 140 ES	**NS**	**5**		**700**		**800**		**2,000**		**480**		**60**		**NS**	**100**		**NS**	**15**	
MW-3																			
03/20/05	na	**53,000**		**9,320**		**35,000**		**39,350**		**10,110**		**<100**		278	**3,690**		529	**18.4**	
04/20/06	na	**18,900**		**4,040**		**5,530**		**13,400**		**4,133**		*<15.0*		na	**590**		na	na	
12/21/06	50,150	**23,670**		**3,410**		**5,455**		**12,305**		**3,237**		**<150**		na	na		na	na	
06/20/07	50,000	**17,700**		**3,240**		**4,240**		**10,870**		**2,607**		**<150**		na	**400**	U	na	*7.41*	
11/18/07	50,800	**16,800**		**3,480**		**2,430**		**10,790**		**3,138**		*34.9*		na	**349**		na	na	
06/04/08	37,800	**18,500**		**1,340**		**1,060**		**6,028**		**1,513**		*20.3*		na	**115**		na	na	
11/25/08	50,400	**19,900**		**2,810**		**1,500**		**8,790**		**3,025**		*<60.0*		na	**358**	J	na	na	
05/27/09	52,800	**24,200**		**2,900**		**1,890**		**9,320**		**2,696**		*<30.0*		na	**277**		na	na	
11/23/09	41,600	**20,100**		**1,270**		**1,200**		**6,260**		**1,662**		*<60.0*		na	**161**	J	na	na	
05/19/10	46,500	**19,900**		**2,430**		**1,320**		**7,675**		**2,489**		*<60.0*		na	**593**		na	na	
10/21/10	53,100	**21,700**		**3,100**		**1,650**		**10,000**		**2,799**		*<30.0*		na	**336**		na	na	
06/16/11	na	**18,850**		**2,275**		**1,108**		**7,037**		**3,650**		**<250**		na	**354**	J	na	na	
10/26/11	na	**16,500**		**2,060**		*555*	J	**5,024**	J	**1,945**	J	**<500**		na	**1,000**	U	na	na	
10/01/12	na	**6,120**		**833**		*174*		**2,855**		**1,518**		*<24.4*		na	**210**		na	na	
08/20/13	na	**13,500**		**4,130**		**1,970**		**12,120**		**5,090**		*<49.4*		na	**618**		na	na	
10/21/14	na	**11,200**		**2,560**		**947**		**7,173**		**2,154**		*<48.5*		na	**264**		na	na	
06/23/15	na	**8,380**		*373*		*279*		*1,703*		*469*		*<17.4*		na	**250**	U	na	na	
10/06/15	na	**12,500**		*409*		*265*		**2,200**		*401*		*<17.4*		na	**250**	U	na	na	
05/24/16	na	**9,630**		**1,170**		*172*		**3,775.7**	J	**846**		*<17.4*		na	**250**	U	na	na	
10/04/16	na	**8,780**		**1,210**		*317*		**3,582**		**1,419**		*<17.4*		na	**250**	U	na	na	

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID	Substance											
Date	GRO	Benzene	RQ	Ethylbenzene	RQ	Toluene	RQ	Xylenes	RQ	TMBs	RQ	MTBE	RQ	Isopropyl-benzene	Naphthalene	RQ	n-Propyl-benzene	Dissolved Lead	RQ
NR 140 PAL	**NS**	**0.5**		**140**		**160**		**400**		**96**		**12**		**NS**	**10**		**NS**	**1.5**	
NR 140 ES	**NS**	**5**		**700**		**800**		**2,000**		**480**		**60**		**NS**	**100**		**NS**	**15**	
MW-4																			
03/20/05	na	**15,000**		**2,155**		**6,345**		**14,615**		**4,901**		*<50.0*		113	**2,855**		252	*5.05*	
04/20/06	na	**10,900**		**1,670**		*750*		**4,196**		**2,119**		<6.00		na	**440**		na	na	
12/21/06	27,300	**12,300**		**2,110**		**1,640**		**6,940**		**2,411**		*<60.0*		na	na		na	na	
06/20/07	38,350	**12,200**		**1,760**		**1,260**		**6,275**		**2,234**		**<75.0**		na	**247**	J	na	*4.93*	
11/18/07	31,700	**10,500**		**1,590**		*677*		**5,070**		**2,240**		*28.2*		na	**374**		na	na	
06/04/08	21,800	**9,260**		*590*		*719*		**3,262**		**1,181**		<6.0		na	**121**		na	na	
11/25/08	30,900	**10,800**		**1,470**		*628*		**5,223**		**2,451**		*<60.0*		na	**371**	J	na	na	
05/27/09	33,300	**10,800**		**1,290**		**819**		**5,953**		**2,624**		*<30.0*		na	**327**		na	na	
11/23/09	31,500	**12,400**		**764**		**1,100**		**5,287**		**1,811**		*<60.0*		na	**210**	J	na	na	
05/19/10	24,800	**8,600**		**723**		*634*		**4,506**		**1,881**		*<30.0*		na	**418**		na	na	
10/21/10	25,600	**9,430**		**1,130**		*398*		**4,710**		**2,470**		*<30.0*		na	**348**		na	na	
06/16/11	na	**8,110**		*427*		*603*		**3,266**		**1,875**		**<250**		na	**<500**		na	na	
10/26/11	na	**8,020**		*653*	J	*455*	J	**3,137**	J	**1,185**	J	**<500**		na	**<1,000**		na	na	
10/01/12	na	**10,700**		**1,865**		*167*		**3,858**	J	**1,876**		**<61.0**		na	**198**	J	na	na	
08/20/13	na	**5,040**		**990**		109		**2,607**		**2,532**		*<19.7*		na	**326**		na	na	
10/21/14	na	**6,390**		**854**		*190*		**2,435**		**1,048**		*<24.2*		na	**159**		na	na	
06/23/15	na	**5,890**		*664*		*165*		**2,796**		**1,274**		<8.7		na	**136**	J	na	na	
10/06/15	na	**8,180**		**979**		*282*		**4,332**		**1,652**		<8.7		na	**155**	J	na	na	
05/24/16	na	**8,200**		**804**		*223*		**3,515**		**1,411**		<8.7		na	**132**	J	na	na	
10/04/16	na	**7,180**		**868**		*242*		**3,991**		**1,717**		<8.7		na	**191**	J	na	na	

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID	Substance											
Date	GRO	Benzene	RQ	Ethylbenzene	RQ	Toluene	RQ	Xylenes	RQ	TMBs	RQ	MTBE	RQ	Isopropyl-benzene	Naphthalene	RQ	n-Propyl-benzene	Dissolved Lead	RQ
NR 140 PAL	**NS**	**0.5**		**140**		**160**		**400**		**96**		**12**		**NS**	**10**		**NS**	**1.5**	
NR 140 ES	**NS**	**5**		**700**		**800**		**2,000**		**480**		**60**		**NS**	**100**		**NS**	**15**	
MW-5																			
03/20/05	na	*0.755*		<0.1		<0.4		<0.5		<0.30		<0.1		<0.1	<1.00		<0.1	<0.6	
04/20/06	na	<0.31		<0.5		<0.3		1.8	J	1.3	J	<0.3		na	<0.8		na	na	
12/21/06	<50	<0.31		<0.5		<0.3		<0.92		<0.71		<0.300		na	na		na	na	
06/20/07	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	<0.60	
11/18/07	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	na	
06/04/08	<50.0	<0.310		<0.500		<0.300		<0.920		<0.710		<0.300		na	<0.800		na	na	
11/25/08	<50.0	<0.310		<0.500		<0.300		<0.980		<0.710		<0.300		na	<0.800		na	na	
05/27/09	<50.0	<0.310		<0.500		<0.370		<1.39		<0.840		<0.300		na	<0.800		na	na	
11/23/09	722	<0.310		85.7		<0.370		321		2.44	J	<0.300		na	<0.800		na	na	
05/19/10	<50.0	<0.310		<0.500		<0.370		<1.390		<0.840		<0.300		na	<0.800		na	na	
10/21/10	<50.0	<0.310		<0.500		<0.370		<1.390		<0.840		<0.300		na	<0.800		na	na	
06/16/11	na	<0.20		<0.20		<0.40		<0.60		<0.40		<0.50		na	<1.00		na	na	
10/26/11	na	<0.20		<0.20		<0.40		<0.60		<0.40		<0.50		na	<1.00		na	na	
10/01/12	na	<0.41		<0.54		<0.67		<2.63		<1.80		<0.61		na	<0.89		na	na	
08/20/13	na	<0.50		<0.50		<0.44		<1.32		<3.07		<0.49		na	<2.5		na	na	

TABLE 2

GROUNDWATER ANALYTICAL RESULTS FOR DETECTED VOCs AND DISSOLVED LEAD - CALUMET WEST RELEASE SITE

Well ID	Substance											
Date	GRO	Benzene RQ	Ethylbenzene RQ	Toluene RQ	Xylenes RQ	TMBs RQ	MTBE RQ	Isopropyl-benzene	Naphthalene RQ	n-Propyl-benzene	Dissolved Lead RQ	
NR 140 PAL	**NS**	**0.5**	**140**	**160**	**400**	**96**	**12**	**NS**	**10**	**NS**	**1.5**	
NR 140 ES	**NS**	**5**	**700**	**800**	**2,000**	**480**	**60**	**NS**	**100**	**NS**	**15**	
MW-6												
03/20/05	na	<0.15	<0.1	<0.4	<0.5	<0.30	<0.1	<0.1	<1.00	<0.1	<0.6	
04/20/06	na	<0.31	<0.5	<0.3	<0.92	<0.71	<0.3	na	<0.8	na	na	
12/21/06	<50	<0.31	<0.5	<0.3	<0.92	<0.71	<0.300	na	na	na	na	
06/20/07	<50.0	<0.310	<0.500	<0.300	<0.920	<0.710	<0.300	na	<0.800	na	<0.60	
11/18/07	<50.0	<0.310	<0.500	<0.300	<0.920	<0.710	<0.300	na	<0.800	na	na	
06/04/08	<50.0	<0.310	<0.500	<0.300	<0.920	<0.710	<0.300	na	<0.800	na	na	
11/25/08	<50.0	<0.310	<0.500	<0.300	<0.980	<0.710	<0.300	na	<0.800	na	na	
05/27/09	<50.0	<0.310	<0.500	<0.370	<1.39	<0.840	<0.300	na	<0.800	na	na	
11/23/09	<50.0	<0.310	3.17	<0.370	19.7	<0.840	<0.300	na	<0.800	na	na	
05/19/10	<50.0	<0.310	<0.500	<0.370	<1.390	<0.840	<0.300	na	<0.800	na	na	
10/21/10	<50.0	<0.310	<0.500	<0.370	2.38 J	6.16 J	<0.300	na	2.11 J	na	na	
06/16/11	na	<0.20	<0.20	<0.40	<0.60	<0.40	<0.50	na	<1.00	na	na	
10/26/11	na	<0.20	<0.20	<0.40	<0.60	<0.40	<0.50	na	<1.00	na	na	
10/01/12	na	<0.41	<0.54	<0.67	<2.63	<1.80	<0.61	na	<0.89	na	na	
08/20/13	na	<0.50	<0.50	<0.44	<1.32	<3.07	<0.49	na	<2.5	na	na	

NOTES:

Results are in micrograms per liter (µg/ℓ); concentrations at or above an NR 140 PAL are italicized and those at or above an NR 140 ES are bold.

Duplicate sample results are averaged for statistical analysis/plotting, per December 2013 Interstate Technology & Regulatory Council guidance.

The samples collected from all wells on 03/20/05 were analyzed for VOCs; all other samples were analyzed for GRO/PVOCs and naphthalene or PVOCs and naphthalene.

The samples collected from all wells on 03/20/05 were also analyzed for PAHs. However, the detected PAH results are not summarized in this table, as described in the text.

On the chain-of-custody record, the duplicate sample from MW-4 was inadvertently noted as MW-7 on 03/20/05 and 04/20/06.

GRO = Gasoline range organics.

J = Estimated concentration, concentration below the laboratory's level of quantitation.

MTBE = Methyl tert butyl ether.

na = Not analyzed.

NR 140 ES = Wisconsin Administrative Code NR 140 Enforcement Standard.

NR 140 PAL = Wisconsin Administrative Code NR 140 Preventive Action Limit.

NS = No standard.

RQ = Results qualifier.

TMBs = Trimethylbenzenes.

U = Compound not detected at or above the detection limit, which is the value shown for all parameters except xylenes and TMBs.

ATTACHMENT A

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY RECORDS FOR GROUNDWATER SAMPLES COLLECTED IN OCTOBER 2015 AND MAY AND OCTOBER 2016

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

Project #34265.003
Calumet Superior
Reviewed by CCW
10/20/15

October 19, 2015

Clifford Wright
Gannett Fleming
8025 Excelsior Drive
Madison, WI 53717

RE: Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Dear Clifford Wright:
Enclosed are the analytical results for sample(s) received by the laboratory on October 08, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
Project Manager

Enclosures

cc: Dave Olig, Gannett Fleming

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
Virginia VELAP ID: 460263
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
US Dept of Agriculture #: S-76505
Virginia VELAP ID: 460263
Virginia VELAP Certification ID: 460263
Wisconsin Certification #: 405132750

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40122459001	**MW-1/CW**	Water	10/06/15 12:00	10/08/15 10:40
40122459002	**MW-2/CW**	Water	10/06/15 12:02	10/08/15 10:40
40122459003	**MW-3/CW**	Water	10/06/15 12:10	10/08/15 10:40
40122459004	**MW-4/CW**	Water	10/06/15 12:05	10/08/15 10:40
40122459005	**MW-1/T40**	Water	10/06/15 08:00	10/08/15 10:40
40122459006	**MW-4/T40**	Water	10/06/15 08:25	10/08/15 10:40
40122459007	**MW-5/T40**	Water	10/06/15 08:10	10/08/15 10:40
40122459008	**MW-6/T40**	Water	10/06/15 08:15	10/08/15 10:40
40122459009	**MW-7/T40**	Water	10/06/15 08:20	10/08/15 10:40
40122459010	**TS-1/T40**	Water	10/06/15 08:22	10/08/15 10:40
40122459011	**MW-1/T68**	Water	10/06/15 08:40	10/08/15 10:40
40122459012	**MW-2/T68**	Water	10/06/15 09:00	10/08/15 10:40
40122459013	**MW-4/T68**	Water	10/06/15 08:55	10/08/15 10:40
40122459014	**MW-5/T66**	Water	10/06/15 08:45	10/08/15 10:40
40122459015	**MW-6/T68**	Water	10/06/15 09:05	10/08/15 10:40
40122459016	**MW-1R/T70**	Water	10/06/15 09:40	10/08/15 10:40
40122459017	**MW-2R/T70**	Water	10/06/15 09:15	10/08/15 10:40
40122459018	**MW-3/T70**	Water	10/06/15 09:30	10/08/15 10:40
40122459019	**MW-4/T70**	Water	10/06/15 09:35	10/08/15 10:40
40122459020	**MW-5/T70**	Water	10/06/15 09:20	10/08/15 10:40
40122459021	**MW-6/T70**	Water	10/06/15 09:25	10/08/15 10:40
40122459022	**TRIP BLANK**	Water	10/06/15 00:00	10/08/15 10:40

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40122459001	MW-1/CW	EPA 8260	HNW	12	PASI-G
40122459002	MW-2/CW	EPA 8260	HNW	12	PASI-G
40122459003	MW-3/CW	EPA 8260	HNW	12	PASI-G
40122459004	MW-4/CW	EPA 8260	HNW	12	PASI-G
40122459005	MW-1/T40	EPA 8260	HNW	11	PASI-G
40122459006	MW-4/T40	EPA 8260	HNW	11	PASI-G
40122459007	MW-5/T40	EPA 8260	AJP	11	PASI-G
40122459008	MW-6/T40	EPA 8260	LAP	11	PASI-G
40122459009	MW-7/T40	EPA 8260	AJP	11	PASI-G
40122459010	TS-1/T40	EPA 8260	AJP	11	PASI-G
40122459011	MW-1/T68	EPA 8260	LAP	63	PASI-G
40122459012	MW-2/T68	EPA 8260	LAP	63	PASI-G
40122459013	MW-4/T68	EPA 8260	LAP	63	PASI-G
40122459014	MW-5/T66	EPA 8260	LAP	63	PASI-G
40122459015	MW-6/T68	EPA 8260	LAP	63	PASI-G
40122459016	MW-1R/T70	EPA 8260	AJP	12	PASI-G
40122459017	MW-2R/T70	EPA 8260	AJP	12	PASI-G
40122459018	MW-3/T70	EPA 8260	AJP	12	PASI-G
40122459019	MW-4/T70	EPA 8260	AJP	12	PASI-G
40122459020	MW-5/T70	EPA 8260	AJP	12	PASI-G
40122459021	MW-6/T70	EPA 8260	LAP	12	PASI-G
40122459022	TRIP BLANK	EPA 8260	AJP	12	PASI-G

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40122459002	**MW-2/CW**					
EPA 8260	1,2,4-Trimethylbenzene	51.5	ug/L	5.0	10/12/15 13:28	
EPA 8260	1,3,5-Trimethylbenzene	4.6J	ug/L	5.0	10/12/15 13:28	
EPA 8260	Benzene	434	ug/L	5.0	10/12/15 13:28	
EPA 8260	Ethylbenzene	61.9	ug/L	5.0	10/12/15 13:28	
EPA 8260	Toluene	6.3	ug/L	5.0	10/12/15 13:28	
EPA 8260	m&p-Xylene	73.1	ug/L	10.0	10/12/15 13:28	
EPA 8260	o-Xylene	8.1	ug/L	5.0	10/12/15 13:28	
40122459003	**MW-3/CW**					
EPA 8260	1,2,4-Trimethylbenzene	282	ug/L	100	10/12/15 10:59	
EPA 8260	1,3,5-Trimethylbenzene	119	ug/L	100	10/12/15 10:59	
EPA 8260	Benzene	12500	ug/L	100	10/12/15 10:59	
EPA 8260	Ethylbenzene	409	ug/L	100	10/12/15 10:59	
EPA 8260	Toluene	265	ug/L	100	10/12/15 10:59	
EPA 8260	m&p-Xylene	1930	ug/L	200	10/12/15 10:59	
EPA 8260	o-Xylene	270	ug/L	100	10/12/15 10:59	
40122459004	**MW-4/CW**					
EPA 8260	1,2,4-Trimethylbenzene	1300	ug/L	50.0	10/12/15 11:22	
EPA 8260	1,3,5-Trimethylbenzene	352	ug/L	50.0	10/12/15 11:22	
EPA 8260	Benzene	8180	ug/L	50.0	10/12/15 11:22	
EPA 8260	Ethylbenzene	979	ug/L	50.0	10/12/15 11:22	
EPA 8260	Naphthalene	155J	ug/L	250	10/12/15 11:22	
EPA 8260	Toluene	282	ug/L	50.0	10/12/15 11:22	
EPA 8260	m&p-Xylene	3750	ug/L	100	10/12/15 11:22	
EPA 8260	o-Xylene	582	ug/L	50.0	10/12/15 11:22	
40122459005	**MW-1/T40**					
EPA 8260	1,2,4-Trimethylbenzene	2.0	ug/L	1.0	10/12/15 10:14	
EPA 8260	1,3,5-Trimethylbenzene	121	ug/L	1.0	10/12/15 10:14	
EPA 8260	Benzene	0.51J	ug/L	1.0	10/12/15 10:14	
EPA 8260	Ethylbenzene	0.79J	ug/L	1.0	10/12/15 10:14	
EPA 8260	Toluene	1.4	ug/L	1.0	10/12/15 10:14	
EPA 8260	m&p-Xylene	7.6	ug/L	2.0	10/12/15 10:14	
EPA 8260	o-Xylene	0.91J	ug/L	1.0	10/12/15 10:14	
40122459006	**MW-4/T40**					
EPA 8260	1,2,4-Trimethylbenzene	858	ug/L	100	10/12/15 11:44	
EPA 8260	1,3,5-Trimethylbenzene	245	ug/L	100	10/12/15 11:44	
EPA 8260	Benzene	6500	ug/L	100	10/12/15 11:44	
EPA 8260	Ethylbenzene	109	ug/L	100	10/12/15 11:44	
EPA 8260	m&p-Xylene	3000	ug/L	200	10/12/15 11:44	
EPA 8260	o-Xylene	1530	ug/L	100	10/12/15 11:44	
40122459007	**MW-5/T40**					
EPA 8260	1,2,4-Trimethylbenzene	0.51J	ug/L	1.0	10/10/15 12:49	
EPA 8260	Toluene	0.70J	ug/L	1.0	10/10/15 12:49	
EPA 8260	m&p-Xylene	1.1J	ug/L	2.0	10/10/15 12:49	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Method: **EPA 8260**
Description: 8260 MSV
Client: Gannett Fleming Inc.
Date: October 19, 2015

General Information:
5 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
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PROJECT NARRATIVE

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Method: **EPA 8260**
Description: 8260 MSV UST
Client: Gannett Fleming Inc.
Date: October 19, 2015

General Information:
17 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Sample: MW-1/CW **Lab ID: 40122459001** Collected: 10/06/15 12:00 Received: 10/08/15 10:40 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	95-63-6	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	108-67-8	
Benzene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	71-43-2	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	100-41-4	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		10/12/15 09:52	1634-04-4	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		10/12/15 09:52	91-20-3	
Toluene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	108-88-3	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		10/12/15 09:52	179601-23-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		10/12/15 09:52	95-47-6	
Surrogates									
Dibromofluoromethane (S)	98	%	70-130		1		10/12/15 09:52	1868-53-7	
Toluene-d8 (S)	95	%	70-130		1		10/12/15 09:52	2037-26-5	
4-Bromofluorobenzene (S)	91	%	70-130		1		10/12/15 09:52	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Sample: MW-2/CW **Lab ID: 40122459002** Collected: 10/06/15 12:02 Received: 10/08/15 10:40 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**51.5**	ug/L	5.0	2.5	5		10/12/15 13:28	95-63-6	
1,3,5-Trimethylbenzene	**4.6J**	ug/L	5.0	2.5	5		10/12/15 13:28	108-67-8	
Benzene	**434**	ug/L	5.0	2.5	5		10/12/15 13:28	71-43-2	
Ethylbenzene	**61.9**	ug/L	5.0	2.5	5		10/12/15 13:28	100-41-4	
Methyl-tert-butyl ether	**<0.87**	ug/L	5.0	0.87	5		10/12/15 13:28	1634-04-4	
Naphthalene	**<12.5**	ug/L	25.0	12.5	5		10/12/15 13:28	91-20-3	
Toluene	**6.3**	ug/L	5.0	2.5	5		10/12/15 13:28	108-88-3	
m&p-Xylene	**73.1**	ug/L	10.0	5.0	5		10/12/15 13:28	179601-23-1	
o-Xylene	**8.1**	ug/L	5.0	2.5	5		10/12/15 13:28	95-47-6	
Surrogates									
Dibromofluoromethane (S)	100	%	70-130		5		10/12/15 13:28	1868-53-7	
Toluene-d8 (S)	96	%	70-130		5		10/12/15 13:28	2037-26-5	
4-Bromofluorobenzene (S)	93	%	70-130		5		10/12/15 13:28	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Sample: MW-3/CW **Lab ID: 40122459003** Collected: 10/06/15 12:10 Received: 10/08/15 10:40 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**282**	ug/L	100	50.0	100		10/12/15 10:59	95-63-6	
1,3,5-Trimethylbenzene	**119**	ug/L	100	50.0	100		10/12/15 10:59	108-67-8	
Benzene	**12500**	ug/L	100	50.0	100		10/12/15 10:59	71-43-2	
Ethylbenzene	**409**	ug/L	100	50.0	100		10/12/15 10:59	100-41-4	
Methyl-tert-butyl ether	**<17.4**	ug/L	100	17.4	100		10/12/15 10:59	1634-04-4	
Naphthalene	**<250**	ug/L	500	250	100		10/12/15 10:59	91-20-3	
Toluene	**265**	ug/L	100	50.0	100		10/12/15 10:59	108-88-3	
m&p-Xylene	**1930**	ug/L	200	100	100		10/12/15 10:59	179601-23-1	
o-Xylene	**270**	ug/L	100	50.0	100		10/12/15 10:59	95-47-6	
Surrogates									
Dibromofluoromethane (S)	103	%	70-130		100		10/12/15 10:59	1868-53-7	
Toluene-d8 (S)	97	%	70-130		100		10/12/15 10:59	2037-26-5	
4-Bromofluorobenzene (S)	96	%	70-130		100		10/12/15 10:59	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Sample: MW-4/CW **Lab ID: 40122459004** Collected: 10/06/15 12:05 Received: 10/08/15 10:40 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**1300**	ug/L	50.0	25.0	50		10/12/15 11:22	95-63-6	
1,3,5-Trimethylbenzene	**352**	ug/L	50.0	25.0	50		10/12/15 11:22	108-67-8	
Benzene	**8180**	ug/L	50.0	25.0	50		10/12/15 11:22	71-43-2	
Ethylbenzene	**979**	ug/L	50.0	25.0	50		10/12/15 11:22	100-41-4	
Methyl-tert-butyl ether	**<8.7**	ug/L	50.0	8.7	50		10/12/15 11:22	1634-04-4	
Naphthalene	**155J**	ug/L	250	125	50		10/12/15 11:22	91-20-3	
Toluene	**282**	ug/L	50.0	25.0	50		10/12/15 11:22	108-88-3	
m&p-Xylene	**3750**	ug/L	100	50.0	50		10/12/15 11:22	179601-23-1	
o-Xylene	**582**	ug/L	50.0	25.0	50		10/12/15 11:22	95-47-6	
Surrogates									
Dibromofluoromethane (S)	100	%	70-130		50		10/12/15 11:22	1868-53-7	
Toluene-d8 (S)	96	%	70-130		50		10/12/15 11:22	2037-26-5	
4-Bromofluorobenzene (S)	96	%	70-130		50		10/12/15 11:22	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Sample: TRIP BLANK **Lab ID: 40122459022** Collected: 10/06/15 00:00 Received: 10/08/15 10:40 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	95-63-6	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	108-67-8	
Benzene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	71-43-2	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	100-41-4	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		10/10/15 11:00	1634-04-4	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		10/10/15 11:00	91-20-3	
Toluene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	108-88-3	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		10/10/15 11:00	179601-23-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		10/10/15 11:00	95-47-6	
Surrogates									
Dibromofluoromethane (S)	104	%	70-130		1		10/10/15 11:00	1868-53-7	
Toluene-d8 (S)	103	%	70-130		1		10/10/15 11:00	2037-26-5	
4-Bromofluorobenzene (S)	106	%	70-130		1		10/10/15 11:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

QC Batch: MSV/30585 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 40122459011, 40122459012, 40122459013, 40122459014, 40122459015

METHOD BLANK: 1236760 Matrix: Water
Associated Lab Samples: 40122459011, 40122459012, 40122459013, 40122459014, 40122459015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.18	1.0	10/12/15 06:43	
1,1,1-Trichloroethane	ug/L	<0.50	1.0	10/12/15 06:43	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	1.0	10/12/15 06:43	
1,1,2-Trichloroethane	ug/L	<0.20	1.0	10/12/15 06:43	
1,1-Dichloroethane	ug/L	<0.24	1.0	10/12/15 06:43	
1,1-Dichloroethene	ug/L	<0.41	1.0	10/12/15 06:43	
1,1-Dichloropropene	ug/L	<0.44	1.0	10/12/15 06:43	
1,2,3-Trichlorobenzene	ug/L	<2.1	5.0	10/12/15 06:43	
1,2,3-Trichloropropane	ug/L	<0.50	1.0	10/12/15 06:43	
1,2,4-Trichlorobenzene	ug/L	<2.2	5.0	10/12/15 06:43	
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	10/12/15 06:43	
1,2-Dibromo-3-chloropropane	ug/L	<2.2	5.0	10/12/15 06:43	
1,2-Dibromoethane (EDB)	ug/L	<0.18	1.0	10/12/15 06:43	
1,2-Dichlorobenzene	ug/L	<0.50	1.0	10/12/15 06:43	
1,2-Dichloroethane	ug/L	<0.17	1.0	10/12/15 06:43	
1,2-Dichloropropane	ug/L	<0.23	1.0	10/12/15 06:43	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	10/12/15 06:43	
1,3-Dichlorobenzene	ug/L	<0.50	1.0	10/12/15 06:43	
1,3-Dichloropropane	ug/L	<0.50	1.0	10/12/15 06:43	
1,4-Dichlorobenzene	ug/L	<0.50	1.0	10/12/15 06:43	
2,2-Dichloropropane	ug/L	<0.48	1.0	10/12/15 06:43	
2-Chlorotoluene	ug/L	<0.50	1.0	10/12/15 06:43	
4-Chlorotoluene	ug/L	<0.21	1.0	10/12/15 06:43	
Benzene	ug/L	<0.50	1.0	10/12/15 06:43	
Bromobenzene	ug/L	<0.23	1.0	10/12/15 06:43	
Bromochloromethane	ug/L	<0.34	1.0	10/12/15 06:43	
Bromodichloromethane	ug/L	<0.50	1.0	10/12/15 06:43	
Bromoform	ug/L	<0.50	1.0	10/12/15 06:43	
Bromomethane	ug/L	<2.4	5.0	10/12/15 06:43	
Carbon tetrachloride	ug/L	<0.50	1.0	10/12/15 06:43	
Chlorobenzene	ug/L	<0.50	1.0	10/12/15 06:43	
Chloroethane	ug/L	<0.37	1.0	10/12/15 06:43	
Chloroform	ug/L	<2.5	5.0	10/12/15 06:43	
Chloromethane	ug/L	<0.50	1.0	10/12/15 06:43	
cis-1,2-Dichloroethene	ug/L	<0.26	1.0	10/12/15 06:43	
cis-1,3-Dichloropropene	ug/L	<0.50	1.0	10/12/15 06:43	
Dibromochloromethane	ug/L	<0.50	1.0	10/12/15 06:43	
Dibromomethane	ug/L	<0.43	1.0	10/12/15 06:43	
Dichlorodifluoromethane	ug/L	<0.22	1.0	10/12/15 06:43	
Ethylbenzene	ug/L	<0.50	1.0	10/12/15 06:43	
Hexachloro-1,3-butadiene	ug/L	<2.1	5.0	10/12/15 06:43	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

METHOD BLANK: 1236760 Matrix: Water
Associated Lab Samples: 40122459011, 40122459012, 40122459013, 40122459014, 40122459015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Isopropylbenzene (Cumene)	ug/L	<0.14	1.0	10/12/15 06:43	
m&p-Xylene	ug/L	<1.0	2.0	10/12/15 06:43	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	10/12/15 06:43	
Methylene Chloride	ug/L	<0.23	1.0	10/12/15 06:43	
n-Butylbenzene	ug/L	<0.50	1.0	10/12/15 06:43	
n-Propylbenzene	ug/L	<0.50	1.0	10/12/15 06:43	
Naphthalene	ug/L	<2.5	5.0	10/12/15 06:43	
o-Xylene	ug/L	<0.50	1.0	10/12/15 06:43	
p-Isopropyltoluene	ug/L	<0.50	1.0	10/12/15 06:43	
sec-Butylbenzene	ug/L	<2.2	5.0	10/12/15 06:43	
Styrene	ug/L	<0.50	1.0	10/12/15 06:43	
tert-Butylbenzene	ug/L	<0.18	1.0	10/12/15 06:43	
Tetrachloroethene	ug/L	<0.50	1.0	10/12/15 06:43	
Toluene	ug/L	<0.50	1.0	10/12/15 06:43	
trans-1,2-Dichloroethene	ug/L	<0.26	1.0	10/12/15 06:43	
trans-1,3-Dichloropropene	ug/L	<0.23	1.0	10/12/15 06:43	
Trichloroethene	ug/L	<0.33	1.0	10/12/15 06:43	
Trichlorofluoromethane	ug/L	<0.18	1.0	10/12/15 06:43	
Vinyl chloride	ug/L	<0.18	1.0	10/12/15 06:43	
4-Bromofluorobenzene (S)	%	92	70-130	10/12/15 06:43	
Dibromofluoromethane (S)	%	104	70-130	10/12/15 06:43	
Toluene-d8 (S)	%	100	70-130	10/12/15 06:43	

LABORATORY CONTROL SAMPLE: 1236761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	53.0	106	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	47.8	96	70-130	
1,1,2-Trichloroethane	ug/L	50	48.6	97	70-130	
1,1-Dichloroethane	ug/L	50	50.7	101	70-130	
1,1-Dichloroethene	ug/L	50	53.6	107	70-130	
1,2,4-Trichlorobenzene	ug/L	50	44.3	89	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	42.7	85	50-150	
1,2-Dibromoethane (EDB)	ug/L	50	49.1	98	70-130	
1,2-Dichlorobenzene	ug/L	50	46.5	93	70-130	
1,2-Dichloroethane	ug/L	50	50.9	102	70-131	
1,2-Dichloropropane	ug/L	50	49.4	99	70-130	
1,3-Dichlorobenzene	ug/L	50	45.6	91	70-130	
1,4-Dichlorobenzene	ug/L	50	44.6	89	70-130	
Benzene	ug/L	50	51.2	102	70-130	
Bromodichloromethane	ug/L	50	48.4	97	70-130	
Bromoform	ug/L	50	45.6	91	68-130	
Bromomethane	ug/L	50	27.5	55	38-137	
Carbon tetrachloride	ug/L	50	54.7	109	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

LABORATORY CONTROL SAMPLE: 1236761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chlorobenzene	ug/L	50	48.2	96	70-130	
Chloroethane	ug/L	50	51.9	104	70-136	
Chloroform	ug/L	50	51.2	102	70-130	
Chloromethane	ug/L	50	45.8	92	48-144	
cis-1,2-Dichloroethene	ug/L	50	50.5	101	70-130	
cis-1,3-Dichloropropene	ug/L	50	45.4	91	70-130	
Dibromochloromethane	ug/L	50	47.7	95	70-130	
Dichlorodifluoromethane	ug/L	50	45.8	92	33-157	
Ethylbenzene	ug/L	50	50.3	101	70-132	
Isopropylbenzene (Cumene)	ug/L	50	52.4	105	70-130	
m&p-Xylene	ug/L	100	102	102	70-131	
Methyl-tert-butyl ether	ug/L	50	49.0	98	48-141	
Methylene Chloride	ug/L	50	50.5	101	70-130	
o-Xylene	ug/L	50	49.4	99	70-131	
Styrene	ug/L	50	51.5	103	70-130	
Tetrachloroethene	ug/L	50	47.4	95	70-130	
Toluene	ug/L	50	49.8	100	70-130	
trans-1,2-Dichloroethene	ug/L	50	51.6	103	70-130	
trans-1,3-Dichloropropene	ug/L	50	44.1	88	70-130	
Trichloroethene	ug/L	50	50.6	101	70-130	
Trichlorofluoromethane	ug/L	50	53.8	108	50-150	
Vinyl chloride	ug/L	50	48.6	97	65-142	
4-Bromofluorobenzene (S)	%			100	70-130	
Dibromofluoromethane (S)	%			105	70-130	
Toluene-d8 (S)	%			100	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1237024 1237025

Parameter	Units	40122459011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	<0.50	50	50	55.1	53.2	110	106	70-130	4	20	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	50	50	49.3	47.2	99	94	70-130	4	20	
1,1,2-Trichloroethane	ug/L	<0.20	50	50	49.2	47.9	98	96	70-130	3	20	
1,1-Dichloroethane	ug/L	<0.24	50	50	52.5	50.6	105	101	70-134	4	20	
1,1-Dichloroethene	ug/L	<0.41	50	50	55.8	53.8	112	108	70-139	3	20	
1,2,4-Trichlorobenzene	ug/L	<2.2	50	50	48.5	46.4	97	93	70-130	4	20	
1,2-Dibromo-3-chloropropane	ug/L	<2.2	50	50	44.7	43.4	89	87	50-150	3	20	
1,2-Dibromoethane (EDB)	ug/L	<0.18	50	50	51.1	49.7	102	99	70-130	3	20	
1,2-Dichlorobenzene	ug/L	<0.50	50	50	49.6	47.4	99	95	70-130	4	20	
1,2-Dichloroethane	ug/L	<0.17	50	50	52.3	50.2	105	100	70-132	4	20	
1,2-Dichloropropane	ug/L	<0.23	50	50	50.8	49.8	102	100	70-130	2	20	
1,3-Dichlorobenzene	ug/L	<0.50	50	50	47.8	46.2	96	92	70-130	3	20	
1,4-Dichlorobenzene	ug/L	<0.50	50	50	46.7	45.2	93	90	70-130	3	20	
Benzene	ug/L	<0.50	50	50	53.1	51.7	106	103	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1237024 1237025

Parameter	Units	40122459011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Bromodichloromethane	ug/L	<0.50	50	50	50.6	48.3	101	97	70-132	5	20	
Bromoform	ug/L	<0.50	50	50	47.6	45.7	95	91	68-130	4	20	
Bromomethane	ug/L	<2.4	50	50	38.8	41.5	78	83	38-141	7	20	
Carbon tetrachloride	ug/L	<0.50	50	50	56.3	54.9	113	110	70-130	3	20	
Chlorobenzene	ug/L	<0.50	50	50	50.0	48.8	100	98	70-130	3	20	
Chloroethane	ug/L	<0.37	50	50	53.2	51.6	106	103	66-152	3	20	
Chloroform	ug/L	<2.5	50	50	53.2	51.0	106	102	70-130	4	20	
Chloromethane	ug/L	<0.50	50	50	49.9	48.9	100	98	44-151	2	20	
cis-1,2-Dichloroethene	ug/L	<0.26	50	50	52.7	50.5	105	101	70-130	4	20	
cis-1,3-Dichloropropene	ug/L	<0.50	50	50	47.4	45.9	95	92	70-130	3	20	
Dibromochloromethane	ug/L	<0.50	50	50	50.1	48.4	100	97	70-130	4	20	
Dichlorodifluoromethane	ug/L	<0.22	50	50	46.3	45.1	93	90	29-160	3	20	
Ethylbenzene	ug/L	<0.50	50	50	52.1	50.6	104	101	70-132	3	20	
Isopropylbenzene (Cumene)	ug/L	<0.14	50	50	53.1	52.1	106	104	70-130	2	20	
m&p-Xylene	ug/L	<1.0	100	100	105	103	105	103	70-131	2	20	
Methyl-tert-butyl ether	ug/L	<0.17	50	50	51.8	49.1	104	98	48-143	5	20	
Methylene Chloride	ug/L	<0.23	50	50	52.7	50.9	105	102	70-130	3	20	
o-Xylene	ug/L	<0.50	50	50	51.1	49.7	102	99	70-131	3	20	
Styrene	ug/L	<0.50	50	50	53.5	52.0	107	104	70-130	3	20	
Tetrachloroethene	ug/L	<0.50	50	50	49.1	48.2	98	96	70-130	2	20	
Toluene	ug/L	<0.50	50	50	51.0	49.5	102	99	70-130	3	20	
trans-1,2-Dichloroethene	ug/L	<0.26	50	50	54.3	52.2	109	104	70-132	4	20	
trans-1,3-Dichloropropene	ug/L	<0.23	50	50	46.4	45.4	93	91	70-130	2	20	
Trichloroethene	ug/L	<0.33	50	50	52.4	50.9	105	102	70-130	3	20	
Trichlorofluoromethane	ug/L	<0.18	50	50	55.4	54.4	111	109	50-153	2	20	
Vinyl chloride	ug/L	<0.18	50	50	51.4	51.1	103	102	60-155	1	20	
4-Bromofluorobenzene (S)	%						101	101	70-130			
Dibromofluoromethane (S)	%						105	103	70-130			
Toluene-d8 (S)	%						98	100	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

QC Batch: MSV/30565 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40122459001, 40122459002, 40122459003, 40122459004, 40122459005, 40122459006

METHOD BLANK: 1235209 Matrix: Water
Associated Lab Samples: 40122459001, 40122459002, 40122459003, 40122459004, 40122459005, 40122459006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	10/10/15 08:53	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	10/10/15 08:53	
Benzene	ug/L	<0.50	1.0	10/10/15 08:53	
Ethylbenzene	ug/L	<0.50	1.0	10/10/15 08:53	
m&p-Xylene	ug/L	<1.0	2.0	10/10/15 08:53	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	10/10/15 08:53	
Naphthalene	ug/L	<2.5	5.0	10/10/15 08:53	
o-Xylene	ug/L	<0.50	1.0	10/10/15 08:53	
Toluene	ug/L	<0.50	1.0	10/10/15 08:53	
4-Bromofluorobenzene (S)	%	92	70-130	10/10/15 08:53	
Dibromofluoromethane (S)	%	100	70-130	10/10/15 08:53	
Toluene-d8 (S)	%	96	70-130	10/10/15 08:53	

LABORATORY CONTROL SAMPLE: 1235210

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	50.7	101	70-130	
Ethylbenzene	ug/L	50	56.3	113	70-132	
m&p-Xylene	ug/L	100	117	117	70-131	
Methyl-tert-butyl ether	ug/L	50	42.6	85	48-141	
o-Xylene	ug/L	50	57.0	114	70-131	
Toluene	ug/L	50	56.2	112	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Dibromofluoromethane (S)	%			86	70-130	
Toluene-d8 (S)	%			97	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1235343 1235344

Parameter	Units	40122448011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	<0.50	50	50	62.1	61.2	124	122	70-130	1	20	
Ethylbenzene	ug/L	<0.50	50	50	56.9	56.2	114	112	70-132	1	20	
m&p-Xylene	ug/L	<1.0	100	100	116	115	116	115	70-131	1	20	
Methyl-tert-butyl ether	ug/L	<0.17	50	50	52.4	52.0	105	104	48-143	1	20	
o-Xylene	ug/L	<0.50	50	50	57.2	57.3	114	115	70-131	0	20	
Toluene	ug/L	<0.50	50	50	57.4	55.9	115	112	70-130	3	20	
4-Bromofluorobenzene (S)	%						99	100	70-130			
Dibromofluoromethane (S)	%						104	105	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1235343 1235344

Parameter	Units	40122448011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%						97	97	70-130			

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REPORT OF LABORATORY ANALYSIS

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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

QC Batch: MSV/30584 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40122459007, 40122459009, 40122459010, 40122459016, 40122459017, 40122459018, 40122459019, 40122459020, 40122459022

METHOD BLANK: 1236271 Matrix: Water
Associated Lab Samples: 40122459007, 40122459009, 40122459010, 40122459016, 40122459017, 40122459018, 40122459019, 40122459020, 40122459022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	10/10/15 09:11	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	10/10/15 09:11	
Benzene	ug/L	<0.50	1.0	10/10/15 09:11	
Ethylbenzene	ug/L	<0.50	1.0	10/10/15 09:11	
m&p-Xylene	ug/L	<1.0	2.0	10/10/15 09:11	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	10/10/15 09:11	
Naphthalene	ug/L	<2.5	5.0	10/10/15 09:11	
o-Xylene	ug/L	<0.50	1.0	10/10/15 09:11	
Toluene	ug/L	<0.50	1.0	10/10/15 09:11	
4-Bromofluorobenzene (S)	%	103	70-130	10/10/15 09:11	
Dibromofluoromethane (S)	%	107	70-130	10/10/15 09:11	
Toluene-d8 (S)	%	107	70-130	10/10/15 09:11	

LABORATORY CONTROL SAMPLE: 1236272

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	54.4	109	70-130	
Ethylbenzene	ug/L	50	61.5	123	70-132	
m&p-Xylene	ug/L	100	111	111	70-131	
Methyl-tert-butyl ether	ug/L	50	52.7	105	48-141	
o-Xylene	ug/L	50	53.4	107	70-131	
Toluene	ug/L	50	57.8	116	70-130	
4-Bromofluorobenzene (S)	%			114	70-130	
Dibromofluoromethane (S)	%			111	70-130	
Toluene-d8 (S)	%			105	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1236295 1236296

Parameter	Units	40122508003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	<1.0	50	50	48.6	53.5	97	107	70-130	10	20	
Ethylbenzene	ug/L	<1.0	50	50	52.6	57.2	105	114	70-132	8	20	
m&p-Xylene	ug/L	<2.0	100	100	95.9	106	96	106	70-131	10	20	
Methyl-tert-butyl ether	ug/L	<1.0	50	50	46.7	49.6	93	99	48-143	6	20	
o-Xylene	ug/L	<1.0	50	50	47.1	50.8	94	102	70-131	8	20	
Toluene	ug/L	<1.0	50	50	51.6	56.7	103	113	70-130	9	20	
4-Bromofluorobenzene (S)	%						113	115	70-130			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1236295 1236296

Parameter	Units	40122508003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dibromofluoromethane (S)	%						114	112	70-130			
Toluene-d8 (S)	%						103	103	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

QC Batch: MSV/30590
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40122459008, 40122459021

METHOD BLANK: 1237062 Matrix: Water
Associated Lab Samples: 40122459008, 40122459021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	10/13/15 17:24	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	10/13/15 17:24	
Benzene	ug/L	<0.50	1.0	10/13/15 17:24	
Ethylbenzene	ug/L	<0.50	1.0	10/13/15 17:24	
m&p-Xylene	ug/L	<1.0	2.0	10/13/15 17:24	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	10/13/15 17:24	
Naphthalene	ug/L	<2.5	5.0	10/13/15 17:24	
o-Xylene	ug/L	<0.50	1.0	10/13/15 17:24	
Toluene	ug/L	<0.50	1.0	10/13/15 17:24	
4-Bromofluorobenzene (S)	%	97	70-130	10/13/15 17:24	
Dibromofluoromethane (S)	%	106	70-130	10/13/15 17:24	
Toluene-d8 (S)	%	96	70-130	10/13/15 17:24	

LABORATORY CONTROL SAMPLE: 1237063

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	49.1	98	70-130	
Ethylbenzene	ug/L	50	53.0	106	70-132	
m&p-Xylene	ug/L	100	106	106	70-131	
Methyl-tert-butyl ether	ug/L	50	46.1	92	48-141	
o-Xylene	ug/L	50	50.3	101	70-131	
Toluene	ug/L	50	50.3	101	70-130	
4-Bromofluorobenzene (S)	%			102	70-130	
Dibromofluoromethane (S)	%			106	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1238144 1238145

Parameter	Units	40122508006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	<1.0	50	50	49.9	49.0	100	98	70-130	2	20	
Ethylbenzene	ug/L	<1.0	50	50	54.8	53.4	109	106	70-132	3	20	
m&p-Xylene	ug/L	<2.0	100	100	108	104	107	104	70-131	3	20	
Methyl-tert-butyl ether	ug/L	<1.0	50	50	49.0	47.0	98	94	48-143	4	20	
o-Xylene	ug/L	<1.0	50	50	52.9	50.7	106	101	70-131	4	20	
Toluene	ug/L	<1.0	50	50	51.9	50.8	104	101	70-130	2	20	
4-Bromofluorobenzene (S)	%						103	100	70-130			
Dibromofluoromethane (S)	%						109	107	70-130			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1238144 1238145

Parameter	Units	40122508006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%						99	97	70-130			

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 34265.003 CALUMET-SUPERIOR
Pace Project No.: 40122459

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40122459011	**MW-1/T68**	EPA 8260	MSV/30585		
40122459012	**MW-2/T68**	EPA 8260	MSV/30585		
40122459013	**MW-4/T68**	EPA 8260	MSV/30585		
40122459014	**MW-5/T66**	EPA 8260	MSV/30585		
40122459015	**MW-6/T68**	EPA 8260	MSV/30585		
40122459001	**MW-1/CW**	EPA 8260	MSV/30565		
40122459002	**MW-2/CW**	EPA 8260	MSV/30565		
40122459003	**MW-3/CW**	EPA 8260	MSV/30565		
40122459004	**MW-4/CW**	EPA 8260	MSV/30565		
40122459005	**MW-1/T40**	EPA 8260	MSV/30565		
40122459006	**MW-4/T40**	EPA 8260	MSV/30565		
40122459007	**MW-5/T40**	EPA 8260	MSV/30584		
40122459008	**MW-6/T40**	EPA 8260	MSV/30590		
40122459009	**MW-7/T40**	EPA 8260	MSV/30584		
40122459010	**TS-1/T40**	EPA 8260	MSV/30584		
40122459016	**MW-1R/T70**	EPA 8260	MSV/30584		
40122459017	**MW-2R/T70**	EPA 8260	MSV/30584		
40122459018	**MW-3/T70**	EPA 8260	MSV/30584		
40122459019	**MW-4/T70**	EPA 8260	MSV/30584		
40122459020	**MW-5/T70**	EPA 8260	MSV/30584		
40122459021	**MW-6/T70**	EPA 8260	MSV/30590		
40122459022	**TRIP BLANK**	EPA 8260	MSV/30584		

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40122459

mm.

(Please Print Clearly)	
Company Name:	Gunnett Fleming
Branch/Location:	Madison, WI
Project Contact:	Cliff Wright
Phone:	608-836-1500
Project Number:	34265.003
Project Name:	Calumet-Superior
Project State:	WI
Sampled By (Print):	Marcus Mussey
Sampled By (Sign):	
PO #:	Regulatory Program:

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, B = Biota, C = Charcoal, O = Oil, S = Soil, SI = Sludge, W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: PVOC Naph 8260	PVOC 8260	VOC 8260	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW-1/CW	10/6	12:00	GW	N	B	3				3-40mlVB	
002	MW2/CW		12:02		N	B	3					
003	MW-3/CW		12:10		N	B	3					
004	MW-4/CW		12:05		N	B	3					
005	MW-1/T40		8:00					3				
006	MW-4/T40		8:25					3				
007	MW-5/T40		8:10					3				
008	MW-6/T40		8:15					3				
009	MW-7/T40		8:20					3				
010	~~M~~TS-1/T40		8:22					3				
011	MW-1/T68		8:40					~~3~~	3			
012	MW-2/T68		9:00						3			
013	MW-4/T68		8:55						3			

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):
Email #1:
Email #2:
Telephone:
Fax:

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Marcus Mussey	10/7/15, 8:30		
Relinquished By:	Date/Time:	Received By:	Date/Time:
Redge	10/8/15 1040	Cathy Pt/Pace	10/8/15 1040
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

PACE Project No. 40122459
Receipt Temp = ROI °C
Sample Receipt pH OK / Adjusted
Cooler Custody Seal Present / Not Present Intact / Not Intact

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Pace Analytical®
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CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	
Branch/Location:	
Project Contact:	See page
Phone:	
Project Number:	
Project Name:	
Project State:	ONE
Sampled By (Print):	
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, W = Water
B = Biota, DW = Drinking Water
C = Charcoal, GW = Ground Water
O = Oil, SW = Surface Water
S = Soil, WW = Waste Water
SI = Sludge, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: PVOC NAPH 8260	Analyses Requested: VOC 8260	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
014	MW-5/T66	10/6	8:45	GW	N	B		3		3-40mlVB	
015	MW-6/T68		9:05		N	B		3			
016	MW-1R/T70		9:40				3				
017	MW-2R/T70		9:15				3				
018	MW-3/T70		9:30				3				
019	MW-4/T70		9:35				3				
020	MW-5/T70		9:20				3				
021	MW6/T70		9:25				3				
022	TripBlankZ									2-40mlVB	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Marcus Mosy	10-7-15/8:30		
FedEx	10/8/15 1040	Cooly RT/PACE	10/8/15 1040

PACE Project No. 40122459

Receipt Temp = ROI °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal Present / Not Present Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #: WO#: 40122459

Client Name: Gannett Fleming

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: _____

Tracking #: 808913861809

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used N/A **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: /Corr: 0.7 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☒ no

Person examining contents:
Date: 10/8/15
Initials: CR

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

				Comments:
Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
-Pace IR Containers Used:	☐Yes	☑No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC:	☑Yes	☐No	☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W				
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes	☐No	☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes	☐No	☑N/A	
exceptions: (VOA) coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes	☐No		Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes	☑No	☐N/A	14.
Trip Blank Present:	☑Yes	☐No	☐N/A	15.
Trip Blank Custody Seals Present (10/8/15)	☑Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if purchased): 093015-3XC				

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: MH for CM **Date:** 10/8/15

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

June 02, 2016

Project #34265.003
Calumet Superior
Reviewed by CCW
6/6/16

Clifford Wright
Gannett Fleming
8025 Excelsior Drive
Madison, WI 53717

RE: Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Dear Clifford Wright:
Enclosed are the analytical results for sample(s) received by the laboratory on May 25, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
Project Manager

Enclosures

cc: Dave Olig, Gannett Fleming

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
Virginia VELAP ID: 460263
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
US Dept of Agriculture #: S-76505
Virginia VELAP ID: 460263
Virginia VELAP Certification ID: 460263
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40132890001	LRS-1	Water	05/24/16 11:30	05/25/16 12:45
40132890002	LRS-2	Water	05/24/16 11:40	05/25/16 12:45
40132890003	LRS-3	Water	05/24/16 11:50	05/25/16 12:45
40132890004	LRS-4	Water	05/24/16 11:55	05/25/16 12:45
40132890005	LRS-6	Water	05/24/16 11:45	05/25/16 12:45
40132890006	LRS-7	Water	05/24/16 12:05	05/25/16 12:45
40132890007	MW-1/FL	Water	05/24/16 10:30	05/25/16 12:45
40132890008	MW-2/FL	Water	05/24/16 10:20	05/25/16 12:45
40132890009	MW-3/FL	Water	05/24/16 10:05	05/25/16 12:45
40132890010	MW-9/FL	Water	05/24/16 12:15	05/25/16 12:45
40132890011	MW-10/FL	Water	05/24/16 12:20	05/25/16 12:45
40132890012	MW-11/FL	Water	05/24/16 10:45	05/25/16 12:45
40132890013	MW-13/FL	Water	05/24/16 11:25	05/25/16 12:45
40132890014	MW-14/FL	Water	05/24/16 11:10	05/25/16 12:45
40132890015	MW-1/CW	Water	05/24/16 09:05	05/25/16 12:45
40132890016	MW-2/CW	Water	05/24/16 09:00	05/25/16 12:45
40132890017	MW-3/CW	Water	05/24/16 09:10	05/25/16 12:45
40132890018	MW-4/CW	Water	05/24/16 08:50	05/25/16 12:45
40132890019	MW-1/T40	Water	05/24/16 13:30	05/25/16 12:45
40132890020	MW-2/T40	Water	05/24/16 13:05	05/25/16 12:45
40132890021	MW-4/T40	Water	05/24/16 13:25	05/25/16 12:45
40132890022	MW-5/T40	Water	05/24/16 13:10	05/25/16 12:45
40132890023	MW-6/T40	Water	05/24/16 13:15	05/25/16 12:45
40132890024	MW-7/T40	Water	05/24/16 13:20	05/25/16 12:45
40132890025	TS-1/T40	Water	05/24/16 13:35	05/25/16 12:45
40132890026	MW-1/T68	Water	05/24/16 14:00	05/25/16 12:45
40132890027	MW-2/T68	Water	05/24/16 14:15	05/25/16 12:45
40132890028	MW-4/T68	Water	05/24/16 14:10	05/25/16 12:45
40132890029	MW-5/T66	Water	05/24/16 14:20	05/25/16 12:45
40132890030	MW-1R/T70	Water	05/24/16 15:15	05/25/16 12:45
40132890031	MW-2R/T70	Water	05/24/16 14:50	05/25/16 12:45
40132890032	MW-3/T70	Water	05/24/16 14:25	05/25/16 12:45
40132890033	MW-4/T70	Water	05/24/16 14:20	05/25/16 12:45
40132890034	MW-5/T70	Water	05/24/16 14:55	05/25/16 12:45
40132890035	MW-6/T70	Water	05/24/16 15:00	05/25/16 12:45
40132890036	TRIP BLANK	Water	05/24/16 00:00	05/25/16 12:45

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40132890001	LRS-1	EPA 8021	PMS	9	PASI-G
40132890002	LRS-2	EPA 8021	PMS	9	PASI-G
40132890003	LRS-3	EPA 8021	PMS	9	PASI-G
40132890004	LRS-4	EPA 8021	PMS	9	PASI-G
40132890005	LRS-6	EPA 8021	PMS	9	PASI-G
40132890006	LRS-7	EPA 8021	PMS	9	PASI-G
40132890007	MW-1/FL	EPA 8021	PMS	9	PASI-G
40132890008	MW-2/FL	EPA 8021	PMS	9	PASI-G
40132890009	MW-3/FL	EPA 8021	PMS	9	PASI-G
40132890010	MW-9/FL	EPA 8021	PMS	9	PASI-G
40132890011	MW-10/FL	EPA 8021	PMS	9	PASI-G
40132890012	MW-11/FL	EPA 8021	PMS	9	PASI-G
40132890013	MW-13/FL	EPA 8021	PMS	9	PASI-G
40132890014	MW-14/FL	EPA 8021	PMS	9	PASI-G
40132890015	MW-1/CW	EPA 8260	LAP	12	PASI-G
40132890016	MW-2/CW	EPA 8260	LAP	12	PASI-G
40132890017	MW-3/CW	EPA 8260	LAP	12	PASI-G
40132890018	MW-4/CW	EPA 8260	HNW	12	PASI-G
40132890019	MW-1/T40	EPA 8260	HNW	11	PASI-G
40132890020	MW-2/T40	EPA 8260	HNW	11	PASI-G
40132890021	MW-4/T40	EPA 8260	HNW	11	PASI-G
40132890022	MW-5/T40	EPA 8260	HNW	11	PASI-G
40132890023	MW-6/T40	EPA 8260	HNW	11	PASI-G
40132890024	MW-7/T40	EPA 8260	HNW	11	PASI-G
40132890025	TS-1/T40	EPA 8260	HNW	11	PASI-G
40132890026	MW-1/T68	EPA 8260	LAP	63	PASI-G
40132890027	MW-2/T68	EPA 8260	LAP	63	PASI-G
40132890028	MW-4/T68	EPA 8260	LAP	63	PASI-G
40132890029	MW-5/T66	EPA 8260	LAP	63	PASI-G
40132890030	MW-1R/T70	EPA 8260	HNW	12	PASI-G
40132890031	MW-2R/T70	EPA 8260	HNW	12	PASI-G
40132890032	MW-3/T70	EPA 8260	HNW	12	PASI-G
40132890033	MW-4/T70	EPA 8260	HNW	12	PASI-G
40132890034	MW-5/T70	EPA 8260	HNW	12	PASI-G
40132890035	MW-6/T70	EPA 8260	HNW	12	PASI-G
40132890036	TRIP BLANK	EPA 8260	LAP	63	PASI-G

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40132890014	**MW-14/FL**					
EPA 8021	o-Xylene	308	ug/L	10.0	05/27/16 18:05	
40132890016	**MW-2/CW**					
EPA 8260	1,2,4-Trimethylbenzene	397	ug/L	40.0	05/27/16 01:50	
EPA 8260	1,3,5-Trimethylbenzene	70.4	ug/L	40.0	05/27/16 01:50	
EPA 8260	Benzene	6360	ug/L	40.0	05/27/16 01:50	
EPA 8260	Ethylbenzene	451	ug/L	40.0	05/27/16 01:50	
EPA 8260	Toluene	140	ug/L	40.0	05/27/16 01:50	
EPA 8260	m&p-Xylene	1380	ug/L	80.0	05/27/16 01:50	
EPA 8260	o-Xylene	183	ug/L	40.0	05/27/16 01:50	
40132890017	**MW-3/CW**					
EPA 8260	1,2,4-Trimethylbenzene	653	ug/L	100	05/27/16 02:13	
EPA 8260	1,3,5-Trimethylbenzene	193	ug/L	100	05/27/16 02:13	
EPA 8260	Benzene	9630	ug/L	100	05/27/16 02:13	
EPA 8260	Ethylbenzene	1170	ug/L	100	05/27/16 02:13	
EPA 8260	Toluene	172	ug/L	100	05/27/16 02:13	
EPA 8260	m&p-Xylene	3690	ug/L	200	05/27/16 02:13	
EPA 8260	o-Xylene	85.7J	ug/L	100	05/27/16 02:13	
40132890018	**MW-4/CW**					
EPA 8260	1,2,4-Trimethylbenzene	1120	ug/L	50.0	05/31/16 09:04	
EPA 8260	1,3,5-Trimethylbenzene	291	ug/L	50.0	05/31/16 09:04	
EPA 8260	Benzene	8200	ug/L	50.0	05/31/16 09:04	
EPA 8260	Ethylbenzene	804	ug/L	50.0	05/31/16 09:04	
EPA 8260	Naphthalene	132J	ug/L	250	05/31/16 09:04	
EPA 8260	Toluene	223	ug/L	50.0	05/31/16 09:04	
EPA 8260	m&p-Xylene	3020	ug/L	100	05/31/16 09:04	
EPA 8260	o-Xylene	495	ug/L	50.0	05/31/16 09:04	
40132890019	**MW-1/T40**					
EPA 8260	1,2,4-Trimethylbenzene	922	ug/L	20.0	05/31/16 09:25	
EPA 8260	1,3,5-Trimethylbenzene	267	ug/L	20.0	05/31/16 09:25	
EPA 8260	Benzene	2520	ug/L	20.0	05/31/16 09:25	
EPA 8260	Ethylbenzene	1030	ug/L	20.0	05/31/16 09:25	
EPA 8260	m&p-Xylene	5620	ug/L	40.0	05/31/16 09:25	
EPA 8260	o-Xylene	124	ug/L	20.0	05/31/16 09:25	
40132890020	**MW-2/T40**					
EPA 8260	1,2,4-Trimethylbenzene	1080	ug/L	100	06/01/16 10:30	
EPA 8260	1,3,5-Trimethylbenzene	294	ug/L	100	06/01/16 10:30	
EPA 8260	Benzene	15300	ug/L	100	06/01/16 10:30	
EPA 8260	Ethylbenzene	1740	ug/L	100	06/01/16 10:30	
EPA 8260	Toluene	7970	ug/L	100	06/01/16 10:30	
EPA 8260	m&p-Xylene	6100	ug/L	200	06/01/16 10:30	
EPA 8260	o-Xylene	2670	ug/L	100	06/01/16 10:30	
40132890021	**MW-4/T40**					
EPA 8260	1,2,4-Trimethylbenzene	1250	ug/L	100	05/31/16 10:08	
EPA 8260	1,3,5-Trimethylbenzene	300	ug/L	100	05/31/16 10:08	

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Method: **EPA 8021**
Description: 8021 GCV Short List
Client: Gannett Fleming Inc.
Date: June 02, 2016

General Information:
14 samples were analyzed for EPA 8021. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Method: **EPA 8260**
Description: 8260 MSV
Client: Gannett Fleming Inc.
Date: June 02, 2016

General Information:
5 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Method: **EPA 8260**
Description: 8260 MSV UST
Client: Gannett Fleming Inc.
Date: June 02, 2016

General Information:
17 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MSV/33720

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40132890022

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1343305)
  - Ethylbenzene
  - m&p-Xylene
- MSD (Lab ID: 1343306)
  - Ethylbenzene

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: MW-1/CW **Lab ID: 40132890015** Collected: 05/24/16 09:05 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	95-63-6	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	108-67-8	
Benzene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	71-43-2	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	100-41-4	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		05/27/16 01:06	1634-04-4	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		05/27/16 01:06	91-20-3	
Toluene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	108-88-3	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		05/27/16 01:06	179601-23-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		05/27/16 01:06	95-47-6	
Surrogates									
Dibromofluoromethane (S)	121	%	70-130		1		05/27/16 01:06	1868-53-7	
Toluene-d8 (S)	88	%	70-130		1		05/27/16 01:06	2037-26-5	
4-Bromofluorobenzene (S)	90	%	70-130		1		05/27/16 01:06	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: MW-2/CW **Lab ID: 40132890016** Collected: 05/24/16 09:00 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**397**	ug/L	40.0	20.0	40		05/27/16 01:50	95-63-6	
1,3,5-Trimethylbenzene	**70.4**	ug/L	40.0	20.0	40		05/27/16 01:50	108-67-8	
Benzene	**6360**	ug/L	40.0	20.0	40		05/27/16 01:50	71-43-2	
Ethylbenzene	**451**	ug/L	40.0	20.0	40		05/27/16 01:50	100-41-4	
Methyl-tert-butyl ether	**<7.0**	ug/L	40.0	7.0	40		05/27/16 01:50	1634-04-4	
Naphthalene	**<100**	ug/L	200	100	40		05/27/16 01:50	91-20-3	
Toluene	**140**	ug/L	40.0	20.0	40		05/27/16 01:50	108-88-3	
m&p-Xylene	**1380**	ug/L	80.0	40.0	40		05/27/16 01:50	179601-23-1	
o-Xylene	**183**	ug/L	40.0	20.0	40		05/27/16 01:50	95-47-6	
Surrogates									
Dibromofluoromethane (S)	122	%	70-130		40		05/27/16 01:50	1868-53-7	
Toluene-d8 (S)	85	%	70-130		40		05/27/16 01:50	2037-26-5	
4-Bromofluorobenzene (S)	97	%	70-130		40		05/27/16 01:50	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: MW-3/CW **Lab ID: 40132890017** Collected: 05/24/16 09:10 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**653**	ug/L	100	50.0	100		05/27/16 02:13	95-63-6	
1,3,5-Trimethylbenzene	**193**	ug/L	100	50.0	100		05/27/16 02:13	108-67-8	
Benzene	**9630**	ug/L	100	50.0	100		05/27/16 02:13	71-43-2	
Ethylbenzene	**1170**	ug/L	100	50.0	100		05/27/16 02:13	100-41-4	
Methyl-tert-butyl ether	**<17.4**	ug/L	100	17.4	100		05/27/16 02:13	1634-04-4	
Naphthalene	**<250**	ug/L	500	250	100		05/27/16 02:13	91-20-3	
Toluene	**172**	ug/L	100	50.0	100		05/27/16 02:13	108-88-3	
m&p-Xylene	**3690**	ug/L	200	100	100		05/27/16 02:13	179601-23-1	
o-Xylene	**85.7J**	ug/L	100	50.0	100		05/27/16 02:13	95-47-6	
Surrogates									
Dibromofluoromethane (S)	122	%	70-130		100		05/27/16 02:13	1868-53-7	
Toluene-d8 (S)	86	%	70-130		100		05/27/16 02:13	2037-26-5	
4-Bromofluorobenzene (S)	95	%	70-130		100		05/27/16 02:13	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: MW-4/CW **Lab ID: 40132890018** Collected: 05/24/16 08:50 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**1120**	ug/L	50.0	25.0	50		05/31/16 09:04	95-63-6	
1,3,5-Trimethylbenzene	**291**	ug/L	50.0	25.0	50		05/31/16 09:04	108-67-8	
Benzene	**8200**	ug/L	50.0	25.0	50		05/31/16 09:04	71-43-2	
Ethylbenzene	**804**	ug/L	50.0	25.0	50		05/31/16 09:04	100-41-4	
Methyl-tert-butyl ether	**<8.7**	ug/L	50.0	8.7	50		05/31/16 09:04	1634-04-4	
Naphthalene	**132J**	ug/L	250	125	50		05/31/16 09:04	91-20-3	
Toluene	**223**	ug/L	50.0	25.0	50		05/31/16 09:04	108-88-3	
m&p-Xylene	**3020**	ug/L	100	50.0	50		05/31/16 09:04	179601-23-1	
o-Xylene	**495**	ug/L	50.0	25.0	50		05/31/16 09:04	95-47-6	
Surrogates									
Dibromofluoromethane (S)	108	%	70-130		50		05/31/16 09:04	1868-53-7	
Toluene-d8 (S)	97	%	70-130		50		05/31/16 09:04	2037-26-5	
4-Bromofluorobenzene (S)	76	%	70-130		50		05/31/16 09:04	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: TRIP BLANK **Lab ID: 40132890036** Collected: 05/24/16 00:00 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260								
1,1,1,2-Tetrachloroethane	**<0.18**	ug/L	1.0	0.18	1		06/01/16 11:41	630-20-6	
1,1,1-Trichloroethane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	71-55-6	
1,1,2,2-Tetrachloroethane	**<0.25**	ug/L	1.0	0.25	1		06/01/16 11:41	79-34-5	
1,1,2-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		06/01/16 11:41	79-00-5	
1,1-Dichloroethane	**<0.24**	ug/L	1.0	0.24	1		06/01/16 11:41	75-34-3	
1,1-Dichloroethene	**<0.41**	ug/L	1.0	0.41	1		06/01/16 11:41	75-35-4	
1,1-Dichloropropene	**<0.44**	ug/L	1.0	0.44	1		06/01/16 11:41	563-58-6	
1,2,3-Trichlorobenzene	**<2.1**	ug/L	5.0	2.1	1		06/01/16 11:41	87-61-6	
1,2,3-Trichloropropane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	96-18-4	
1,2,4-Trichlorobenzene	**<2.2**	ug/L	5.0	2.2	1		06/01/16 11:41	120-82-1	
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	95-63-6	
1,2-Dibromo-3-chloropropane	**<2.2**	ug/L	5.0	2.2	1		06/01/16 11:41	96-12-8	
1,2-Dibromoethane (EDB)	**<0.18**	ug/L	1.0	0.18	1		06/01/16 11:41	106-93-4	
1,2-Dichlorobenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	95-50-1	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/01/16 11:41	107-06-2	
1,2-Dichloropropane	**<0.23**	ug/L	1.0	0.23	1		06/01/16 11:41	78-87-5	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	108-67-8	
1,3-Dichlorobenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	541-73-1	
1,3-Dichloropropane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	142-28-9	
1,4-Dichlorobenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	106-46-7	
2,2-Dichloropropane	**<0.48**	ug/L	1.0	0.48	1		06/01/16 11:41	594-20-7	
2-Chlorotoluene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	95-49-8	
4-Chlorotoluene	**<0.21**	ug/L	1.0	0.21	1		06/01/16 11:41	106-43-4	
Benzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	71-43-2	
Bromobenzene	**<0.23**	ug/L	1.0	0.23	1		06/01/16 11:41	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		06/01/16 11:41	74-97-5	
Bromodichloromethane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	75-27-4	
Bromoform	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	75-25-2	
Bromomethane	**<2.4**	ug/L	5.0	2.4	1		06/01/16 11:41	74-83-9	
Carbon tetrachloride	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	56-23-5	
Chlorobenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	108-90-7	
Chloroethane	**<0.37**	ug/L	1.0	0.37	1		06/01/16 11:41	75-00-3	
Chloroform	**<2.5**	ug/L	5.0	2.5	1		06/01/16 11:41	67-66-3	
Chloromethane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	74-87-3	
Dibromochloromethane	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	124-48-1	
Dibromomethane	**<0.43**	ug/L	1.0	0.43	1		06/01/16 11:41	74-95-3	
Dichlorodifluoromethane	**<0.22**	ug/L	1.0	0.22	1		06/01/16 11:41	75-71-8	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	100-41-4	
Hexachloro-1,3-butadiene	**<2.1**	ug/L	5.0	2.1	1		06/01/16 11:41	87-68-3	
Isopropylbenzene (Cumene)	**<0.14**	ug/L	1.0	0.14	1		06/01/16 11:41	98-82-8	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		06/01/16 11:41	1634-04-4	
Methylene Chloride	**<0.23**	ug/L	1.0	0.23	1		06/01/16 11:41	75-09-2	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		06/01/16 11:41	91-20-3	
Styrene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	100-42-5	
Tetrachloroethene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	127-18-4	
Toluene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	108-88-3	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Sample: TRIP BLANK **Lab ID: 40132890036** Collected: 05/24/16 00:00 Received: 05/25/16 12:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260								
Trichloroethene	**<0.33**	ug/L	1.0	0.33	1		06/01/16 11:41	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		06/01/16 11:41	75-69-4	
Vinyl chloride	**<0.18**	ug/L	1.0	0.18	1		06/01/16 11:41	75-01-4	
cis-1,2-Dichloroethene	**<0.26**	ug/L	1.0	0.26	1		06/01/16 11:41	156-59-2	
cis-1,3-Dichloropropene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	10061-01-5	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		06/01/16 11:41	179601-23-1	
n-Butylbenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	104-51-8	
n-Propylbenzene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	103-65-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	95-47-6	
p-Isopropyltoluene	**<0.50**	ug/L	1.0	0.50	1		06/01/16 11:41	99-87-6	
sec-Butylbenzene	**<2.2**	ug/L	5.0	2.2	1		06/01/16 11:41	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/01/16 11:41	98-06-6	
trans-1,2-Dichloroethene	**<0.26**	ug/L	1.0	0.26	1		06/01/16 11:41	156-60-5	
trans-1,3-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/01/16 11:41	10061-02-6	
Surrogates									
4-Bromofluorobenzene (S)	97	%	70-130		1		06/01/16 11:41	460-00-4	
Dibromofluoromethane (S)	100	%	70-130		1		06/01/16 11:41	1868-53-7	
Toluene-d8 (S)	108	%	70-130		1		06/01/16 11:41	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

QC Batch: GCV/16083 Analysis Method: EPA 8021
QC Batch Method: EPA 8021 Analysis Description: 8021 GCV BTEX
Associated Lab Samples: 40132890001, 40132890002, 40132890003, 40132890004, 40132890005, 40132890006, 40132890007, 40132890008, 40132890009, 40132890010, 40132890011, 40132890012, 40132890013, 40132890014

METHOD BLANK: 1342348 Matrix: Water
Associated Lab Samples: 40132890001, 40132890002, 40132890003, 40132890004, 40132890005, 40132890006, 40132890007, 40132890008, 40132890009, 40132890010, 40132890011, 40132890012, 40132890013, 40132890014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.42	1.0	05/27/16 08:07	
1,3,5-Trimethylbenzene	ug/L	<0.42	1.0	05/27/16 08:07	
Benzene	ug/L	<0.40	1.0	05/27/16 08:07	
Ethylbenzene	ug/L	<0.39	1.0	05/27/16 08:07	
m&p-Xylene	ug/L	<0.80	2.0	05/27/16 08:07	
Methyl-tert-butyl ether	ug/L	<0.48	1.0	05/27/16 08:07	
o-Xylene	ug/L	<0.45	1.0	05/27/16 08:07	
Toluene	ug/L	<0.39	1.0	05/27/16 08:07	
a,a,a-Trifluorotoluene (S)	%	103	80-120	05/27/16 08:07	

LABORATORY CONTROL SAMPLE & LCSD: 1342349 1342350

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.8	21.0	109	105	80-120	4	20	
1,3,5-Trimethylbenzene	ug/L	20	21.1	20.4	106	102	80-120	4	20	
Benzene	ug/L	20	21.4	21.2	107	106	80-120	1	20	
Ethylbenzene	ug/L	20	20.9	20.4	105	102	80-120	3	20	
m&p-Xylene	ug/L	40	41.9	40.6	105	102	80-120	3	20	
Methyl-tert-butyl ether	ug/L	20	21.8	21.0	109	105	80-120	4	20	
o-Xylene	ug/L	20	21.5	20.8	108	104	80-120	3	20	
Toluene	ug/L	20	21.2	20.7	106	104	80-120	2	20	
a,a,a-Trifluorotoluene (S)	%				102	101	80-120			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

QC Batch: MSV/33712 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 40132890026, 40132890027, 40132890028, 40132890029, 40132890036

METHOD BLANK: 1342374 Matrix: Water
Associated Lab Samples: 40132890026, 40132890027, 40132890028, 40132890029, 40132890036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.18	1.0	06/01/16 06:47	
1,1,1-Trichloroethane	ug/L	<0.50	1.0	06/01/16 06:47	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	1.0	06/01/16 06:47	
1,1,2-Trichloroethane	ug/L	<0.20	1.0	06/01/16 06:47	
1,1-Dichloroethane	ug/L	<0.24	1.0	06/01/16 06:47	
1,1-Dichloroethene	ug/L	<0.41	1.0	06/01/16 06:47	
1,1-Dichloropropene	ug/L	<0.44	1.0	06/01/16 06:47	
1,2,3-Trichlorobenzene	ug/L	<2.1	5.0	06/01/16 06:47	
1,2,3-Trichloropropane	ug/L	<0.50	1.0	06/01/16 06:47	
1,2,4-Trichlorobenzene	ug/L	<2.2	5.0	06/01/16 06:47	
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	06/01/16 06:47	
1,2-Dibromo-3-chloropropane	ug/L	<2.2	5.0	06/01/16 06:47	
1,2-Dibromoethane (EDB)	ug/L	<0.18	1.0	06/01/16 06:47	
1,2-Dichlorobenzene	ug/L	<0.50	1.0	06/01/16 06:47	
1,2-Dichloroethane	ug/L	<0.17	1.0	06/01/16 06:47	
1,2-Dichloropropane	ug/L	<0.23	1.0	06/01/16 06:47	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	06/01/16 06:47	
1,3-Dichlorobenzene	ug/L	<0.50	1.0	06/01/16 06:47	
1,3-Dichloropropane	ug/L	<0.50	1.0	06/01/16 06:47	
1,4-Dichlorobenzene	ug/L	<0.50	1.0	06/01/16 06:47	
2,2-Dichloropropane	ug/L	<0.48	1.0	06/01/16 06:47	
2-Chlorotoluene	ug/L	<0.50	1.0	06/01/16 06:47	
4-Chlorotoluene	ug/L	<0.21	1.0	06/01/16 06:47	
Benzene	ug/L	<0.50	1.0	06/01/16 06:47	
Bromobenzene	ug/L	<0.23	1.0	06/01/16 06:47	
Bromochloromethane	ug/L	<0.34	1.0	06/01/16 06:47	
Bromodichloromethane	ug/L	<0.50	1.0	06/01/16 06:47	
Bromoform	ug/L	<0.50	1.0	06/01/16 06:47	
Bromomethane	ug/L	<2.4	5.0	06/01/16 06:47	
Carbon tetrachloride	ug/L	<0.50	1.0	06/01/16 06:47	
Chlorobenzene	ug/L	<0.50	1.0	06/01/16 06:47	
Chloroethane	ug/L	<0.37	1.0	06/01/16 06:47	
Chloroform	ug/L	<2.5	5.0	06/01/16 06:47	
Chloromethane	ug/L	<0.50	1.0	06/01/16 06:47	
cis-1,2-Dichloroethene	ug/L	<0.26	1.0	06/01/16 06:47	
cis-1,3-Dichloropropene	ug/L	<0.50	1.0	06/01/16 06:47	
Dibromochloromethane	ug/L	<0.50	1.0	06/01/16 06:47	
Dibromomethane	ug/L	<0.43	1.0	06/01/16 06:47	
Dichlorodifluoromethane	ug/L	<0.22	1.0	06/01/16 06:47	
Ethylbenzene	ug/L	<0.50	1.0	06/01/16 06:47	
Hexachloro-1,3-butadiene	ug/L	<2.1	5.0	06/01/16 06:47	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

METHOD BLANK: 1342374 Matrix: Water
Associated Lab Samples: 40132890026, 40132890027, 40132890028, 40132890029, 40132890036

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Isopropylbenzene (Cumene)	ug/L	<0.14	1.0	06/01/16 06:47	
m&p-Xylene	ug/L	<1.0	2.0	06/01/16 06:47	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	06/01/16 06:47	
Methylene Chloride	ug/L	<0.23	1.0	06/01/16 06:47	
n-Butylbenzene	ug/L	<0.50	1.0	06/01/16 06:47	
n-Propylbenzene	ug/L	<0.50	1.0	06/01/16 06:47	
Naphthalene	ug/L	<2.5	5.0	06/01/16 06:47	
o-Xylene	ug/L	<0.50	1.0	06/01/16 06:47	
p-Isopropyltoluene	ug/L	<0.50	1.0	06/01/16 06:47	
sec-Butylbenzene	ug/L	<2.2	5.0	06/01/16 06:47	
Styrene	ug/L	<0.50	1.0	06/01/16 06:47	
tert-Butylbenzene	ug/L	<0.18	1.0	06/01/16 06:47	
Tetrachloroethene	ug/L	<0.50	1.0	06/01/16 06:47	
Toluene	ug/L	<0.50	1.0	06/01/16 06:47	
trans-1,2-Dichloroethene	ug/L	<0.26	1.0	06/01/16 06:47	
trans-1,3-Dichloropropene	ug/L	<0.23	1.0	06/01/16 06:47	
Trichloroethene	ug/L	<0.33	1.0	06/01/16 06:47	
Trichlorofluoromethane	ug/L	<0.18	1.0	06/01/16 06:47	
Vinyl chloride	ug/L	<0.18	1.0	06/01/16 06:47	
4-Bromofluorobenzene (S)	%	92	70-130	06/01/16 06:47	
Dibromofluoromethane (S)	%	98	70-130	06/01/16 06:47	
Toluene-d8 (S)	%	102	70-130	06/01/16 06:47	

LABORATORY CONTROL SAMPLE: 1342375

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	49.8	100	70-131	
1,1,2,2-Tetrachloroethane	ug/L	50	50.2	100	67-130	
1,1,2-Trichloroethane	ug/L	50	52.5	105	70-130	
1,1-Dichloroethane	ug/L	50	48.6	97	70-133	
1,1-Dichloroethene	ug/L	50	47.8	96	70-130	
1,2,4-Trichlorobenzene	ug/L	50	42.7	85	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	48.4	97	50-150	
1,2-Dibromoethane (EDB)	ug/L	50	54.5	109	70-130	
1,2-Dichlorobenzene	ug/L	50	49.8	100	70-130	
1,2-Dichloroethane	ug/L	50	50.3	101	70-130	
1,2-Dichloropropane	ug/L	50	50.7	101	70-130	
1,3-Dichlorobenzene	ug/L	50	48.9	98	70-130	
1,4-Dichlorobenzene	ug/L	50	48.1	96	70-130	
Benzene	ug/L	50	49.4	99	60-135	
Bromodichloromethane	ug/L	50	51.8	104	70-130	
Bromoform	ug/L	50	50.5	101	70-130	
Bromomethane	ug/L	50	34.7	69	33-130	
Carbon tetrachloride	ug/L	50	50.5	101	70-138	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

LABORATORY CONTROL SAMPLE: 1342375

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chlorobenzene	ug/L	50	52.8	106	70-130	
Chloroethane	ug/L	50	50.2	100	51-130	
Chloroform	ug/L	50	49.3	99	70-130	
Chloromethane	ug/L	50	42.8	86	25-132	
cis-1,2-Dichloroethene	ug/L	50	48.0	96	69-130	
cis-1,3-Dichloropropene	ug/L	50	45.7	91	70-130	
Dibromochloromethane	ug/L	50	52.4	105	70-130	
Dichlorodifluoromethane	ug/L	50	35.2	70	23-130	
Ethylbenzene	ug/L	50	54.3	109	70-136	
Isopropylbenzene (Cumene)	ug/L	50	55.7	111	70-140	
m&p-Xylene	ug/L	100	114	114	70-138	
Methyl-tert-butyl ether	ug/L	50	48.7	97	66-138	
Methylene Chloride	ug/L	50	47.2	94	70-130	
o-Xylene	ug/L	50	54.7	109	70-134	
Styrene	ug/L	50	57.4	115	70-133	
Tetrachloroethene	ug/L	50	50.4	101	70-138	
Toluene	ug/L	50	54.1	108	70-130	
trans-1,2-Dichloroethene	ug/L	50	48.4	97	70-131	
trans-1,3-Dichloropropene	ug/L	50	48.6	97	69-130	
Trichloroethene	ug/L	50	51.2	102	70-130	
Trichlorofluoromethane	ug/L	50	49.8	100	50-150	
Vinyl chloride	ug/L	50	44.3	89	49-130	
4-Bromofluorobenzene (S)	%			102	70-130	
Dibromofluoromethane (S)	%			101	70-130	
Toluene-d8 (S)	%			106	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1343476 1343477

Parameter	Units	40132886002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	<1.0	50	50	45.7	43.0	91	86	70-134	6	20	
1,1,2,2-Tetrachloroethane	ug/L	<1.0	50	50	51.0	48.9	102	98	67-130	4	20	
1,1,2-Trichloroethane	ug/L	<1.0	50	50	50.6	48.2	101	96	70-130	5	20	
1,1-Dichloroethane	ug/L	<1.0	50	50	44.0	41.8	88	84	70-134	5	20	
1,1-Dichloroethene	ug/L	<1.0	50	50	42.7	39.6	85	79	68-136	7	20	
1,2,4-Trichlorobenzene	ug/L	<5.0	50	50	41.1	39.4	82	78	62-139	4	20	
1,2-Dibromo-3-chloropropane	ug/L	<5.0	50	50	47.0	48.2	94	96	50-150	2	20	
1,2-Dibromoethane (EDB)	ug/L	<1.0	50	50	53.3	48.9	107	98	70-130	8	20	
1,2-Dichlorobenzene	ug/L	<1.0	50	50	48.4	45.9	97	92	70-130	5	20	
1,2-Dichloroethane	ug/L	<1.0	50	50	46.4	43.4	93	87	70-130	7	20	
1,2-Dichloropropane	ug/L	<1.0	50	50	48.5	47.1	97	94	70-130	3	20	
1,3-Dichlorobenzene	ug/L	<1.0	50	50	46.6	44.9	93	90	70-131	4	20	
1,4-Dichlorobenzene	ug/L	<1.0	50	50	46.2	44.7	92	89	70-130	3	20	
Benzene	ug/L	<1.0	50	50	45.2	42.7	90	85	57-138	6	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1343476 1343477

Parameter	Units	40132886002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Bromodichloromethane	ug/L	<1.0	50	50	48.8	45.5	98	91	70-130	7	20	
Bromoform	ug/L	<1.0	50	50	48.2	47.0	96	94	70-130	2	20	
Bromomethane	ug/L	<5.0	50	50	32.8	31.7	66	63	33-130	3	27	
Carbon tetrachloride	ug/L	<1.0	50	50	47.0	44.1	94	88	70-138	6	20	
Chlorobenzene	ug/L	<1.0	50	50	48.5	46.4	97	93	70-130	5	20	
Chloroethane	ug/L	<1.0	50	50	42.8	40.7	86	81	51-130	5	20	
Chloroform	ug/L	<5.0	50	50	45.8	42.8	92	86	70-130	7	20	
Chloromethane	ug/L	<1.0	50	50	35.6	33.0	71	66	25-132	8	20	
cis-1,2-Dichloroethene	ug/L	<1.0	50	50	43.4	40.4	87	81	61-140	7	20	
cis-1,3-Dichloropropene	ug/L	<1.0	50	50	44.7	42.0	89	84	70-130	6	20	
Dibromochloromethane	ug/L	<1.0	50	50	49.6	46.9	99	94	70-130	6	20	
Dichlorodifluoromethane	ug/L	<1.0	50	50	26.8	24.6	54	49	23-130	9	20	
Ethylbenzene	ug/L	<1.0	50	50	50.6	48.1	101	96	70-138	5	20	
Isopropylbenzene (Cumene)	ug/L	<1.0	50	50	51.6	48.9	103	98	70-152	5	20	
m&p-Xylene	ug/L	<2.0	100	100	105	99.2	105	99	70-140	5	20	
Methyl-tert-butyl ether	ug/L	<1.0	50	50	46.8	43.6	94	87	66-139	7	20	
Methylene Chloride	ug/L	<1.0	50	50	44.5	41.3	89	83	70-130	7	20	
o-Xylene	ug/L	<1.0	50	50	50.6	47.5	101	95	70-134	6	20	
Styrene	ug/L	<1.0	50	50	53.2	50.1	106	100	70-138	6	20	
Tetrachloroethene	ug/L	<1.0	50	50	47.2	44.5	94	89	70-148	6	20	
Toluene	ug/L	<1.0	50	50	50.5	48.3	101	97	70-130	4	20	
trans-1,2-Dichloroethene	ug/L	<1.0	50	50	43.0	41.1	86	82	70-133	5	20	
trans-1,3-Dichloropropene	ug/L	<1.0	50	50	46.1	43.9	92	88	69-130	5	20	
Trichloroethene	ug/L	<1.0	50	50	46.9	44.3	94	89	70-131	6	20	
Trichlorofluoromethane	ug/L	<1.0	50	50	43.7	41.1	87	82	50-150	6	20	
Vinyl chloride	ug/L	<1.0	50	50	38.1	35.6	76	71	49-133	7	20	
4-Bromofluorobenzene (S)	%						102	102	70-130			
Dibromofluoromethane (S)	%						97	97	70-130			
Toluene-d8 (S)	%						105	104	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

QC Batch: MSV/33697 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40132890015, 40132890016, 40132890017

METHOD BLANK: 1341593 Matrix: Water
Associated Lab Samples: 40132890015, 40132890016, 40132890017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	05/26/16 15:41	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	05/26/16 15:41	
Benzene	ug/L	<0.50	1.0	05/26/16 15:41	
Ethylbenzene	ug/L	<0.50	1.0	05/26/16 15:41	
m&p-Xylene	ug/L	<1.0	2.0	05/26/16 15:41	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	05/26/16 15:41	
Naphthalene	ug/L	<2.5	5.0	05/26/16 15:41	
o-Xylene	ug/L	<0.50	1.0	05/26/16 15:41	
Toluene	ug/L	<0.50	1.0	05/26/16 15:41	
4-Bromofluorobenzene (S)	%	87	70-130	05/26/16 15:41	
Dibromofluoromethane (S)	%	124	70-130	05/26/16 15:41	
Toluene-d8 (S)	%	86	70-130	05/26/16 15:41	

LABORATORY CONTROL SAMPLE: 1341594

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	56.6	113	60-135	
Ethylbenzene	ug/L	50	54.0	108	70-136	
m&p-Xylene	ug/L	100	112	112	70-138	
Methyl-tert-butyl ether	ug/L	50	42.4	85	66-138	
o-Xylene	ug/L	50	53.3	107	70-134	
Toluene	ug/L	50	54.0	108	70-130	
4-Bromofluorobenzene (S)	%			108	70-130	
Dibromofluoromethane (S)	%			118	70-130	
Toluene-d8 (S)	%			87	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1342376 1342377

Parameter	Units	40132629002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	<0.50	50	50	53.5	53.4	107	107	57-138	0	20	
Ethylbenzene	ug/L	<0.50	50	50	51.1	50.7	102	101	70-138	1	20	
m&p-Xylene	ug/L	<1.0	100	100	109	105	109	105	70-140	3	20	
Methyl-tert-butyl ether	ug/L	<0.17	50	50	41.3	40.6	83	81	66-139	2	20	
o-Xylene	ug/L	<0.50	50	50	50.4	50.0	101	100	70-134	1	20	
Toluene	ug/L	<0.50	50	50	51.7	51.3	103	103	70-130	1	20	
4-Bromofluorobenzene (S)	%						107	108	70-130			
Dibromofluoromethane (S)	%						118	119	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1342376 1342377

Parameter	Units	40132629002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%						87	88	70-130			

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REPORT OF LABORATORY ANALYSIS

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1241 Bellevue Street - Suite 9
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(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

QC Batch: MSV/33720 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40132890018, 40132890019, 40132890020, 40132890021, 40132890022, 40132890023, 40132890024, 40132890025, 40132890030, 40132890031, 40132890032, 40132890033, 40132890034, 40132890035

METHOD BLANK: 1343277 Matrix: Water
Associated Lab Samples: 40132890018, 40132890019, 40132890020, 40132890021, 40132890022, 40132890023, 40132890024, 40132890025, 40132890030, 40132890031, 40132890032, 40132890033, 40132890034, 40132890035

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	05/31/16 07:17	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	05/31/16 07:17	
Benzene	ug/L	<0.50	1.0	05/31/16 07:17	
Ethylbenzene	ug/L	<0.50	1.0	05/31/16 07:17	
m&p-Xylene	ug/L	<1.0	2.0	05/31/16 07:17	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	05/31/16 07:17	
Naphthalene	ug/L	<2.5	5.0	05/31/16 07:17	
o-Xylene	ug/L	<0.50	1.0	05/31/16 07:17	
Toluene	ug/L	<0.50	1.0	05/31/16 07:17	
4-Bromofluorobenzene (S)	%	74	70-130	05/31/16 07:17	
Dibromofluoromethane (S)	%	105	70-130	05/31/16 07:17	
Toluene-d8 (S)	%	98	70-130	05/31/16 07:17	

LABORATORY CONTROL SAMPLE: 1343278

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	53.1	106	60-135	
Ethylbenzene	ug/L	50	47.8	96	70-136	
m&p-Xylene	ug/L	100	99.9	100	70-138	
Methyl-tert-butyl ether	ug/L	50	43.7	87	66-138	
o-Xylene	ug/L	50	47.8	96	70-134	
Toluene	ug/L	50	46.5	93	70-130	
4-Bromofluorobenzene (S)	%			84	70-130	
Dibromofluoromethane (S)	%			107	70-130	
Toluene-d8 (S)	%			95	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1343305 1343306

Parameter	Units	40132890022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	50.3	50	50	84.3	91.3	68	82	57-138	8	20	
Ethylbenzene	ug/L	152	50	50	168	179	33	55	70-138	6	20	M1
m&p-Xylene	ug/L	478	100	100	515	562	37	84	70-140	9	20	M1
Methyl-tert-butyl ether	ug/L	<0.35	50	50	41.1	43.6	82	87	66-139	6	20	
o-Xylene	ug/L	1.7J	50	50	49.7	50.2	96	97	70-134	1	20	
Toluene	ug/L	<1.0	50	50	45.3	46.7	91	93	70-130	3	20	
4-Bromofluorobenzene (S)	%						93	89	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1343305 1343306

Parameter	Units	40132890022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dibromofluoromethane (S)	%						100	100	70-130			
Toluene-d8 (S)	%						96	95	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 34265.003 CALUMET SUPERIOR
Pace Project No.: 40132890

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40132890001	**LRS-1**	EPA 8021	GCV/16083		
40132890002	**LRS-2**	EPA 8021	GCV/16083		
40132890003	**LRS-3**	EPA 8021	GCV/16083		
40132890004	**LRS-4**	EPA 8021	GCV/16083		
40132890005	**LRS-6**	EPA 8021	GCV/16083		
40132890006	**LRS-7**	EPA 8021	GCV/16083		
40132890007	**MW-1/FL**	EPA 8021	GCV/16083		
40132890008	**MW-2/FL**	EPA 8021	GCV/16083		
40132890009	**MW-3/FL**	EPA 8021	GCV/16083		
40132890010	**MW-9/FL**	EPA 8021	GCV/16083		
40132890011	**MW-10/FL**	EPA 8021	GCV/16083		
40132890012	**MW-11/FL**	EPA 8021	GCV/16083		
40132890013	**MW-13/FL**	EPA 8021	GCV/16083		
40132890014	**MW-14/FL**	EPA 8021	GCV/16083		
40132890026	**MW-1/T68**	EPA 8260	MSV/33712		
40132890027	**MW-2/T68**	EPA 8260	MSV/33712		
40132890028	**MW-4/T68**	EPA 8260	MSV/33712		
40132890029	**MW-5/T66**	EPA 8260	MSV/33712		
40132890036	**TRIP BLANK**	EPA 8260	MSV/33712		
40132890015	**MW-1/CW**	EPA 8260	MSV/33697		
40132890016	**MW-2/CW**	EPA 8260	MSV/33697		
40132890017	**MW-3/CW**	EPA 8260	MSV/33697		
40132890018	**MW-4/CW**	EPA 8260	MSV/33720		
40132890019	**MW-1/T40**	EPA 8260	MSV/33720		
40132890020	**MW-2/T40**	EPA 8260	MSV/33720		
40132890021	**MW-4/T40**	EPA 8260	MSV/33720		
40132890022	**MW-5/T40**	EPA 8260	MSV/33720		
40132890023	**MW-6/T40**	EPA 8260	MSV/33720		
40132890024	**MW-7/T40**	EPA 8260	MSV/33720		
40132890025	**TS-1/T40**	EPA 8260	MSV/33720		
40132890030	**MW-1R/T70**	EPA 8260	MSV/33720		
40132890031	**MW-2R/T70**	EPA 8260	MSV/33720		
40132890032	**MW-3/T70**	EPA 8260	MSV/33720		
40132890033	**MW-4/T70**	EPA 8260	MSV/33720		
40132890034	**MW-5/T70**	EPA 8260	MSV/33720		
40132890035	**MW-6/T70**	EPA 8260	MSV/33720		

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

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CHAIN OF CUSTODY

401328 40

(Please Print Clearly)	
Company Name:	Gannett Fleming
Branch/Location:	Madison, WI
Project Contact:	Cliff Wright
Phone:	608-836-1500
Project Number:	34265.003
Project Name:	Calumet Superior
Project State:	WI
Sampled By (Print):	Marcus Mussey
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	Pace 2016
Mail To Contact:	Cliff Wright
Mail To Company:	Gannett Fleming
Mail To Address:	8025 Excelsior Dr. Madison, WI 53717
Invoice To Contact:	
Invoice To Company:	See
Invoice To Address:	above
Invoice To Phone:	

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, W = Water, B = Biota, DW = Drinking Water, C = Charcoal, GW = Ground Water, O = Oil, SW = Surface Water, S = Soil, WW = Waste Water, SI = Sludge, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: PVOCs 8021	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)
001	LRS-1	5/24	1130	GW	N	B	3		3-40ml VB
002	LRS-2		1140				3		
003	LRS-3		1150				3		
004	LRS-4		1155				3		
005	LRS-6		1145				3		
006	LRS-7		1205				3		
	~~LRS-8~~		~~1200~~						
007	MW-1/FL	5/24	1030	GW			3		
008	MW-2/FL		1020						
009	MW-3/FL		1005						
010	MW-9/FL		1215						
011	MW-10/FL		1220						
012	MW-11/FL		1045						

Profile #

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
	16:30		
Fed Ex	5-25-16 1245	Susan Myhre	5-25-16 1245
		Pace	

PACE Project No.: 401328 40

Receipt Temp = ROI °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal: Present / Not Present; Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

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CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	
Branch/Location:	
Project Contact:	See Page 1
Phone:	
Project Number:	
Project Name:	
Project State:	
Sampled By (Print):	
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	See Page 1
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: PVOCs 8021	PVOCs/Naph. 8260	PVOCs 8260	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
	~~MW-12/FL~~	~~5/24~~		~~GW~~								
013	MW-13/FL	5/24	11:25	GW		N B	3				3-40mlVB	
014	MW-14/FL		11:10			N B	3					
015	MW-1/CW		9:05			N B		3				
016	MW-2/CW		9:00			N B		3				
017	MW-3/CW		9:10			N B		3				
018	MW-4/CW		8:50			N B		3				
019	MW-1/T40		13:30			N B			3			
020	MW-2/T40		13:05			N B						
021	MW-3/T40		13:25			N B						
022	MW-5/T40		13:10			N B						
023	MW-6/T40		13:15			N B						
024	MW-7/T40		13:20			N B						

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
	16:30		
Fed Ex	5-25-16 1245	Susan Wylie Pace	5-25-16 1245

PACE Project No.: 4032890

Receipt Temp = ROI °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal Present / Not Present Intact / Not Intact

Version 6.0 06/14/06

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CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	
Branch/Location:	
Project Contact:	See page 1
Phone:	
Project Number:	
Project Name:	
Project State:	
Sampled By (Print):	
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	See page 1
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	1
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, B = Biota, C = Charcoal, O = Oil, S = Soil, SI = Sludge, W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO)	PRESERVATION (CODE)*	Analyses Requested: 8260 PVOCs	8260 VOCs	8260 PVOC/ Naph	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
	Y/N				N	N	N					
	Pick Letter				B	B	B					
025	TS-1 / T40	5/24	13:35	GW			3				3-40mlVB	
026	MW-1 / T68		14:00					3				
027	MW-2 / T68		14:15					3				
028	MW-4 / T68		14:10					3				
029	MW-5 / T66		14:20					3				
030	MW-1R / T70		15:15						3			
031	MW-2R / T70		14:50									
032	MW-3 / T70		14:25									
033	MW-4 / T70		14:20									
034	MW-5 / T70		14:55									
035	MW-6 / T70		15:00									
	~~MW-7 / T70~~		15:05									
036	Trip Blank							2			2-40mlVB	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
	16:30		
Fed Ex	5-25-16 1245	Susan Wylie Pace	5-25-16 1245
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

PACE Project No. 4013840

Receipt Temp = ROT °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal (Circle) Present / Not Present
Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

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Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Project # **WO#: 40132890**

40132890

Client Name: Gannett Fleming

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: _____

Tracking #: 8718 1210 7902

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used N/A **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROI /Corr: **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 5-25-16
Initials: SKW

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☐Yes ☑No ☐N/A	12. 024 - 1-40mlVB collect time 13:40. 5-25-16 SKW
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	14.
Trip Blank Present:	☑Yes ☐No ☐N/A	15.
Trip Blank Custody Seals Present	☑Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AMH per RDM **Date:** 5/25/16

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

October 12, 2016

Project #34265.003
Calumet Superior
Reviewed by CCW
10/17/16

Clifford Wright
Gannett Fleming
8025 Excelsior Drive
Madison, WI 53717

RE: Project: 34265.003 CALUMET
Pace Project No.: 40139527

Dear Clifford Wright:
Enclosed are the analytical results for sample(s) received by the laboratory on October 05, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
Project Manager

Enclosures

cc: Dave Olig, Gannett Fleming

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
Virginia VELAP ID: 460263
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
US Dept of Agriculture #: S-76505
Virginia VELAP Certification ID: 460263
Virginia VELAP ID: 460263
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40139527001	**PZ-2/T66**	Water	10/04/16 10:20	10/05/16 09:15
40139527002	**PZ-3D**	Water	10/04/16 09:50	10/05/16 09:15
40139527003	**MW-7**	Water	10/04/16 10:35	10/05/16 09:15
40139527004	**PZ-8R**	Water	10/04/16 08:35	10/05/16 09:15
40139527005	**MW-11**	Water	10/04/16 13:15	10/05/16 09:15
40139527006	**PZ-11**	Water	10/04/16 13:10	10/05/16 09:15
40139527007	**MW-12**	Water	10/04/16 11:10	10/05/16 09:15
40139527008	**MW-13**	Water	10/04/16 11:05	10/05/16 09:15
40139527009	**PZ-13**	Water	10/04/16 11:00	10/05/16 09:15
40139527010	**MW-14**	Water	10/04/16 10:50	10/05/16 09:15
40139527011	**MW-15**	Water	10/04/16 08:50	10/05/16 09:15
40139527012	**MW-16**	Water	10/04/16 09:35	10/05/16 09:15
40139527013	**PZ-16**	Water	10/04/16 09:25	10/05/16 09:15
40139527014	**MW-17**	Water	10/04/16 10:10	10/05/16 09:15
40139527015	**PZ-17**	Water	10/04/16 10:00	10/05/16 09:15
40139527016	**MW-18**	Water	10/04/16 10:15	10/05/16 09:15
40139527017	**MW-19**	Water	10/04/16 13:25	10/05/16 09:15
40139527018	**MW-20**	Water	10/04/16 14:00	10/05/16 09:15
40139527019	**MW-21**	Water	10/04/16 13:50	10/05/16 09:15
40139527020	**PZ-21**	Water	10/04/16 13:45	10/05/16 09:15
40139527021	**MW-22**	Water	10/04/16 13:35	10/05/16 09:15
40139527022	**MW-1/CW**	Water	10/04/16 12:45	10/05/16 09:15
40139527023	**MW-2/CW**	Water	10/04/16 12:40	10/05/16 09:15
40139527024	**MW-3/CW**	Water	10/04/16 12:35	10/05/16 09:15
40139527025	**MW-4/CW**	Water	10/04/16 12:30	10/05/16 09:15
40139527026	**TRIP BLANK**	Water	10/04/16 00:00	10/05/16 09:15

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40139527001	PZ-2/T66	EPA 8021	PMS	10	PASI-G
40139527002	PZ-3D	EPA 8021	PMS	10	PASI-G
40139527003	MW-7	EPA 8021	PMS	10	PASI-G
40139527004	PZ-8R	EPA 8021	PMS	10	PASI-G
40139527005	MW-11	EPA 8021	PMS	10	PASI-G
40139527006	PZ-11	EPA 8021	PMS	10	PASI-G
40139527007	MW-12	EPA 8021	PMS	10	PASI-G
40139527008	MW-13	EPA 8021	PMS	10	PASI-G
40139527009	PZ-13	EPA 8021	PMS	10	PASI-G
40139527010	MW-14	EPA 8021	PMS	10	PASI-G
40139527011	MW-15	EPA 8021	PMS	10	PASI-G
40139527012	MW-16	EPA 8021	PMS	10	PASI-G
40139527013	PZ-16	EPA 8021	PMS	10	PASI-G
40139527014	MW-17	EPA 8021	PMS	10	PASI-G
40139527015	PZ-17	EPA 8021	PMS	10	PASI-G
40139527016	MW-18	EPA 8021	PMS	10	PASI-G
40139527017	MW-19	EPA 8021	PMS	10	PASI-G
40139527018	MW-20	EPA 8021	PMS	10	PASI-G
40139527019	MW-21	EPA 8021	PMS	10	PASI-G
40139527020	PZ-21	EPA 8021	PMS	10	PASI-G
40139527021	MW-22	EPA 8021	PMS	10	PASI-G
40139527022	MW-1/CW	EPA 8260	LAP	12	PASI-G
40139527023	MW-2/CW	EPA 8260	LAP	12	PASI-G
40139527024	MW-3/CW	EPA 8260	LAP	12	PASI-G
40139527025	MW-4/CW	EPA 8260	LAP	12	PASI-G
40139527026	TRIP BLANK	EPA 8260	LAP	12	PASI-G

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40139527023	**MW-2/CW**					
EPA 8260	1,2,4-Trimethylbenzene	1010	ug/L	40.0	10/10/16 18:24	
EPA 8260	1,3,5-Trimethylbenzene	235	ug/L	40.0	10/10/16 18:24	
EPA 8260	Benzene	5770	ug/L	40.0	10/10/16 18:24	
EPA 8260	Ethylbenzene	581	ug/L	40.0	10/10/16 18:24	
EPA 8260	Naphthalene	113J	ug/L	200	10/10/16 18:24	
EPA 8260	Toluene	451	ug/L	40.0	10/10/16 18:24	
EPA 8260	m&p-Xylene	2120	ug/L	80.0	10/10/16 18:24	
EPA 8260	o-Xylene	460	ug/L	40.0	10/10/16 18:24	
40139527024	**MW-3/CW**					
EPA 8260	1,2,4-Trimethylbenzene	1140	ug/L	100	10/10/16 18:46	
EPA 8260	1,3,5-Trimethylbenzene	279	ug/L	100	10/10/16 18:46	
EPA 8260	Benzene	8780	ug/L	100	10/10/16 18:46	
EPA 8260	Ethylbenzene	1210	ug/L	100	10/10/16 18:46	
EPA 8260	Toluene	317	ug/L	100	10/10/16 18:46	
EPA 8260	m&p-Xylene	3340	ug/L	200	10/10/16 18:46	
EPA 8260	o-Xylene	242	ug/L	100	10/10/16 18:46	
40139527025	**MW-4/CW**					
EPA 8260	1,2,4-Trimethylbenzene	1370	ug/L	50.0	10/10/16 19:08	
EPA 8260	1,3,5-Trimethylbenzene	347	ug/L	50.0	10/10/16 19:08	
EPA 8260	Benzene	7180	ug/L	50.0	10/10/16 19:08	
EPA 8260	Ethylbenzene	868	ug/L	50.0	10/10/16 19:08	
EPA 8260	Naphthalene	191J	ug/L	250	10/10/16 19:08	
EPA 8260	Toluene	242	ug/L	50.0	10/10/16 19:08	
EPA 8260	m&p-Xylene	3500	ug/L	100	10/10/16 19:08	
EPA 8260	o-Xylene	491	ug/L	50.0	10/10/16 19:08	

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PROJECT NARRATIVE

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Method: **EPA 8021**
Description: 8021 GCV Short List
Client: Gannett Fleming Inc.
Date: October 12, 2016

General Information:
21 samples were analyzed for EPA 8021. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 237415

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40139615020

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1407441)
  - 1,3,5-Trimethylbenzene

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Method: **EPA 8260**
Description: 8260 MSV UST
Client: Gannett Fleming Inc.
Date: October 12, 2016

General Information:
5 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Sample: MW-1/CW **Lab ID: 40139527022** Collected: 10/04/16 12:45 Received: 10/05/16 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	95-63-6	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	108-67-8	
Benzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	71-43-2	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	100-41-4	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		10/10/16 14:53	1634-04-4	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		10/10/16 14:53	91-20-3	
Toluene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	108-88-3	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		10/10/16 14:53	179601-23-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 14:53	95-47-6	
Surrogates									
Dibromofluoromethane (S)	102	%	70-130		1		10/10/16 14:53	1868-53-7	
Toluene-d8 (S)	91	%	70-130		1		10/10/16 14:53	2037-26-5	
4-Bromofluorobenzene (S)	85	%	70-130		1		10/10/16 14:53	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Sample: MW-2/CW **Lab ID: 40139527023** Collected: 10/04/16 12:40 Received: 10/05/16 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**1010**	ug/L	40.0	20.0	40		10/10/16 18:24	95-63-6	
1,3,5-Trimethylbenzene	**235**	ug/L	40.0	20.0	40		10/10/16 18:24	108-67-8	
Benzene	**5770**	ug/L	40.0	20.0	40		10/10/16 18:24	71-43-2	
Ethylbenzene	**581**	ug/L	40.0	20.0	40		10/10/16 18:24	100-41-4	
Methyl-tert-butyl ether	**<7.0**	ug/L	40.0	7.0	40		10/10/16 18:24	1634-04-4	
Naphthalene	**113J**	ug/L	200	100	40		10/10/16 18:24	91-20-3	
Toluene	**451**	ug/L	40.0	20.0	40		10/10/16 18:24	108-88-3	
m&p-Xylene	**2120**	ug/L	80.0	40.0	40		10/10/16 18:24	179601-23-1	
o-Xylene	**460**	ug/L	40.0	20.0	40		10/10/16 18:24	95-47-6	
Surrogates									
Dibromofluoromethane (S)	99	%	70-130		40		10/10/16 18:24	1868-53-7	
Toluene-d8 (S)	90	%	70-130		40		10/10/16 18:24	2037-26-5	
4-Bromofluorobenzene (S)	89	%	70-130		40		10/10/16 18:24	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Sample: MW-3/CW **Lab ID: 40139527024** Collected: 10/04/16 12:35 Received: 10/05/16 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**1140**	ug/L	100	50.0	100		10/10/16 18:46	95-63-6	
1,3,5-Trimethylbenzene	**279**	ug/L	100	50.0	100		10/10/16 18:46	108-67-8	
Benzene	**8780**	ug/L	100	50.0	100		10/10/16 18:46	71-43-2	
Ethylbenzene	**1210**	ug/L	100	50.0	100		10/10/16 18:46	100-41-4	
Methyl-tert-butyl ether	**<17.4**	ug/L	100	17.4	100		10/10/16 18:46	1634-04-4	
Naphthalene	**<250**	ug/L	500	250	100		10/10/16 18:46	91-20-3	
Toluene	**317**	ug/L	100	50.0	100		10/10/16 18:46	108-88-3	
m&p-Xylene	**3340**	ug/L	200	100	100		10/10/16 18:46	179601-23-1	
o-Xylene	**242**	ug/L	100	50.0	100		10/10/16 18:46	95-47-6	
Surrogates									
Dibromofluoromethane (S)	97	%	70-130		100		10/10/16 18:46	1868-53-7	
Toluene-d8 (S)	91	%	70-130		100		10/10/16 18:46	2037-26-5	
4-Bromofluorobenzene (S)	88	%	70-130		100		10/10/16 18:46	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Sample: MW-4/CW **Lab ID: 40139527025** Collected: 10/04/16 12:30 Received: 10/05/16 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**1370**	ug/L	50.0	25.0	50		10/10/16 19:08	95-63-6	
1,3,5-Trimethylbenzene	**347**	ug/L	50.0	25.0	50		10/10/16 19:08	108-67-8	
Benzene	**7180**	ug/L	50.0	25.0	50		10/10/16 19:08	71-43-2	
Ethylbenzene	**868**	ug/L	50.0	25.0	50		10/10/16 19:08	100-41-4	
Methyl-tert-butyl ether	**<8.7**	ug/L	50.0	8.7	50		10/10/16 19:08	1634-04-4	
Naphthalene	**191J**	ug/L	250	125	50		10/10/16 19:08	91-20-3	
Toluene	**242**	ug/L	50.0	25.0	50		10/10/16 19:08	108-88-3	
m&p-Xylene	**3500**	ug/L	100	50.0	50		10/10/16 19:08	179601-23-1	
o-Xylene	**491**	ug/L	50.0	25.0	50		10/10/16 19:08	95-47-6	
Surrogates									
Dibromofluoromethane (S)	101	%	70-130		50		10/10/16 19:08	1868-53-7	
Toluene-d8 (S)	91	%	70-130		50		10/10/16 19:08	2037-26-5	
4-Bromofluorobenzene (S)	89	%	70-130		50		10/10/16 19:08	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Sample: TRIP BLANK **Lab ID: 40139527026** Collected: 10/04/16 00:00 Received: 10/05/16 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
1,2,4-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	95-63-6	
1,3,5-Trimethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	108-67-8	
Benzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	71-43-2	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	100-41-4	
Methyl-tert-butyl ether	**<0.17**	ug/L	1.0	0.17	1		10/10/16 16:34	1634-04-4	
Naphthalene	**<2.5**	ug/L	5.0	2.5	1		10/10/16 16:34	91-20-3	
Toluene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	108-88-3	
m&p-Xylene	**<1.0**	ug/L	2.0	1.0	1		10/10/16 16:34	179601-23-1	
o-Xylene	**<0.50**	ug/L	1.0	0.50	1		10/10/16 16:34	95-47-6	
Surrogates									
Dibromofluoromethane (S)	102	%	70-130		1		10/10/16 16:34	1868-53-7	
Toluene-d8 (S)	91	%	70-130		1		10/10/16 16:34	2037-26-5	
4-Bromofluorobenzene (S)	86	%	70-130		1		10/10/16 16:34	460-00-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

QC Batch: 237292 Analysis Method: EPA 8021
QC Batch Method: EPA 8021 Analysis Description: 8021 GCV BTEX
Associated Lab Samples: 40139527001, 40139527002, 40139527003, 40139527004, 40139527005, 40139527006, 40139527007, 40139527008, 40139527009, 40139527010, 40139527011, 40139527012, 40139527013, 40139527014, 40139527015, 40139527016

METHOD BLANK: 1406204 Matrix: Water
Associated Lab Samples: 40139527001, 40139527002, 40139527003, 40139527004, 40139527005, 40139527006, 40139527007, 40139527008, 40139527009, 40139527010, 40139527011, 40139527012, 40139527013, 40139527014, 40139527015, 40139527016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.42	1.0	10/06/16 08:16	
1,3,5-Trimethylbenzene	ug/L	<0.42	1.0	10/06/16 08:16	
Benzene	ug/L	<0.40	1.0	10/06/16 08:16	
Ethylbenzene	ug/L	<0.39	1.0	10/06/16 08:16	
m&p-Xylene	ug/L	<0.80	2.0	10/06/16 08:16	
Methyl-tert-butyl ether	ug/L	<0.48	1.0	10/06/16 08:16	
Naphthalene	ug/L	<0.42	5.0	10/06/16 08:16	
o-Xylene	ug/L	<0.45	1.0	10/06/16 08:16	
Toluene	ug/L	<0.39	1.0	10/06/16 08:16	
a,a,a-Trifluorotoluene (S)	%	102	80-120	10/06/16 08:16	

LABORATORY CONTROL SAMPLE & LCSD: 1406205 1406206

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.4	21.1	107	105	80-120	2	20	
1,3,5-Trimethylbenzene	ug/L	20	20.4	20.0	102	100	80-120	2	20	
Benzene	ug/L	20	21.4	21.4	107	107	80-120	0	20	
Ethylbenzene	ug/L	20	20.6	20.3	103	102	80-120	1	20	
m&p-Xylene	ug/L	40	40.7	39.8	102	100	80-120	2	20	
Methyl-tert-butyl ether	ug/L	20	21.3	21.4	107	107	80-120	0	20	
Naphthalene	ug/L	20	21.5	21.6	108	108	80-120	0	20	
o-Xylene	ug/L	20	20.9	20.5	105	102	80-120	2	20	
Toluene	ug/L	20	21.1	20.9	105	104	80-120	1	20	
a,a,a-Trifluorotoluene (S)	%				102	101	80-120			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1406781 1406782

Parameter	Units	40139527001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	<0.42	20	20	22.3	22.4	112	112	48-177	0	20	
1,3,5-Trimethylbenzene	ug/L	<0.42	20	20	21.3	21.3	107	106	73-145	0	20	
Benzene	ug/L	<0.40	20	20	22.2	22.4	111	112	74-139	1	20	
Ethylbenzene	ug/L	<0.39	20	20	21.7	21.5	108	108	74-140	1	20	
m&p-Xylene	ug/L	<0.80	40	40	42.5	42.3	106	106	55-165	1	20	
Methyl-tert-butyl ether	ug/L	<0.48	20	20	21.4	21.8	107	109	80-120	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1406781 1406782

Parameter	Units	40139527001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Naphthalene	ug/L	<0.42	20	20	22.4	22.8	112	114	73-133	2	20	
o-Xylene	ug/L	<0.45	20	20	21.7	21.6	108	108	73-136	0	20	
Toluene	ug/L	<0.39	20	20	22.0	22.0	110	110	80-128	0	20	
a,a,a-Trifluorotoluene (S)	%						102	101	80-120			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

QC Batch: 237415 Analysis Method: EPA 8021
QC Batch Method: EPA 8021 Analysis Description: 8021 GCV BTEX
Associated Lab Samples: 40139527017, 40139527018, 40139527019, 40139527020, 40139527021

METHOD BLANK: 1407029 Matrix: Water
Associated Lab Samples: 40139527017, 40139527018, 40139527019, 40139527020, 40139527021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.42	1.0	10/07/16 08:04	
1,3,5-Trimethylbenzene	ug/L	<0.42	1.0	10/07/16 08:04	
Benzene	ug/L	<0.40	1.0	10/07/16 08:04	
Ethylbenzene	ug/L	<0.39	1.0	10/07/16 08:04	
m&p-Xylene	ug/L	<0.80	2.0	10/07/16 08:04	
Methyl-tert-butyl ether	ug/L	<0.48	1.0	10/07/16 08:04	
Naphthalene	ug/L	<0.42	5.0	10/07/16 08:04	
o-Xylene	ug/L	<0.45	1.0	10/07/16 08:04	
Toluene	ug/L	<0.39	1.0	10/07/16 08:04	
a,a,a-Trifluorotoluene (S)	%	103	80-120	10/07/16 08:04	

LABORATORY CONTROL SAMPLE & LCSD: 1407030 1407031

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	20.9	19.9	104	99	80-120	5	20	
1,3,5-Trimethylbenzene	ug/L	20	19.8	18.8	99	94	80-120	5	20	
Benzene	ug/L	20	20.7	19.6	104	98	80-120	6	20	
Ethylbenzene	ug/L	20	19.9	18.8	100	94	80-120	6	20	
m&p-Xylene	ug/L	40	39.3	37.2	98	93	80-120	6	20	
Methyl-tert-butyl ether	ug/L	20	20.9	20.3	104	101	80-120	3	20	
Naphthalene	ug/L	20	20.8	20.7	104	104	80-120	1	20	
o-Xylene	ug/L	20	20.2	19.2	101	96	80-120	5	20	
Toluene	ug/L	20	20.4	19.2	102	96	80-120	6	20	
a,a,a-Trifluorotoluene (S)	%				102	102	80-120			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1407441 1407442

Parameter	Units	40139615020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	201	100	100	348	332	148	131	48-177	5	20	
1,3,5-Trimethylbenzene	ug/L	181	100	100	328	311	147	130	73-145	5	20	M1
Benzene	ug/L	158	100	100	261	244	104	86	74-139	7	20	
Ethylbenzene	ug/L	45.3	100	100	148	129	102	83	74-140	14	20	
m&p-Xylene	ug/L	387	200	200	623	583	118	98	55-165	7	20	
Methyl-tert-butyl ether	ug/L	<2.4	100	100	98.4	81.6	98	82	80-120	19	20	
Naphthalene	ug/L	58.0	100	100	170	159	112	101	73-133	7	20	
o-Xylene	ug/L	226	100	100	346	326	121	101	73-136	6	20	
Toluene	ug/L	17.4	100	100	120	100	103	83	80-128	18	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1407441 1407442

Parameter	Units	40139615020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
a,a,a-Trifluorotoluene (S)	%						105	106	80-120			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

QC Batch: 237306 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 40139527022, 40139527023, 40139527024, 40139527025, 40139527026

METHOD BLANK: 1406242 Matrix: Water
Associated Lab Samples: 40139527022, 40139527023, 40139527024, 40139527025, 40139527026

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	10/10/16 07:54	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	10/10/16 07:54	
Benzene	ug/L	<0.50	1.0	10/10/16 07:54	
Ethylbenzene	ug/L	<0.50	1.0	10/10/16 07:54	
m&p-Xylene	ug/L	<1.0	2.0	10/10/16 07:54	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	10/10/16 07:54	
Naphthalene	ug/L	<2.5	5.0	10/10/16 07:54	
o-Xylene	ug/L	<0.50	1.0	10/10/16 07:54	
Toluene	ug/L	<0.50	1.0	10/10/16 07:54	
4-Bromofluorobenzene (S)	%	85	70-130	10/10/16 07:54	
Dibromofluoromethane (S)	%	95	70-130	10/10/16 07:54	
Toluene-d8 (S)	%	92	70-130	10/10/16 07:54	

LABORATORY CONTROL SAMPLE: 1406243

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	44.6	89	60-135	
Ethylbenzene	ug/L	50	48.6	97	70-136	
m&p-Xylene	ug/L	100	104	104	70-138	
Methyl-tert-butyl ether	ug/L	50	37.5	75	66-138	
o-Xylene	ug/L	50	49.4	99	70-134	
Toluene	ug/L	50	46.9	94	70-130	
4-Bromofluorobenzene (S)	%			95	70-130	
Dibromofluoromethane (S)	%			94	70-130	
Toluene-d8 (S)	%			94	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1406244 1406245

Parameter	Units	40139523001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	718	500	500	1140	1120	84	80	57-138	2	20	
Ethylbenzene	ug/L	304	500	500	808	788	101	97	70-138	2	20	
m&p-Xylene	ug/L	56.8	1000	1000	1080	1060	103	100	70-140	2	20	
Methyl-tert-butyl ether	ug/L	<1.7	500	500	367	355	73	71	66-139	3	20	
o-Xylene	ug/L	106	500	500	615	600	102	99	70-134	2	20	
Toluene	ug/L	9.8J	500	500	468	448	92	88	70-130	5	20	
4-Bromofluorobenzene (S)	%						94	93	70-130			
Dibromofluoromethane (S)	%						96	96	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 34265.003 CALUMET
Pace Project No.: 40139527

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1406244 1406245

Parameter	Units	40139523001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%						92	90	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 34265.003 CALUMET
Pace Project No.: 40139527

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 34265.003 CALUMET
Pace Project No.: 40139527

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40139527001	**PZ-2/T66**	EPA 8021	237292		
40139527002	**PZ-3D**	EPA 8021	237292		
40139527003	**MW-7**	EPA 8021	237292		
40139527004	**PZ-8R**	EPA 8021	237292		
40139527005	**MW-11**	EPA 8021	237292		
40139527006	**PZ-11**	EPA 8021	237292		
40139527007	**MW-12**	EPA 8021	237292		
40139527008	**MW-13**	EPA 8021	237292		
40139527009	**PZ-13**	EPA 8021	237292		
40139527010	**MW-14**	EPA 8021	237292		
40139527011	**MW-15**	EPA 8021	237292		
40139527012	**MW-16**	EPA 8021	237292		
40139527013	**PZ-16**	EPA 8021	237292		
40139527014	**MW-17**	EPA 8021	237292		
40139527015	**PZ-17**	EPA 8021	237292		
40139527016	**MW-18**	EPA 8021	237292		
40139527017	**MW-19**	EPA 8021	237415		
40139527018	**MW-20**	EPA 8021	237415		
40139527019	**MW-21**	EPA 8021	237415		
40139527020	**PZ-21**	EPA 8021	237415		
40139527021	**MW-22**	EPA 8021	237415		
40139527022	**MW-1/CW**	EPA 8260	237306		
40139527023	**MW-2/CW**	EPA 8260	237306		
40139527024	**MW-3/CW**	EPA 8260	237306		
40139527025	**MW-4/CW**	EPA 8260	237306		
40139527026	**TRIP BLANK**	EPA 8260	237306		

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UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Page 1 of 2

401395527

CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	Gannett Fleming
Branch/Location:	Madison, WI
Project Contact:	Cliff Wright
Phone:	608-836-1500
Project Number:	34265.003
Project Name:	Calumet
Project State:	WI
Sampled By (Print):	Marcus Mussey
Sampled By (Sign):	
PO #:	
Regulatory Program:	

Quote #:	Pace 2016
Mail To Contact:	Cliff Wright
Mail To Company:	Gannett Fleming
Mail To Address:	8025 Excelsior Dr. Madison, WI 53717
Invoice To Contact:	See Mail To
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

FILTERED? (YES/NO) — Y/N: N
PRESERVATION (CODE)* — Pick Letter: B

Analyses Requested: 3PVOCs/Naph. 8021

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	PZ-2/T66	10/4	10:20	GW		3-40mlVB	
002	PZ-3D		9:50				
003	MW-7		10:35				
004	PZ-8R		835				
005	MW-11		13:15				
006	PZ-11		13:10				
007	MW-12		11:10				
008	MW-13		11:05				
009	PZ-13		11:00				
010	MW-14		10:50				
011	MW-15		8:50				
012	MW-16		9:35				
013	PZ-16		9:25				

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Marcus Mussey	10-4/16:30		
Fed Ex	10/5/16 0915	pace	10/5/16 0915

PACE Project No.: 401395527

Receipt Temp = ROI °C

Sample Receipt pH: ~~OK / Adjusted~~

Cooler Custody Seal: Present / ~~Not Present~~ Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Pace Analytical®
www.pacelabs.com

CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	
Branch/Location:	
Project Contact:	See
Phone:	
Project Number:	Page
Project Name:	
Project State:	1
Sampled By (Print):	
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	See
Mail To Company:	
Mail To Address:	Page
Invoice To Contact:	
Invoice To Company:	1
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

FILTERED? (YES/NO)
PRESERVATION (CODE)*

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Y/N	N	N							CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					Pick Letter	B	B									
					Analyses Requested	PVOCs/Naph. 8021	PVOCs/Naph. 8260									
014	MW-17	10/4	10:10	GW		3									3-40mlVB	
015	PZ-17		10:00													
016	MW-18		10:15													
017	MW-19		13:25													
018	MW-20		14:00													
019	MW-21		13:50													
020	~~MW~~ PZ-21		13:45													
021	MW-22		13:35			↓										
022	MW-1/CW		12:45				3									
023	MW-2/CW		12:40				3									
024	MW-3/CW		12:35				3									
025	MW-4/CW	↓	12:30	↓			3									
026	TRIP BLANK														2-40mlVB	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Marcus Mussey	10-4/16:30		
Fed Ex	10/5/16 0915	pace	10/5/16 0915

PACE Project No.: 40139527

Receipt Temp = ROI °C

Sample Receipt pH: ~~OK / Adjusted~~

Cooler Custody Seal: Present / ~~Not Present~~ Intact / Not Intact

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Client Name: Gannett Fleming

Project #: **WO# : 40139527**

40139527

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: _____

Tracking #: 8103 9247 1259

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used NA **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROI /Corr: **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 10/5/16
Initials: BH

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☑Yes ☐No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	14.
Trip Blank Present:	☑Yes ☐No ☐N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased): 369		

Client Notification/ Resolution:
Person Contacted: _____ Date/Time: _____
If checked, see attached form for additional comments ☐
Comments/ Resolution: _____

Project Manager Review: MM for DM **Date:** 10/5/16

F-GB-C-031-Rev.03 (9April2015) SCUR Form

Appendix C

BRRTS #03-16-000320 Murphy Oil Marine Terminal Soil Analytical Results

CALUMET SUPERIOR, LLC
SUPERIOR, WISCONSIN

TABLE 4

SOIL ANALYTICAL RESULTS FOR CALUMET MARINE TERMINAL SITE (MAY 2005 THROUGH MAY 2010)

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.							NR 720	NR 720
Sample ID	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	Soil to	Industrial
Sample Depth (ft bgs)	0-2	2-3	2-3	0-2	0-2	0-2	0-2	Groundwater	Direct
Depth to Water (ft bgs)	3	3	3	3	3	3	3	Pathway	Contact
Sample Date	05/26/05	05/26/05	05/26/05	05/26/05	05/26/05	05/26/05	05/26/05	Standard	Standard
Lead	14.3	3.57	2.04	8.54	11.5	6.65	10.50	27	800
Diesel range organics	467	<5.97	<5.85	97.7	43.8	<6.67	15.1	NS	NS
Gasoline range organics	8.22	<5.97	5.85	<5.71	<5.90	<6.67	<6.46	NS	NS
Petroleum Volatile Organic Compounds (PVOCs)									
Benzene	*0.352*	*<0.025*	*<0.025*	*<0.025*	*<0.025*	*<0.025*	*<0.025*	0.00512	7.41
Toluene	0.886	<0.025	<0.025	<0.025	0.0408	<0.025	<0.025	1.1072	818
Ethylbenzene	0.268	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	1.57	37
Xylenes	1.444	<0.050	<0.050	<0.0568	0.0896	<0.050	<0.050	3.94	258
1,2,4-TMB	0.439	<0.025	<0.025	<0.025	0.0325	<0.025	<0.025	NS	219
1,3,5-TMB	0.16	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NS	182
TMBs (combined)	0.599	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.382069	NS
Methyl tert butyl ether	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.027021	293
Polycyclic Aromatic Hydrocarbons (PAHs)									
1-Methylnaphthalene	0.203	<0.00418	<0.00409	<0.08	<0.0413	<0.00467	<0.904	NS	53.1
2-Methylnaphthalene	0.305	<0.0049	<0.0048	<0.0937	<0.0483	<0.00547	<1.06	NS	2,200
Acenaphthene	<0.0541	<0.00562	<0.0055	0.559	<0.0554	<0.00627	11	NS	33,000
Acenaphthylene	<0.0759	<0.00789	<0.00772	<0.151	<0.0778	<0.0088	<1.71	NS	NS
Anthracene	<0.0242	<0.00251	<0.00246	1.23	1.71	<0.0028	29.3	197.7273	100,000
Benzo(a)anthracene	0.108	<0.0049	<0.0048	1.36	***2.64***	<0.00547	***16.5***	NS	2.11
Benzo(a)pyrene	0.137	<0.00275	<0.00269	***0.863***	***1.86***	0.00579 J	***7.24***	0.47	0.211
Benzo(b)fluoranthene	0.227	<0.00251	<0.00246	*0.971*	***2.42***	0.00345 J	***8.88***	0.4793	2.11
Benzo(ghi)perylene	0.234	<0.00251	<0.00246	0.773	1.54	0.0232	3.53	NS	NS
Benzo(k)fluoranthene	0.0792	<0.00346	<0.00339	0.473	1.02	<0.00387	3.42	NS	21.1
Chrysene	0.106	<0.00275	<0.00269	*1.04*	*2.03*	0.00399 J	*10.7*	0.144606	211
Dibenzo(a,h)anthracene	<0.0161	<0.00167	<0.00164	<0.032	<0.0165	<0.00187	<0.362	NS	0.211
Fluoranthene	0.856	0.0106	<0.00257	6.07	9.98	0.0066	84.1	88.87781	22,000
Fluorene	<0.023	<0.00239	<0.00234	0.578	<0.0236	<0.00267	12.9	14.80272	22,000
Indeno(1,2,3-cd)pyrene	0.15	<0.00191	<0.00187	0.434	1.25	0.0074	2.65	NS	2.11
Naphthalene	0.386	<0.00191	<0.00187	<0.0366	<0.0189	<0.00213	*3.98*	0.658182	26
Phenanthrene	0.482	0.0062 J	<0.00269	4.59	5.64	0.004 J	74.5	NS	NS
Pyrene	<0.0242	<0.00251	<0.00246	5.13	4.09	0.00625 J	*77.0*	54.13223	16,500

NOTES:
Results are in milligrams per kilogram (mg/kg) on a dry weight basis.
Results underlined and italicized exceed applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).
Results in bold exceed applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).
J = Estimated concentration between laboratory's level of detection and level of quantitation.
NS = No standard.
TMB = Trimethylbenzene.
TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

TABLE 4

SOIL ANALYTICAL RESULTS FOR CALUMET MARINE TERMINAL SITE (MAY 2005 THROUGH MAY 2010)

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.				NR 720 Soil to Groundwater Pathway Standard	NR 720 Industrial Direct Contact Standard
Sample ID	E	N	S	W		
Sample Depth (ft bgs)	2.5	2.5	2.5	2.5		
Depth to Water (ft bgs)	3	3	3	3		
Sample Date	07/11/07	07/11/07	07/11/07	07/11/07		
PID (ppmv)	<0.1	<0.1	<0.1	<0.1	NS	NS
Lead	*48.8*	*109*	*125*	*48.4*	27	800
Diesel range organics	838	414	184	137	NS	NS
Gasoline range organics	20.7	19.9	17.3	21.7	NS	NS
Petroleum Volatile Organic Compounds (PVOCs)						
Benzene	*0.280*	*0.151*	*0.313*	*0.603*	0.00512	7.41
Toluene	*1.18*	1.01	*1.39*	*1.44*	1.1072	818
Ethylbenzene	0.704	0.320	0.534	0.604	1.57	37
Xylenes	2.475	1.872	2.193	2.383	3.94	258
1,2,4-TMB	0.803	0.577	0.695	0.807	NS	219
1,3,5-TMB	0.431	0.171	0.349	0.338	NS	182
TMBs (combined)	1.234	0.748	1.044	1.145	1.382069	NS
Methyl tert butyl ether	<0.011	<0.011	<0.011	<0.011	0.027021	293
Polycyclic Aromatic Hydrocarbons (PAHs)						
1-Methylnaphthalene	0.131	<0.0790	0.230	0.203	NS	53.1
2-Methylnaphthalene	0.334	0.399	0.644	0.515	NS	2,200
Acenaphthene	<0.0258	0.284 J	<0.0279	<0.0250	NS	33,000
Acenaphthylene	<0.0362	<0.141	<0.0391	<0.0351	NS	NS
Anthracene	<0.0175	0.699	<0.0190	0.146	197.7273	100,000
Benzo(a)anthracene	0.106	0.791	0.0836	0.257	NS	2.11
Benzo(a)pyrene	**0.275**	***1.15***	**0.329**	***0.912***	0.47	0.211
Benzo(b)fluoranthene	0.217	*0.791*	0.273	*0.653*	0.4793	2.11
Benzo(ghi)perylene	0.232	0.737	0.334	0.570	NS	NS
Benzo(k)fluoranthene	0.0798	0.419	0.0884	0.334	NS	21.1
Chrysene	*0.279*	*1.18*	*0.308*	*0.655*	0.144606	211
Dibenzo(a,h)anthracene	<0.0148	<0.0576	<0.0160	<0.0144	NS	0.211
Fluoranthene	0.469	2.92	<0.0154	0.720	88.87781	22,000
Fluorene	0.0660	0.350	<0.0196	0.101	14.80272	22,000
Indeno(1,2,3-cd)pyrene	0.205	0.547	0.258	0.524	NS	2.11
Naphthalene	0.0884	0.294 J	0.174	0.170	0.658182	26
Phenanthrene	0.527	2.87	<0.0243	0.731	NS	NS
Pyrene	0.0228 J	0.372	<0.0167	0.0598	54.13223	16,500

NOTES:

Results in milligrams per kilogram (mg/kg) on a dry weight basis, except for PID readings which are in parts per million volume (ppmv).

Results underlined and italicized exceed applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold exceed applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

J = Estimated concentration between laboratory's level of detection and level of quantitation.

NS = No standard.

PID = Photo-ionization detector reading in parts per million, volume (ppmv).

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

TABLE 4

SOIL ANALYTICAL RESULTS FOR CALUMET MARINE TERMINAL SITE (MAY 2005 THROUGH MAY 2010)

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.				NR 720	NR 720
Sample ID	E-1	N-1	S-1	W-1	Soil to	Industrial
Sample Depth (ft bgs)	1	1	1	1	Groundwater	Direct
Depth to Water (ft bgs)	3	3	3	3	Pathway	Contact
Sample Date	09/12/07	09/12/07	09/12/07	09/12/07	Standard	Standard
PID (ppmv)	<0.1	<0.1	<0.1	<0.1	NS	NS
Diesel range organics	438	205	400	390	NS	NS
Gasoline range organics	20.7	9.98	9.39	15.0	NS	NS
Petroleum Volatile Organic Compounds (PVOCs)						
Benzene	*0.253*	*0.089*	*0.161*	*0.285*	0.00512	7.41
Toluene	*2.04*	0.514	0.643	*1.65*	1.1072	818
Ethylbenzene	0.567	0.181	0.228	0.315	1.57	37
Xylenes	3.237	1.202	1.186	2.053	3.94	258
1,2,4-TMB	0.814	0.398	0.409	0.630	NS	219
1,3,5-TMB	0.378	0.124	0.187	0.305	NS	182
TMBs (combined)	1.192	0.522	0.596	0.935	1.382069	NS
Methyl tert butyl ether	<0.012	<0.012	<0.011	<0.011	0.027021	293
Polycyclic Aromatic Hydrocarbons (PAHs)						
1-Methylnaphthalene	0.438	<0.198	<0.810	<0.406	NS	53.1
2-Methylnaphthalene	1.40	<0.219	<0.897	1.06 J	NS	2,200
Acenaphthene	<0.0514	<0.252	<1.03	<0.515	NS	33,000
Acenaphthylene	<0.0721	<0.353	<1.44	<0.724	NS	NS
Anthracene	<0.0350	0.354 J	1.85 J	0.948 J	197.7273	100,000
Benzo(a)anthracene	<0.0448	0.411 J	1.80 J	0.699 J	NS	2.11
Benzo(a)pyrene	**0.373**	**0.407 J**	*<0.503*	***0.732 J***	0.47	0.211
Benzo(b)fluoranthene	*0.520*	0.442	*1.39 J*	*0.844*	0.4793	2.11
Benzo(ghi)perylene	0.545	0.297 J	<0.875	<0.439	NS	NS
Benzo(k)fluoranthene	0.143	0.171 J	<0.635	<0.318	NS	21.1
Chrysene	*0.453*	*0.712*	*2.78*	*1.35*	0.144606	211
Dibenzo(a,h)anthracene	<0.0295	<0.145	***<0.591***	***<0.296***	NS	0.211
Fluoranthene	<0.0284	1.49	6.87	3.13	88.87781	22,000
Fluorene	<0.0361	<0.177	0.979 J	0.607 J	14.80272	22,000
Indeno(1,2,3-cd)pyrene	0.748	0.340 J	0.726 J	0.586 J	NS	2.11
Naphthalene	0.284	<0.246	<1.01	*0.697 J*	0.658182	26
Phenanthrene	<0.0448	1.35	6.48	3.40	NS	NS
Pyrene	<0.0308	0.223 J	1.09 J	0.404 J	54.13223	16,500

NOTES:

Results in milligrams per kilogram (mg/kg) on a dry weight basis, except for PID readings which are in parts per million volume (ppmv).

Results underlined and italicized exceed applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold exceed applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

J = Estimated concentration between laboratory's level of detection and level of quantitation.

NS = No standard.

PID = Photo-ionization detector reading in parts per million, volume (ppmv).

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

TABLE 4

SOIL ANALYTICAL RESULTS FOR CALUMET MARINE TERMINAL SITE (MAY 2005 THROUGH MAY 2010)

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.				NR 720	NR 720
Sample ID	E-15	N-15	S-15	W-15	Soil to	Industrial
Sample Depth (ft bgs)	0.7	0.5	1	1	Groundwater	Direct
Depth to Water (ft bgs)	3	3	3	3	Pathway	Contact
Sample Date	09/10/09	09/10/09	09/10/09	09/10/09	Standard	Standard
PID (ppmv)	0	0	0	0	NS	NS
Diesel range organics	401	44.3	445	389	NS	NS
Gasoline range organics	<5.20	<5.00	33.5	24.9	NS	NS
Petroleum Volatile Organic Compounds (PVOCs)						
Benzene	*0.124*	*<0.016*	*0.475*	*0.154*	0.00512	7.41
Toluene	0.365	0.052	*2.68*	0.817	1.1072	818
Ethylbenzene	0.098	0.051	*2.19*	0.523	1.57	37
Xylenes	0.466	0.127	*5.08*	2.52	3.94	258
1,2,4-TMB	0.118	0.039	1.32	1.01	NS	219
1,3,5-TMB	0.062	<0.018	0.481	0.329	NS	182
TMBs (combined)	0.180	<0.057	*1.801*	1.339	1.382069	NS
Methyl tert butyl ether	<0.011	<0.011	<0.013	<0.012	0.027021	293
Polycyclic Aromatic Hydrocarbons (PAHs)						
1-Methylnaphthalene	<0.0831	<0.0807	0.446	0.208	NS	53.1
2-Methylnaphthalene	<0.0920	<0.0894	0.806	0.325	NS	2,200
Acenaphthene	<0.105	<0.103	<0.106	<0.0275	NS	33,000
Acenaphthylene	<0.148	<0.144	<0.149	<0.0386	NS	NS
Anthracene	<0.0718	0.286	<0.0722	<0.0187	197.7273	100,000
Benzo(a)anthracene	0.776	0.598	0.427	0.137	NS	2.11
Benzo(a)pyrene	**0.442**	***0.545***	**0.346**	0.150	0.47	0.211
Benzo(b)fluoranthene	*0.526*	*0.608*	*0.521*	0.233	0.4793	2.11
Benzo(ghi)perylene	0.389	0.395	0.355	0.167	NS	NS
Benzo(k)fluoranthene	0.291	0.295	0.234	0.149	NS	21.1
Chrysene	*0.971*	*0.732*	*0.735*	*0.363*	0.144606	211
Dibenzo(a,h)anthracene	<0.0606	<0.0589	<0.0609	<0.0158	NS	0.211
Fluoranthene	2.46	1.52	1.35	0.467	88.87781	22,000
Fluorene	0.250	<0.0720	<0.0744	<0.0193	14.80272	22,000
Indeno(1,2,3-cd)pyrene	0.308	0.486	0.402	0.177	NS	2.11
Naphthalene	<0.103	<0.100	0.256 J	0.176	0.658182	26
Phenanthrene	2.54	0.825	<0.0924	0.378	NS	NS
Pyrene	1.54	1.32	0.500	0.145	54.13223	16,500

NOTES:

Results in milligrams per kilogram (mg/kg) on a dry weight basis, except for PID readings which are in parts per million volume (ppmv).
Results underlined and italicized exceed applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).
Results in bold exceed applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).
J = Estimated concentration between laboratory's level of detection and level of quantitation.
NS = No standard.
PID = Photo-ionization detector reading in parts per million, volume (ppmv).
TMB = Trimethylbenzene.
TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

TABLE 4

SOIL ANALYTICAL RESULTS FOR CALUMET MARINE TERMINAL SITE (MAY 2005 THROUGH MAY 2010)

Parameter	Sample ID, Sample Depth in feet below ground surface (ft bgs), etc.				NR 720	NR 720
Sample ID	N-25	N-35	S-25	S-35	Soil to	Industrial
Sample Depth (ft bgs)	0-1	0-1	0-1	0-1	Groundwater	Direct
Depth to Water (ft bgs)	3	3	3	3	Pathway	Contact
Sample Date	05/12/10	05/12/10	05/12/10	05/12/10	Standard	Standard
Diesel range organics	7.25	29.4	208	21.2	NS	NS
Gasoline range organics	<5.00	<5.00	<5.00	<5.00	NS	NS
Petroleum Volatile Organic Compounds (PVOCs)						
Benzene	*<0.016*	*<0.016*	*0.063*	*<0.016*	0.00512	7.41
Toluene	0.077	0.193	0.215	0.100	1.1072	818
Ethylbenzene	<0.018	0.107	0.087	0.054	1.57	37
Xylenes	0.137	0.433	0.432	0.253	3.94	258
1,2,4-TMB	<0.013	0.164	0.113	0.079	NS	219
1,3,5-TMB	<0.018	0.081	0.066	0.056	NS	182
TMBs (combined)	<0.031	0.245	0.179	0.135	1.382069	NS
Methyl tert butyl ether	<0.011	<0.011	<0.011	<0.011	0.027021	293
Polycyclic Aromatic Hydrocarbons (PAHs)						
1-Methylnaphthalene	<0.0409	<0.0431	<0.431	<0.0415	NS	53.1
2-Methylnaphthalene	<0.0454	<0.0478	<0.478	<0.0460	NS	2,200
Acenaphthene	<0.0520	<0.0548	0.738 J	<0.0527	NS	33,000
Acenaphthylene	<0.0730	<0.0769	<0.769	<0.0741	NS	NS
Anthracene	<0.0354	<0.0373	2.57	<0.0359	197.7273	100,000
Benzo(a)anthracene	0.211	0.242	**2.61**	0.241	NS	2.11
Benzo(a)pyrene	**0.237**	**0.260**	***1.69***	**0.258**	0.47	0.211
Benzo(b)fluoranthene	0.243	0.292	*1.64*	0.311	0.4793	2.11
Benzo(ghi)perylene	0.173	0.234	0.736 J	0.155	NS	NS
Benzo(k)fluoranthene	0.117	0.155	0.991 J	0.164	NS	21.1
Chrysene	*0.262*	0.140	*1.89*	*0.170*	0.144606	211
Dibenzo(a,h)anthracene	<0.0299	<0.0315	<0.315	<0.0303	NS	0.211
Fluoranthene	0.451	0.484	7.06	0.589	88.87781	22,000
Fluorene	<0.0365	<0.0385	<0.385	<0.0370	14.80272	22,000
Indeno(1,2,3-cd)pyrene	0.215	0.279	0.822	0.0708 J	NS	2.11
Naphthalene	<0.0590	<0.0536	<0.536	<0.0516	0.658182	26
Phenanthrene	0.272	0.265	7.87	0.443	NS	NS
Pyrene	0.472	0.452	7.18	0.515	54.13223	16,500

NOTES:

Results in milligrams per kilogram (mg/kg) on a dry weight basis.

Results underlined and italicized exceed applicable NR 720 soil to groundwater pathway standard (for unsaturated samples only).

Results in bold exceed applicable NR 720 industrial direct contact standard (for samples within 4 ft of ground surface only).

J = Estimated concentration between laboratory's level of detection and level of quantitation.

NS = No standard.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

Appendix D

Drainage Ditch Assessment Soil and Groundwater Analytical Results

TABLE 9

Surface Water Runoff Chemistry
Superior Terminal
Superior, Wisconsin
Delta No. 10-88-457

	SWRO-1	SWRO-2
Lead	0.004 mg/l	0.002 mg/l
EPA Method 610	All Parameters BDL	All Parameters BDL
EPA Method 601	All Parameters BDL	All Parameters BDL
EPA Method 602	All Parameters BDL	All Parameters BDL

Notes: BDL = Below Analytical Detection Limits
Samples were collected August 1990
Sample locations are shown on Figure 15
EPA Method 610 analyzes for polynuclear aromatic hydrocarbons
EPA Method 601 analyzes for purgeable halocarbons
EPA Method 602 analyzes for purgeable aromatics

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TABLE 10

Drainage Ditch Soil Chemistry
Superior Terminal
Superior, Wisconsin
Delta No. 10-88-457

Parameter	SROS-1	SROS-2
Lead	21.0	69.0
Moisture Content	37.4	16.8
Acenaphthylene	0.59	<0.50
Phenanthrene	0.37	<0.12
Anthracene	0.14	<0.030
Fluoranthene	1.0	<0.10
Pyrene	0.48	0.044
Benzo(a)anthracene	0.55	<0.030
Chrysene	0.42	<0.050
Benzo(b)fluoranthene	0.50	<0.035
Dibenzo(a,h)anthracene	0.11	<0.045
Benzo(g,h,i)perylene	0.44	<0.040
Ideno(1,2,3-cd)pyrene	0.40	<0.080

Moisture content expressed as %; other data expressed as mg/kg on a wet weight basis.
Samples were collected August 30, 1990.
Samples analyzed by PACE, Incorporated.

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Appendix E

EA Engineering Sediment Analytical Results Summary

Sediment Samples SW15-SLB01 through SW15-SLB06

					SW15-SLB01											
Depth Interval (ft)					0-0.5		0.5-2		2.0-4.0		4.0-6.0		6.0-8.0		8.0-10.0	
TOC (mg/kg)					23,000	J	47,300	J	53,800	J	62,700	J	54,900	J	51,200	J
PCB Aroclors	TEC*	MEC*	PEC*	Unit												
Total PCBs (ND=0)	60	368	676	µg/kg	0		14		17		NS		NS		NS	
PAH																
2-Methylnapthalene	20.2	111	201	µg/kg	**48**		**56**	J	**160**	J	**110**	J	**87**	J	**72**	J
Acenaphthlene	6.7	48	89	µg/kg	**7.2**	J	**14**	J	280	J	240	U	110	U	100	U
Acenapthylene	5.9	67	128	µg/kg	27	U	59	U	280	U	240	U	110	U	100	U
Anthracene	57.2	451	845	µg/kg	40		**60**		**150**	J	**140**	J	**98**	J	**80**	J
Benzo(a)anthracene	108	579	1,050	µg/kg	85		**200**		**490**		**490**		**320**		**260**	
Benzo(a)pyrene	150	800	1,450	µg/kg	65		**180**		**430**		**440**		**290**		**230**	
Benzo(b)fluoranthene	240	6,820	13,400	µg/kg	110		**250**		**580**		**580**		**370**		**290**	
Benzo(e)pyrene																
Benzo(g,h,i)perylene	170	1,685	3,200	µg/kg	55		130		**300**		**260**		**180**		150	
Benzo(k)flouranthene	240	6,820	13,400	µg/kg	36		88		200	J	200	J	130		130	
Chrysene	166	728	1,290	µg/kg	97		**200**		**480**		**470**		**290**		**240**	
Dibenzo(a,h)anthracene	33	84	135	µg/kg	18J		**42**	J	**91**	J	**78**	J	**53**	J	**47**	J
Flouranthene	423	1,327	2,230	µg/kg	180		320		**820**		**780**		**520**		**440**	
Flourene	77	307	536	µg/kg	20J		29	J	67	J	54	J	48	J	34	J
Indeno(1,2,3-cd)pyrene	200	1,700	3,200	µg/kg	51		120		**280**		**250**		180		150	
Napthalene	176	369	561	µg/kg	54		85		**220**	J	**230**		**180**		150	
Phenanthrene	204	687	1,170	µg/kg	82		140		**340**		**280**		**210**		170	
Pyrene	195	858	1,520	µg/kg	180		**350**		**800**		**820**		**540**		**460**	
TOTAL PAH17 (ND=1/2RL)	1,610	12,205	22,800	µg/kg	1,141.7		**2,293.5**		**5,688**		**5,422**		**3,606**		**3,003**	
1-Methylnapthalene				µg/kg												
C1-Napthalenes				µg/kg												
C2-Napthalenes				µg/kg												
C3-Napthalenes				µg/kg												
C4-Napthalenes				µg/kg												
C1-Flourenes				µg/kg												
C2-Flourenes				µg/kg												
C3-Flourenes				µg/kg												
C1-Phenanthrenes/Anthracenes				µg/kg												
C2-Phenanthrenes/Anthracenes				µg/kg												
C3-Phenanthrenes/Anthracenes				µg/kg												
C4-Phenanthrenes/Anthracenes				µg/kg												
C1-Flouranthrenes/Pyrenes				µg/kg												
C2-Flouranthrenes/Pyrenes				µg/kg												
C3-Flouranthrenes/Pyrenes				µg/kg												
C1-Chrysenes				µg/kg												
C2-Chrysenes				µg/kg												
C3-Chrysenes				µg/kg												

					SW15-SLB01											
C4-Chrysenes				µg/kg												
Perylene				µg/kg												
TOTAL PAH				µg/kg												
Metals																
Aluminum				mg/kg	5,610		8,880		9,370		11,100		10,400		10,400	
Antimony	2	13.5	25	mg/kg	6.6	UJ	8.9	UJ	9.5	UJ	7.7	UJ	0.43	J	7.5	UJ
Arsenic				mg/kg	3.0		3.7		4.3		4.8		4.3		4.3	
Barium				mg/kg	41.7		68.5		69.6		81.3		73.0		74.8	
Beryllium				mg/kg	0.27	J	0.43	J	0.47	J	0.55	J	0.50		0.49	J
Cadmium	0.99	3	5	mg/kg	0.23	J	0.49	J	0.62	J	0.71		0.68		0.65	
Calcium				mg/kg	5,420	*	8,590	*	12,800	*	14,400	*	14,100	*	14,300	*
Chromium	43	76.5	110	mg/kg	14.2		22.7		24.3		28.9		26.9		26.5	
Cobalt				mg/kg	5.1	J	7.9		8.2		8.9		8.5		8.4	
Copper	32	91	150	mg/kg	8.2		16.1		18.1		22.5		20.3		20.6	
Iron	20,000	30,000	40,000	mg/kg	14,600		**20,200**		**22,600**		**26,200**		**23,700**		**24,200**	
Lead	36	83	130	mg/kg	6.8		18.4		25.7		29.2		25.4		25.7	
Magnesium				mg/kg	3,930		6,320		8,420		9,450		8,990		9,160	*
Manganese	460	780	1,100	mg/kg	419		404		392		**475**		468		461	*
Mercury	0.18	0.64	1.1	mg/kg	0.15	U	0.087	J	0.11	J	**0.19**		0.17		0.15	J
Nickel	23	36	49	mg/kg	10.6		17.3		18.3		20.7		19.4		19.4	
Potassium				mg/kg	570		938		972		1,140		1,080		1,110	
Selenium				mg/kg	3.9		0.86		0.85	J	1.1	J	1.0	J	0.75	J
Silver	1.6	1.9	2.2	mg/kg	1.1	U	1.5	U	1.6	U	1.3	U	1.2	U	1.3	U
Sodium				mg/kg	195		264		279	J	309	J	303	J	289	
Thallium				mg/kg	2.8		3.7		4.0	U	3.2	U	3.0		3.1	
Vanadium				mg/kg	26.5		34.9		37.0		41.5		39.7		38.3	
Zinc	120	290	460	mg/kg	38.6		82.5		119		**129**		111		113	
VOCS																
Benzene	57	83.5	110	µg/kg												
Xylene	25	37.5	50	µg/kg												
SVOC																
Dibenzofuran	150	365	580	µg/kg												
Pesticides																
Dieldrin	1.9	32	62	µg/kg												
Total DDT	5.3	289	572	µg/kg												
Organitins																
Tetrabutyltin																
Tributyltin	0.52	1.73	2.94	µg/kg												
Dibutyltin																
Monobutyltin																
Dioxins																
FISH TEQ (ND=1/2RL)	0.85	11.2	21.5	pg/g												

	SW15-SLB01

* = Source: Consensus-Based Sediment Quality Guidelines, Recommendations for Use and Application, Publication No. WT-732 2003, WDNR December 2003.

Notes

Bolded = Exceeds TEC

Bolded + Shaded = Exceeds MEC

Red = Exceeds PEC

B = Blank Contamination

J = Indicates that the concentration is an estimated value

J+ = Analyte present. Reported value may be biased high. Result is estimated high.

J- = Analyte present. Reported value may be biased low. Result is estimated low.

U = Indicates that the analyte was analyzed for but not detected.

					SW15-SLB02									
Depth Interval (ft)					0-0.5		0.5-2		2.0-4.0		4.0-6.0		6.0-8.0	
TOC (mg/kg)					32,900		62,200		51,600		41,400		44,400	
PCB Aroclors	TEC*	MEC*	PEC*	Unit										
Total PCBs (ND=0)	60	368	676	µg/kg	12		0		0		NS		NS	
PAH														
2-Methylnapthalene	20.2	111	201	µg/kg	410		4.1	U	4.1	U	4.1	U	3.9	U
Acenaphthlene	6.7	48	89	µg/kg	99	J	4.1	U	4.1	U	4.1	U	3.9	U
Acenapthylene	5.9	67	128	µg/kg	160	U	4.1	U	4.1	U	4.1	U	3.9	U
Anthracene	57.2	451	845	µg/kg	**270**		4.1	U	4.1	U	4.1	U	3.9	U
Benzo(a)anthracene	108	579	1,050	µg/kg	**800**		1.3	J	4.1	U	4.1	U	3.9	U
Benzo(a)pyrene	150	800	1,450	µg/kg	**610**		4.1	U	1.3	J	1.3	J	0.63	J
Benzo(b)fluoranthene	240	6,820	13,400	µg/kg	**920**		3.5	J	4.1	U	4.1	U	3.9	U
Benzo(e)pyrene					**540**		4.1	U	4.1	U	4.1	U	3.9	U
Benzo(g,h,i)perylene	170	1,685	3,200	µg/kg	**420**		1.5	J	4.1	U	4.1	U	3.9	U
Benzo(k)flouranthene	240	6,820	13,400	µg/kg	**310**		0.76	J	4.1	U	4.1	U	3.9	U
Chrysene	166	728	1,290	µg/kg	**780**		1.4	J	4.1	U	4.1	U	3.9	U
Dibenzo(a,h)anthracene	33	84	135	µg/kg	140	J	4.1	U	4.1	U	4.1	U	3.9	U
Flouranthene	423	1,327	2,230	µg/kg	**1,300**		1.6	J	4.1	U	4.1	U	3.9	U
Flourene	77	307	536	µg/kg	**150**	J	4.1	U	4.1	U	4.1	U	3.9	U
Indeno(1,2,3-cd)pyrene	200	1,700	3,200	µg/kg	**320**		1.3	J	4.1	U	4.1	U	3.9	U
Napthalene	176	369	561	µg/kg	**290**		4.1	U	4.1	U	4.1	U	3.9	U
Phenanthrene	204	687	1,170	µg/kg	1,200		1.8	J	4.1	U	4.1	U	3.9	U
Pyrene	195	858	1,520	µg/kg	**1,400**		2.5	J	4.1	U	4.1	U	3.9	U
TOTAL PAH17 (ND=1/2RL)	1,610	12,205	22,800	µg/kg	**9,499**		32.06		34.1		34.1		31.83	
1-Methylnapthalene				µg/kg	340		4.1	U	4.1	U	4.1	U	3.9	U
C1-Napthalenes				µg/kg	480	J	4.1	U	4.1	U	4.1	U	3.9	U
C2-Napthalenes				µg/kg	1,900	J	4.1	U	4.1	U	4.1	U	3.9	U
C3-Napthalenes				µg/kg	2,100	J	4.1	U	4.1	U	4.1	U	3.9	U
C4-Napthalenes				µg/kg	1,200	J	4.1	U	4.1	U	4.1	U	3.9	U
C1-Flourenes				µg/kg	170	J	4.1	U	4.1	U	4.1	U	3.9	U
C2-Flourenes				µg/kg	360	J	4.1	U	4.1	U	4.1	U	3.9	U
C3-Flourenes				µg/kg	440	J	4.1	U	4.1	U	4.1	U	3.9	U
C1-Phenanthrenes/Anthracenes				µg/kg	960	J	4.1	U	4.1	U	4.1	U	3.9	U
C2-Phenanthrenes/Anthracenes				µg/kg	1,000	J	4.1	U	4.1	U	4.1	U	3.9	U
C3-Phenanthrenes/Anthracenes				µg/kg	1,400	J	4.1	U	4.1	U	4.1	U	3.9	U
C4-Phenanthrenes/Anthracenes				µg/kg	640	J	4.1	U	4.1	U	4.1	U	3.9	U
C1-Flouranthrenes/Pyrenes				µg/kg	1,500	J	4.1	U	4.1	U	4.1	U	3.9	U
C2-Flouranthrenes/Pyrenes				µg/kg	1,100	J	4.1	U	4.1	U	4.1	U	3.9	U
C3-Flouranthrenes/Pyrenes				µg/kg	740	J	4.1	U	4.1	U	4.1	U	3.9	U
C1-Chrysenes				µg/kg	550	J	4.1	U	4.1	U	4.1	U	3.9	U
C2-Chrysenes				µg/kg	680	J	4.1	U	4.1	U	4.1	U	3.9	U
C3-Chrysenes				µg/kg	330	J	4.1	U	4.1	U	4.1	U	3.9	U

					SW15-SLB02								
C4-Chrysenes				µg/kg	230	J	4.1	U	4.1	U	4.1	U	3.9	U
Perylene				µg/kg	260		5.5		4.1	U	4.1	U	3.9	U
TOTAL PAH				µg/kg	25,000		27		6.1		6.3		2.4	J
Metals														
Aluminum				mg/kg	11,900		6,490		6,540		4,350		3,800	
Antimony	2	13.5	25	mg/kg	12.0	UJ	6.0	UJ	5.9	UJ	6.3	UJ	7.1	UJ
Arsenic				mg/kg	6.4		3.5		2.3		1.9		1.9	
Barium				mg/kg	112		57.8		57.7		40.5		32.4	
Beryllium				mg/kg	0.65	J	0.34	J	0.32	J	0.23	J	0.19	J
Cadmium	0.99	3	5	mg/kg	0.69	J	0.30	J	0.31	J	0.22	J	0.26	J
Calcium				mg/kg	21,600		36,600	D	49,500	D	33,000	D	26,100	
Chromium	43	76.5	110	mg/kg	28.3		14.9		14.4		10.5		9.0	
Cobalt				mg/kg	10.1		5.7		5.2		4.0	J	3.4	J
Copper	32	91	150	mg/kg	22.1		13.5		13.7		8.2		5.7	
Iron	20,000	30,000	40,000	mg/kg	**28,700**		14,800		11,900		9,860		9,010	
Lead	36	83	130	mg/kg	17.3		4.5		4.6		3.2		2.5	
Magnesium				mg/kg	11,800		15,600		20,900		13,100		9,870	
Manganese	460	780	1,100	mg/kg	**720**		360		415		244		196	
Mercury	0.18	0.64	1.1	mg/kg	0.23	U	0.12	U	0.12	U	0.12	U	0.11	U
Nickel	23	36	49	mg/kg	22.4		13.9		13.1		10.0		8.2	
Potassium				mg/kg	1,510		1,020		1,070		705		568	J
Selenium				mg/kg	0.91	J	3.5	U	3.5	U	3.7	U	4.1	U
Silver	1.6	1.9	2.2	mg/kg	2.0	U	1.0	U	0.99	U	1.0	U	1.2	U
Sodium				mg/kg	366	J	247	J	269	J	181	J	177	J
Thallium				mg/kg	5.0	U	2.5	U	2.5	U	2.6	U	3.0	U
Vanadium				mg/kg	45.8		32.0		27.8		21.6		20.8	
Zinc	120	290	460	mg/kg	90.3		27.9		27.5		19.1		15.6	
VOCS														
Benzene	57	83.5	110	µg/kg	970	U	330	U	350	U	NS		NS	
Xylene	25	37.5	50	µg/kg	1,940	U	660	U	700	U	NS		NS	
SVOC														
Dibenzofuran	150	365	580	µg/kg	140	J	210	U	210	U	210	U	210	U
Pesticides														
Dieldrin	1.9	32	62	µg/kg										
Total DDT	5.3	289	572	µg/kg										
Organitins														
Tetrabutyltin														
Tributyltin	0.52	1.73	2.94	µg/kg										
Dibutyltin														
Monobutyltin														
Dioxins														
FISH TEQ (ND=1/2RL)	0.85	11.2	21.5	pg/g										

					SW15-SLB02

* = Source: Consensus-Based Sediment Quality Guidelines, Recommendatic

Notes

Bolded = Exceeds TEC

Bolded + Shaded = Exceeds MEC

Red = Exceeds PEC

B = Blank Contamination

J = Indicates that the concentration is an estimated value

J+ = Analyte present. Reported value may be biased high. Result is estimate

J- = Analyte present. Reported value may be biased low. Result is estimated

U = Indicates that the analyte was analyzed for but not detected.

					SW15-SLB03											
Depth Interval (ft)					0-0.5		0.5-2		2.0-4.0		4.0-6.0		6.0-8.0		8.0-10.0	
TOC (mg/kg)					339,000	J	475,000	J	439,000	J	368,000	J	279,000	J	269,000	J
PCB Aroclors	TEC*	MEC*	PEC*	Unit												
Total PCBs (ND=0)	60	368	676	µg/kg	0		21		15		12		**112**		0	
PAH																
2-Methylnapthalene	20.2	111	201	µg/kg	1,700	J	4,700		7,300		7,900		4,700		9,500	
Acenaphthlene	6.7	48	89	µg/kg	130	J	740		750	J	810	J	330	J	710	J
Acenapthylene	5.9	67	128	µg/kg	**37**	J	210	J	1300	U	420	J	440	J	270	J
Anthracene	57.2	451	845	µg/kg	**130**	J	**700**		**760**	J	**360**	J	1100	U	1000	U
Benzo(a)anthracene	108	579	1,050	µg/kg	**560**	J	1,300		1,600		**1,000**	J	**480**	J	**590**	J
Benzo(a)pyrene	150	800	1,450	µg/kg	**610**	J	**1200**		**1100**	J	**650**	J	**310**	J	**500**	J
Benzo(b)fluoranthene	240	6,820	13,400	µg/kg	**570**	J	**1300**		**1600**		**1100**	J	**500**	J	**730**	J
Benzo(e)pyrene					**670**	J	1,700		1,800		**1,400**	U	1,100	U	1,000	U
Benzo(g,h,i)perylene	170	1,685	3,200	µg/kg	**500**	J	**1200**		**1500**		**810**	J	**360**	J	**410**	J
Benzo(k)flouranthene	240	6,820	13,400	µg/kg	**420**	J	**300**	J	**420**	J	**320**	J	160	J	**250**	J
Chrysene	166	728	1,290	µg/kg	**640**	J	1,700		2,000		**1,200**	J	**640**	J	**730**	J
Dibenzo(a,h)anthracene	33	84	135	µg/kg	170	J	230	J	260	J	1,400	U	1,100	U	1,000	U
Flouranthene	423	1,327	2,230	µg/kg	**840**	J	**1,600**		2,600		**1,700**		**760**	J	**1,000**	
Flourene	77	307	536	µg/kg	**290**	J	1,200		1,100	J	1,100	J	**510**	J	670	J
Indeno(1,2,3-cd)pyrene	200	1,700	3,200	µg/kg	**310**	J	**480**	J	**700**	J	**410**	J	1,100	U	**270**	J
Napthalene	176	369	561	µg/kg	620	J	1,800		3,100		2,600		1,400		1,700	
Phenanthrene	204	687	1,170	µg/kg	**1,000**	J	5,500		5,500		3,900		2,100		1,500	
Pyrene	195	858	1,520	µg/kg	**840**	J	2,700		3,100		1,900		**940**	J	**1,100**	
TOTAL PAH17 (ND=1/2RL)	1,610	12,205	22,800	µg/kg	**9,367**		26,860		34,040		26,880		**15,280**		**20,930**	
1-Methylnapthalene				µg/kg	1,500		9,400		13,000		16,000		7,500		12,000	
C1-Napthalenes				µg/kg	2,200	J	9,100	J	13,000	J	15,000	J	8,000	J	14,000	J
C2-Napthalenes				µg/kg	9,200	J	65,000	J	61,000	J	85,000	J	44,000	J	58,000	J
C3-Napthalenes				µg/kg	9,700	J	79,000	J	67,000	J	80,000	J	39,000	J	41,000	J
C4-Napthalenes				µg/kg	4,200	J	36,000	J	29,000	J	30,000	J	14,000	J	12,000	J
C1-Flourenes				µg/kg	650	J	3,100	J	2,200	J	1,700	J	1,100	U	1,000	U
C2-Flourenes				µg/kg	1,500	J	4,700	J	3,800	J	2,600	J	1,700	J	1,100	J
C3-Flourenes				µg/kg	1,100	J	4,100	J	3,600	J	2,700	J	1,800	J	1,100	J
C1-Phenanthrenes/Anthracenes				µg/kg	2,900	J	12,000	J	10,000	J	6,700	J	4,100	J	2,700	J
C2-Phenanthrenes/Anthracenes				µg/kg	3,000	J	13,000	J	11,000	J	7,300	J	4,600	J	3,300	J
C3-Phenanthrenes/Anthracenes				µg/kg	2,800	J	12,000	J	10,000	J	8,100	J	5,300	J	4,600	J
C4-Phenanthrenes/Anthracenes				µg/kg	2,300	J	5,300	J	5,400	J	4,600	J	3,000	J	3,000	J
C1-Flouranthrenes/Pyrenes				µg/kg	2,200	J	5,300	J	6,100	J	3,900	J	2,000	J	2,200	J
C2-Flouranthrenes/Pyrenes				µg/kg	2,300	J	5,400	J	5,800	J	3,700	J	1,900	J	2,100	J
C3-Flouranthrenes/Pyrenes				µg/kg	1,700	J	4,200	J	4,400	J	2,900	J	1,500	J	1,700	J
C1-Chrysenes				µg/kg	1,100	J	3,000	J	2,800	J	1,600	J	1,100	U	1,000	U
C2-Chrysenes				µg/kg	2,000	J	4,700	J	3,900	J	2,200	J	1,100	J	1,200	J
C3-Chrysenes				µg/kg	1,300	J	2,700	J	1,900	J	1,400	U	1,100	U	1,000	U

					SW15-SLB03											
C4-Chrysenes				µg/kg	730	J	1,500	J	1,700	J	1,400	U	1,100	U	1,000	U
Perylene				µg/kg	270		600	U	1,300	U	1,400	U	1,100	U	1,000	U
TOTAL PAH				µg/kg	63,000		290,000		270,000	B	280,000	B	150,000	B	160,000	B
Metals																
Aluminum				mg/kg	9,520		6,890		7,790		7,770		7,520		6,820	
Antimony	2	13.5	25	mg/kg	0.62	J	1.4	J	1.7	J	1.2	J	0.33	J	0.39	J
Arsenic				mg/kg	**10.5**		61.5		52.8		39.5		7.8		7.4	
Barium				mg/kg	104		118		121		136		87.3		61.7	
Beryllium				mg/kg	0.64		0.93		0.99		1.0		0.59	J	0.57	J
Cadmium	0.99	3	5	mg/kg	**1.1**		**1.7**		**1.7**		**1.3**		0.69	J	0.55	J
Calcium				mg/kg	6,870		4,480		4,930		6,020		6,950		6,540	
Chromium	43	76.5	110	mg/kg	23.7		17.1		18.3		20.0		19.7		17.9	
Cobalt				mg/kg	8.7		7.9		6.8		9.1		7.9		7.1	
Copper	32	91	150	mg/kg	37		**65.4**		**40.5**		35		20.4		18.4	
Iron	20,000	30,000	40,000	mg/kg	**26,400**		54,900		49,500		**32,500**		**20,400**		18,000	
Lead	36	83	130	mg/kg	**62.0**		179		**118**		**98.3**		**61.2**		35.2	
Magnesium				mg/kg	5,650		3,070		2,910		4,250		5,420		4,700	
Manganese	460	780	1,100	mg/kg	338		205		259		278		248		237	
Mercury	0.18	0.64	1.1	mg/kg	0.057	J	0.12	J	0.13	J	0.13	J	0.16	U	0.047	J
Nickel	23	36	49	mg/kg	19.4		15.7		14.3		18.2		16.3		14.6	
Potassium				mg/kg	1,160		727	J	691	J	816	J	794		692	
Selenium				mg/kg	1.7	J	4.6	J	3.7	J	2.7	J	1.2	J	1.2	J
Silver	1.6	1.9	2.2	mg/kg	0.12	J	0.19	J	0.13	J	1.8	U	1.4	U	1.2	U
Sodium				mg/kg	241	J	205	J	239	J	329	J	354	J	345	J
Thallium				mg/kg	2.4	U	3.7	U	4.8	U	4.5	U	3.5	U	3.1	U
Vanadium				mg/kg	32.4		29		27.7		32.4		28.6		28.2	
Zinc	120	290	460	mg/kg	**185**		**201**		**207**		**209**		**143**		108	
VOCS																
Benzene	57	83.5	110	µg/kg	2,600	UJ	510	J	1,500	U	640	U	550	U	490	U
Xylene	25	37.5	50	µg/kg	3,240		1,790		1,750		780		390		229	
SVOC																
Dibenzofuran	150	365	580	µg/kg	**300**	J	930	J+	560	U	620	UJ	340	UJ	650	UJ
Pesticides																
Dieldrin	1.9	32	62	µg/kg												
Total DDT	5.3	289	572	µg/kg												
Organitins																
Tetrabutyltin																
Tributyltin	0.52	1.73	2.94	µg/kg												
Dibutyltin																
Monobutyltin																
Dioxins																
FISH TEQ (ND=1/2RL)	0.85	11.2	21.5	pg/g												

					SW15-SLB03

* = Source: Consensus-Based Sediment Quality Guidelines, Recommendatic

Notes

Bolded = Exceeds TEC

Bolded + Shaded = Exceeds MEC

Red = Exceeds PEC

B = Blank Contamination

J = Indicates that the concentration is an estimated value

J+ = Analyte present. Reported value may be biased high. Result is estimate

J- = Analyte present. Reported value may be biased low. Result is estimated

U = Indicates that the analyte was analyzed for but not detected.

					SW15-SLB04				SW15-SLB05							
Depth Interval (ft)					0-0.5		0.5-2		0-0.5		0.5-2		2.0-4.0		4.0-6.0	
TOC (mg/kg)					49,400		27,000		44,200		36,500	J	44,500		5,830	
PCB Aroclors	TEC*	MEC*	PEC*	Unit												
Total PCBs (ND=0)	60	368	676	µg/kg	0		19.7		13		50		198		NS	
PAH																
2-Methylnapthalene	20.2	111	201	µg/kg	**27**	J	**110**	J	370	U	**180**	J	**170**	J	**27**	J
Acenaphthlene	6.7	48	89	µg/kg	**19**	J	140	J	130	J	370	J	430	J	**68**	J
Acenapthylene	5.9	67	128	µg/kg	34	U	**14**	J	**120**	J	590	U	1,100	U	82	U
Anthracene	57.2	451	845	µg/kg	48		**310**		**820**		990		2,000		**110**	
Benzo(a)anthracene	108	579	1,050	µg/kg	**150**		**570**		1,800		1,700		4,100		**260**	
Benzo(a)pyrene	150	800	1,450	µg/kg	120		**470**		**1,300**		**1,300**		2,400		**170**	
Benzo(b)fluoranthene	240	6,820	13,400	µg/kg	160		**410**		**1,300**		**1,800**		2,100		220	
Benzo(e)pyrene					110		**300**		**800**		**860**		1,600		140	
Benzo(g,h,i)perylene	170	1,685	3,200	µg/kg	67		**240**		**550**		**720**		**1,200**		87	
Benzo(k)flouranthene	240	6,820	13,400	µg/kg	120		**390**		**1,200**		**730**		**2,500**		180	
Chrysene	166	728	1,290	µg/kg	150		**560**		1,500		2,000		3,500		**260**	
Dibenzo(a,h)anthracene	33	84	135	µg/kg	31	J	**120**	J	190	J	200	J	380	J	**35**	J
Flouranthene	423	1,327	2,230	µg/kg	**440**		**1,300**		3,900		4,600		8,100		**870**	
Flourene	77	307	536	µg/kg	40		**150**		**210**	J	560	J	630	J	72	J
Indeno(1,2,3-cd)pyrene	200	1,700	3,200	µg/kg	78		**240**		**620**		**630**		**1,200**		82	
Napthalene	176	369	561	µg/kg	43		100	J	**68**	J	**260**	J	**230**	J	35	J
Phenanthrene	204	687	1,170	µg/kg	**230**		1,300		1,600		4,400		5,200		**560**	
Pyrene	195	858	1,520	µg/kg	**240**		**1,100**		2,100		5,000		5,700		**560**	
TOTAL PAH17 (ND=1/2RL)	1,610	12,205	22,800	µg/kg	**1,980**		**7,514**		**17,593**		25,735		40,390		**3,637**	
1-Methylnapthalene				µg/kg					370	U	590	U	1,100	U	82	U
C1-Napthalenes				µg/kg					370	U	590	U	1,100	U	82	U
C2-Napthalenes				µg/kg					370	U	610	J	1,100	U	110	J
C3-Napthalenes				µg/kg					460	J	660	J	1,200	J	170	J
C4-Napthalenes				µg/kg					370	U	590U	U	1,100	U	99	J
C1-Flourenes				µg/kg					370	U	590	U	1,100	U	82	U
C2-Flourenes				µg/kg					370	U	590	U	1,100	U	82	U
C3-Flourenes				µg/kg					370	U	590	U	1,100	U	82	U
C1-Phenanthrenes/Anthracenes				µg/kg					1,400	J	1,900	J	5,500	J	240	J
C2-Phenanthrenes/Anthracenes				µg/kg					850	J	1,100	J	2,600	J	220	J
C3-Phenanthrenes/Anthracenes				µg/kg					710	J	1,300	J	2,200	J	280	J
C4-Phenanthrenes/Anthracenes				µg/kg					1,100	J	1,100	J	1,300	J	210	J
C1-Flouranthrenes/Pyrenes				µg/kg					3,100	J	3,100	J	7,100	J	490	J
C2-Flouranthrenes/Pyrenes				µg/kg					1,100	J	1,300	J	2,600	J	210	J
C3-Flouranthrenes/Pyrenes				µg/kg					430	J	590	U	1,600	J	130	J
C1-Chrysenes				µg/kg					520	J	730	J	1,700	J	100	J
C2-Chrysenes				µg/kg					540	J	590	U	1,500	J	120	J
C3-Chrysenes				µg/kg					370	U	590	U	1,100	U	82	U

					SW15-SLB04				SW15-SLB05							
C4-Chrysenes				µg/kg					370	U	590	U	1,100	U	86	J
Perylene				µg/kg					470		590	U	1,100	U	82	U
TOTAL PAH				µg/kg					30,000	B	41,000	B	73,000		6,500	B
Metals																
Aluminum				mg/kg	9,680		11,800		11,300		9,530		7,510		3,270	
Antimony	2	13.5	25	mg/kg	9.3	UJ	7.4	UJ	0.51	J	7.6	UJ	0.52	J	5.7	U
Arsenic				mg/kg	4.7		4.0		4.5		4.2		4.4		1.9	
Barium				mg/kg	141		85.7		115		96.5		65.9		26.4	
Beryllium				mg/kg	0.47		0.66		0.52	J	0.43	J	0.4	J	0.17	J
Cadmium	0.99	3	5	mg/kg	0.36	J	0.42	J	0.52	J	0.53	J	0.73	J	0.28	J
Calcium				mg/kg	12,100		15,900	J	14,800		11,500		14,400		24,100	
Chromium	43	76.5	110	mg/kg	22.8	J	24.0	J	25.9		22.9		19.5		7.0	
Cobalt				mg/kg	7.4		8.4		9.3	J	7.5		6.6	J	3.3	J
Copper	32	91	150	mg/kg	15.7		21.6		28.3		**32.6**		**42.9**		7.7	
Iron	20,000	30,000	40,000	mg/kg	**20,700**	J	**21,700**	J	**22,300**		19,600		16,100		7,300	
Lead	36	83	130	mg/kg	10.8		23.0		28.9		**52.2**		**50.9**		4.0	
Magnesium				mg/kg	8,720		9,420		10,200		7,980		8,370		9,270	
Manganese	460	780	1,100	mg/kg	**595**		364		**575**		326		255		218	
Mercury	0.18	0.64	1.1	mg/kg	0.065	J	0.053	J	0.16	J-	0.13	J	**0.2**		0.12	UJ
Nickel	23	36	49	mg/kg	15.9		18.1		21.9		17.3		16.7		8.5	
Potassium				mg/kg	1,290		1,710		1,330		1,110		906		412	J
Selenium				mg/kg	1.2	J	0.94	J	7.0	U	0.79	J	5.3	U	3.3	U
Silver	1.6	1.9	2.2	mg/kg	1.5	U	1.2	U	2.0	U	1.3	U	0.14	J	0.96	U
Sodium				mg/kg	323	J	349	J	288	J	283	J	214	J	154	J
Thallium				mg/kg	3.9	UJ	3.1	UJ	5.0	U	3.2	U	3.8	U	2.4	U
Vanadium				mg/kg	34.4		34.9		34.7		34.4		27.5		16.0	
Zinc	120	290	460	mg/kg	65.7		76.4		104		119		**175**		26.5	
VOCS																
Benzene	57	83.5	110	µg/kg												
Xylene	25	37.5	50	µg/kg												
SVOC																
Dibenzofuran	150	365	580	µg/kg												
Pesticides																
Dieldrin	1.9	32	62	µg/kg					7.7	U	0.92	J	NS		NS	
Total DDT	5.3	289	572	µg/kg					**24.4**		**30.2**		NS		NS	
Organitins																
Tetrabutyltin									3.8	U	3.1	U				
Tributyltin	0.52	1.73	2.94	µg/kg					14		23		NS		NS	
Dibutyltin									2.9	U	2.4	U				
Monobutyltin									47	U	38	U				
Dioxins																
FISH TEQ (ND=1/2RL)	0.85	11.2	21.5	pg/g												

					SW15-SLB04	SW15-SLB05

* = Source: Consensus-Based Sediment Quality Guidelines, Recommendatic

Notes

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					SW15-SLB06							
Depth Interval (ft)					0-0.5		0.5-2		2.0-4.0		4.0-6.0	
TOC (mg/kg)					100,000		64,600		60,000		68,400	
PCB Aroclors	TEC*	MEC*	PEC*	Unit								
Total PCBs (ND=0)	60	368	676	µg/kg	17		30		40		NS	
PAH												
2-Methylnapthalene	20.2	111	201	µg/kg	69	J	**120**	J	490	J	1,400	
Acenaphthlene	6.7	48	89	µg/kg	140		200	J	820		4,800	
Acenapthylene	5.9	67	128	µg/kg	**23**	J	**27**	J	**63**	J	**120**	J
Anthracene	57.2	451	845	µg/kg	**190**		**350**		1,400		1,700	
Benzo(a)anthracene	108	579	1,050	µg/kg	**370**		**730**		2,700		2,300	
Benzo(a)pyrene	150	800	1,450	µg/kg	**310**		**600**		2,000		2,000	
Benzo(b)fluoranthene	240	6,820	13,400	µg/kg	**420**		**650**		2,000		1,700	
Benzo(e)pyrene												
Benzo(g,h,i)perylene	170	1,685	3,200	µg/kg	130	J	**250**		**1,000**		**710**	
Benzo(k)flouranthene	240	6,820	13,400	µg/kg	**330**		**640**		**2,200**		**1,900**	
Chrysene	166	728	1,290	µg/kg	**530**		**940**		2,900		2,600	
Dibenzo(a,h)anthracene	33	84	135	µg/kg	**49**	J	**98**	J	400	J	280	J
Flouranthene	423	1,327	2,230	µg/kg	**1,400**	J	2,300		7,800		6,600	
Flourene	77	307	536	µg/kg	**240**		**350**		1,000		3,200	
Indeno(1,2,3-cd)pyrene	200	1,700	3,200	µg/kg	140		**270**		**1,100**		**750**	
Napthalene	176	369	561	µg/kg	90	J	150	J	600		2,100	
Phenanthrene	204	687	1,170	µg/kg	**510**		1,300		6,400		8,800	
Pyrene	195	858	1,520	µg/kg	**900**		**1,500**		5,600		5,000	
TOTAL PAH17 (ND=1/2RL)	1,610	12,205	22,800	µg/kg	**5,841**		**10,475**		38,473		45,960	
1-Methylnapthalene				µg/kg								
C1-Napthalenes				µg/kg								
C2-Napthalenes				µg/kg								
C3-Napthalenes				µg/kg								
C4-Napthalenes				µg/kg								
C1-Flourenes				µg/kg								
C2-Flourenes				µg/kg								
C3-Flourenes				µg/kg								
C1-Phenanthrenes/Anthracenes				µg/kg								
C2-Phenanthrenes/Anthracenes				µg/kg								
C3-Phenanthrenes/Anthracenes				µg/kg								
C4-Phenanthrenes/Anthracenes				µg/kg								
C1-Flouranthrenes/Pyrenes				µg/kg								
C2-Flouranthrenes/Pyrenes				µg/kg								
C3-Flouranthrenes/Pyrenes				µg/kg								
C1-Chrysenes				µg/kg								
C2-Chrysenes				µg/kg								
C3-Chrysenes				µg/kg								

					SW15-SLB06							
C4-Chrysenes				µg/kg								
Perylene				µg/kg								
TOTAL PAH				µg/kg								
Metals												
Aluminum				mg/kg	16,700		13,600		10,900		9,100	
Antimony	2	13.5	25	mg/kg	13.7	U	0.49	J	0.75	J	**2.2**	J
Arsenic				mg/kg	5.4		5.7		5		6	
Barium				mg/kg	218		149		98.3		103	
Beryllium				mg/kg	0.74	J	0.64	J	0.56	J	0.55	J
Cadmium	0.99	3	5	mg/kg	0.71	J	**1.1**		**1**		**1.4**	
Calcium				mg/kg	14,400		17,700		15,800		13,500	
Chromium	43	76.5	110	mg/kg	37.4		33.3		26.4		23.7	
Cobalt				mg/kg	12		11		8.9		8.1	
Copper	32	91	150	mg/kg	**43.7**		**59.7**		**58**		**85.8**	
Iron	20,000	30,000	40,000	mg/kg	**32,500**		**24,800**		**21,800**		**22,400**	
Lead	36	83	130	mg/kg	27.2		**51.1**		**72.5**		**115**	
Magnesium				mg/kg	12,000		12,100		10,400		8,810	
Manganese	460	780	1,100	mg/kg	**629**		**469**		337		290	
Mercury	0.18	0.64	1.1	mg/kg	0.095	J-	0.21	U	**0.34**		**0.45**	
Nickel	23	36	49	mg/kg	**29.4**		**27.1**		21.7		19.9	
Potassium				mg/kg	2,100		1,580		1,270		1,100	
Selenium				mg/kg	1.3	J	6.6	U	1	J	1.1	J
Silver	1.6	1.9	2.2	mg/kg	2.3	U	0.27	J	0.29	J	0.26	J
Sodium				mg/kg	372	J	319	J	266	J	239	J
Thallium				mg/kg	5.7	U	4.7	U	3.5	U	4	U
Vanadium				mg/kg	47		38.1		34.4		31.2	
Zinc	120	290	460	mg/kg	**136**		**203**		**221**		**408**	
VOCS												
Benzene	57	83.5	110	µg/kg								
Xylene	25	37.5	50	µg/kg								
SVOC												
Dibenzofuran	150	365	580	µg/kg								
Pesticides												
Dieldrin	1.9	32	62	µg/kg	9.4	U	72	U	NS		NS	
Total DDT	5.3	289	572	µg/kg	**121.2**		**271**		NS		NS	
Organitins												
Tetrabutyltin												
Tributyltin	0.52	1.73	2.94	µg/kg								
Dibutyltin												
Monobutyltin												
Dioxins												
FISH TEQ (ND=1/2RL)	0.85	11.2	21.5	pg/g								

					SW15-SLB06

* = Source: Consensus-Based Sediment Quality Guidelines, Recommendatic

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Appendix F

Dr. Allan Jeffrey of Zymax Forensics Expert Review

Pace Analytical Energy Services dba Zymax Forensics
220 William Pitt Way
Pittsburgh, PA 15238

October 18, 2017

Wayne Hutchinson
Antea Group
Delafield, Wisconsin 53018-2445

RE: Superior Waterfront Site Characterization Report, St. Louis River and Bay Area of Concern, Superior, WI

Dear Mr. Hutchinson,

I have reviewed the chemical analysis data for Locations SW15-SLB01, SW15-SLB02, SW15-SLB03, SW15-SLB04, SW15-SLB05, and SW15-SLB06 at the above site to determine the source of polyaromatic hydrocarbons (PAHs) in sediments at these Locations. Analytical data include concentrations of PAHs, metals, PCBs, pesticides, organic tin compounds, and benzene and toluene. The major emphasis will be on Locations SW15-SLB02, SW15-SLB03, and SW15-SLB05, for which PAH analysis included alkylated PAHs.

Alkylated PAH are particularly useful in differentiating PAHs produced by pyrogenic – high temperature combustion – processes from PAHs produced by thermogenic – relatively low temperature – processes. Examples of pyrogenic products include creosote, urban runoff, and Manufactured Gas Plant residues. Thermogenic products include petroleum and its refinery products – commonly termed petrogenic - and coal. The full PAH distributions are typically displayed as bar diagrams as shown in Fig 1. Fig 1 includes, in addition to parent (C0) PAHs and several high molecular weight PAHs, including benzopyrenes and benzofluoranthenes that comprise the EPA PAH method, C1-C3 or C1-C4 alkylated PAHs. The full PAH distributions of thermogenic and pyrogenic products are distinctly different, as shown in Fig 2. Thermogenic products, illustrated by a crude oil, have a bell shaped C0-C4 PAH distribution. Pyrogenic products, illustrated by a coal tar and urban runoff, have a C0-C4 PAH distribution skewed towards the parent C0 PAH.

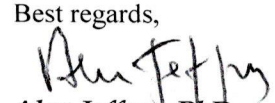
The full PAH distributions in SW15-SLB02 and SW15-SLB05 are characteristic of pyrogenic products, as illustrated by samples SW15-SLB02 0-0.5 and SW15-SLB05 4-6 in Fig 3. SW15-SLB04, and SW15-SLB06 most likely also contain pyrogenic products: the fluoranthene/pyrene ratios are >1, in common with the pyrogenic PAHs in SW15-SLB02 and SW15-SLB05, whereas the ratios in SW15-SLB03 sediments are <1. SW15-SLB03 shows a thermogenic PAH signature, as illustrated by sample SW15-SLB03-0-0.5 in Fig 4. This thermogenic signature extends throughout the sediment column in SW15-SLB03, as illustrated by samples SW15-SLB03 4-6 and 8-10 in Fig 5. This indicates that the PAHs in SW15-SLB03 sediment are sourced from a thermogenic product such as petroleum or coal.

PAH concentrations in a crude oil and a coal were reported by Boehm (2006), and are shown as bar diagrams in Fig 6. Both show a bell shaped distribution of C0-C4 PAHs. There are, however, some significant differences in the distributions. The ratio of phenanthrene/anthracene is much higher in the crude oil compared to the coal (>>10 and 5, respectively). Boehm (2006), and references therein, report that this ratio differentiates PAHs sourced from oil and coal. The ratios in SW15-SLB03 range from 7 to 11, closer to the ratio for coal. However, Stout and Emsbo-Mattingly (2008) analyzed 15 coal samples of differing coal rank and report a wide range of phenanthrene/anthracene ratios that overlapped the crude oil range and showed some correlation to coal rank. The crude oil and coal PAH distributions in Fig 6 also show a difference in the relative concentrations of fluorenes and phenanthrenes/anthracenes, with significantly lower fluorene concentrations in the coal. The SW15-SLB03 samples also show lower fluorene concentrations. This is illustrated by the ratio of C3-fluorene/(C3-phenanthrene/anthracene). This ratio ranges from 0.33-0.39 in SW15-SLB03 samples, which is similar to the ratio in the coal sample (0.32) and distinct from the crude oil sample (0.91). However, again, Stout and Emsbo-Mattingly (2008) report more variation in this ratio in 15 coal samples, with several coals overlapping the crude oil range.

The concentrations of arsenic in SW15-SLB03 sediments are consistently higher than the other locations, with several SW15-SLB03 samples an order of magnitude higher. Arsenic is a documented constituent in coals (Yakov and Ketris, 2005)) and may have been leached from coal particles in the SW15-SLB03 sediments. However, this data set cannot prove this conclusively.

In conclusion, the distributions of the PAHs in the SW15-SLB03 sediments indicate unequivocally that their source is a thermogenic product, rather than the pyrogenic products in SW15-SLB02 and SW15-SLB05, and most likely in SW15-SLB04 and SW15-SLB06 as well. The arsenic concentrations and phenanthrene/anthracene ratios and fluorene/phenanthrene ratios may be suggestive of coal as the major PAH source at SW15-SLB03. However, a definitive way of determining the source would be provided by analysis of the aliphatic hydrocarbons in the samples. Coals have ratios of pristane/phytane that are higher than most petroleum, and have different sterane and terpane distributions, which reflect the terrestrial origin of coal (Stout and Emsby-Mattingly, 2008; Kaplan et al., 2001). A detailed Full Scan GC/MS analysis of the sediment samples should identify the source of the PAHs in the SW15-SLB03 sediments. Microscopic analysis of the sediment samples to detect coal particles would also support a coal source.

Best regards,



Alan Jeffrey, PhD
Senior Geochemist

Boehm, P.D. (2006) Polycyclic Aromatic Hydrocarbons (PAHs) *in* Environmental Forensics, Contaminant Specific Guide, Morrison R.D. and Murphy, B.L. eds. Academic Press, San Diego. pp.313-337.

Kaplan I.R., Lu, S-T, Alimi, H.M., and MacMurphy, J. (2001) Fingerprints of high boiling hydrocarbon fuels, asphalts and lubricants. *Environmental Forensics*, 2, 231-248.

Stout, S.A. and Emsbo-Mattingly, S.D. (2008) Concentration and character of PAHs and other hydrocarbons in coals of varying rank – Implications for environmental studies of soils and sediments containing particulate coal. *Org Geochem*, 39, 801-819.

Yakov, R.Y. and Ketris, M. P. (2005) Arsenic in coal: a review. Int. J. Coal Geology, 61 141– 196.

Table 1. Key to PAH abbreviations

Napthalene	C0N
C1-Napthalenes	C1N
C2-Napthalenes	C2N
C3-Napthalenes	C3N
C4-Napthalenes	C4N
Acenapthylene	ACEY
Acenaphthlene	ACE
Dibenzofuran	DBF
Flourene	C0F
C1-Flourenes	C1F
C2-Flourenes	C2F
C3-Flourenes	C3F
Anthracene	C0A
Phenanthrene	C0P
C1-Phenanthrenes/Anthracenes	C1P/A
C2-Phenanthrenes/Anthracenes	C2P/A
C3-Phenanthrenes/Anthracenes	C3P/A
C4-Phenanthrenes/Anthracenes	C4P/A
Dibenzothiophene	C0D
C1-Dibenzothiophene	C1D
C2-Dibenzothiophene	C2D
C3-Dibenzothiophene	C3D
Flouranthene	FLANT
Pyrene	PYR
C1-Flouranthrenes/Pyrenes	C1F/P
C2-Flouranthrenes/Pyrenes	C2F/P
C3-Flouranthrenes/Pyrenes	C3F/P
Benzo(a)anthracene	BAA
Chrysene	C0C
C1-Chrysenes	C1C
C2-Chrysenes	C2C
C3-Chrysenes	C3C
C4-Chrysenes	C4C
Benzo(b)fluoranthene	BBF
Benzo(k)flouranthene	BKF
Benzo(e)pyrene	BEP
Benzo(a)pyrene	BAP
Perylene	PER
Indeno(1,2,3-cd)pyrene	AND
Dibenzo(a,h)anthracene	DAH
Benzo(g,h,i)perylene	BGP

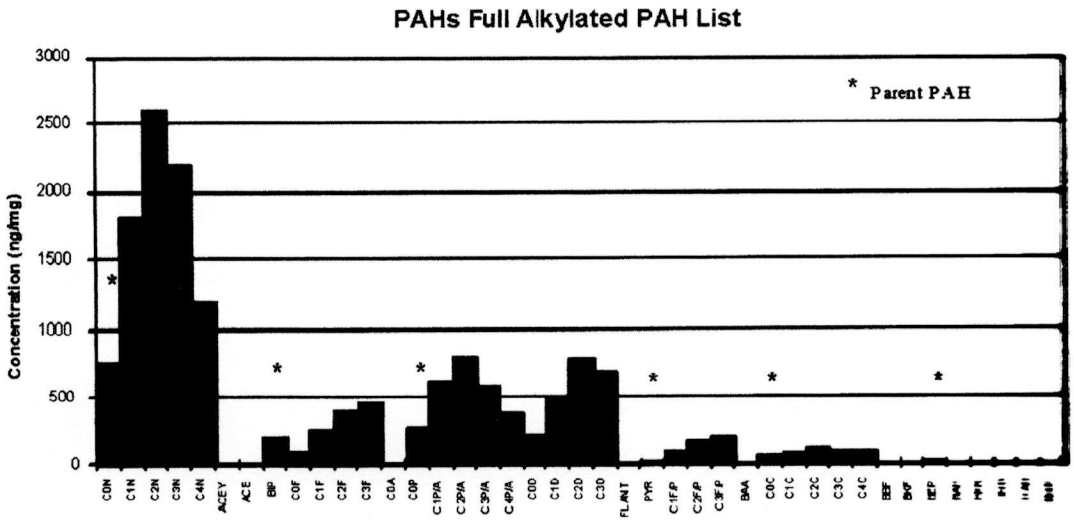


Figure 1. Bar diagram showing PAH concentrations of parent (C0) PAHs for Naphthalene, Fluorene, Anthracene, Phenanthrene, Dibenzothiophene, Fluoranthene, Pyrene, and Chrysene. Each of the C0 PAHs is followed by C1-C3 or C1-C4 alkylated PAHs. Several high molecular weight C0 PAHs, including benzopyrenes and benzofluoranthenes, are displayed towards the right hand side of the bar diagram (Boehm, 2006).

- Petrogenic
  - Alkyl > Parent
  - Little 4 to 6 Ring
- Pyrogenic – Type 1
  - Parent > Alkyl
  - High 2 and 3 Ring
- Pyrogenic – Type 2
  - Parent > Alkyl
  - High 4 to 6 Ring

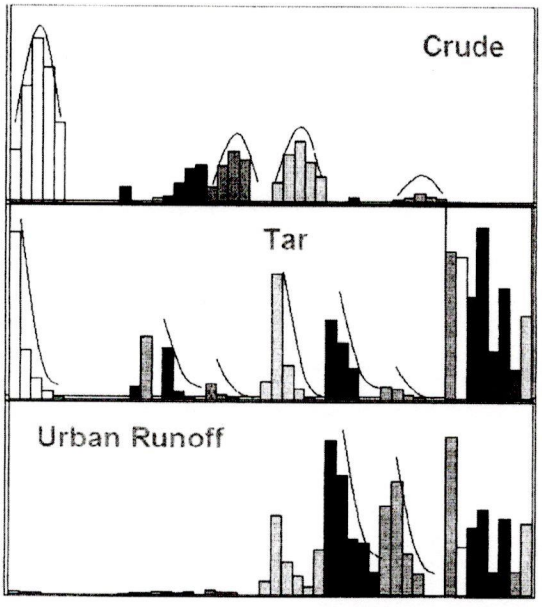


Figure 2. Typical characteristics of PAH assemblages for petrogenic and pyrogenic sources (Boehm, 2006). Petrogenic PAHs show a bell shaped distribution. Pyrogenic PAHs show a distribution skewed towards the parent PAH.

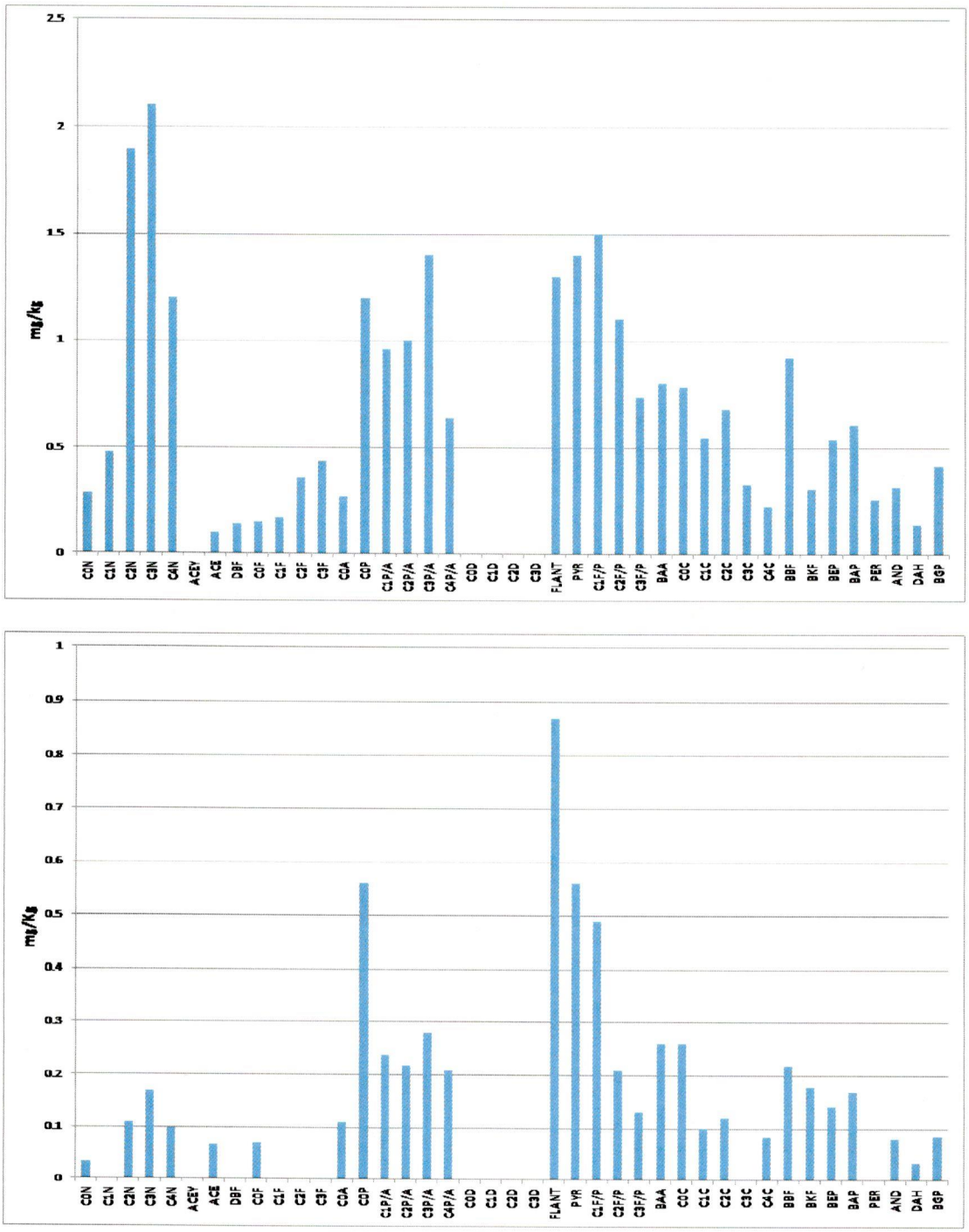


Figure 3. PAH concentrations in SW15-SLB02 0-0.5 (upper) and SW15-SLB05 4-6 (lower). The PAHs in the X-axis correspond to those in Fig 1, except benzothiophenes (C0-3D) were not analyzed in this characterization study. Note the distributions skewed towards parent PAHs in phenanthrenes/anthracenes (P/A), fluoranthenes/ pyrenes (F/P), and chrysenes (C). This is more apparent when anthracene (C0A) and phenanthrene (C0P) are combined, as is more common. Similarly for fluoranthene (FLANT) and pyrene (PYR).

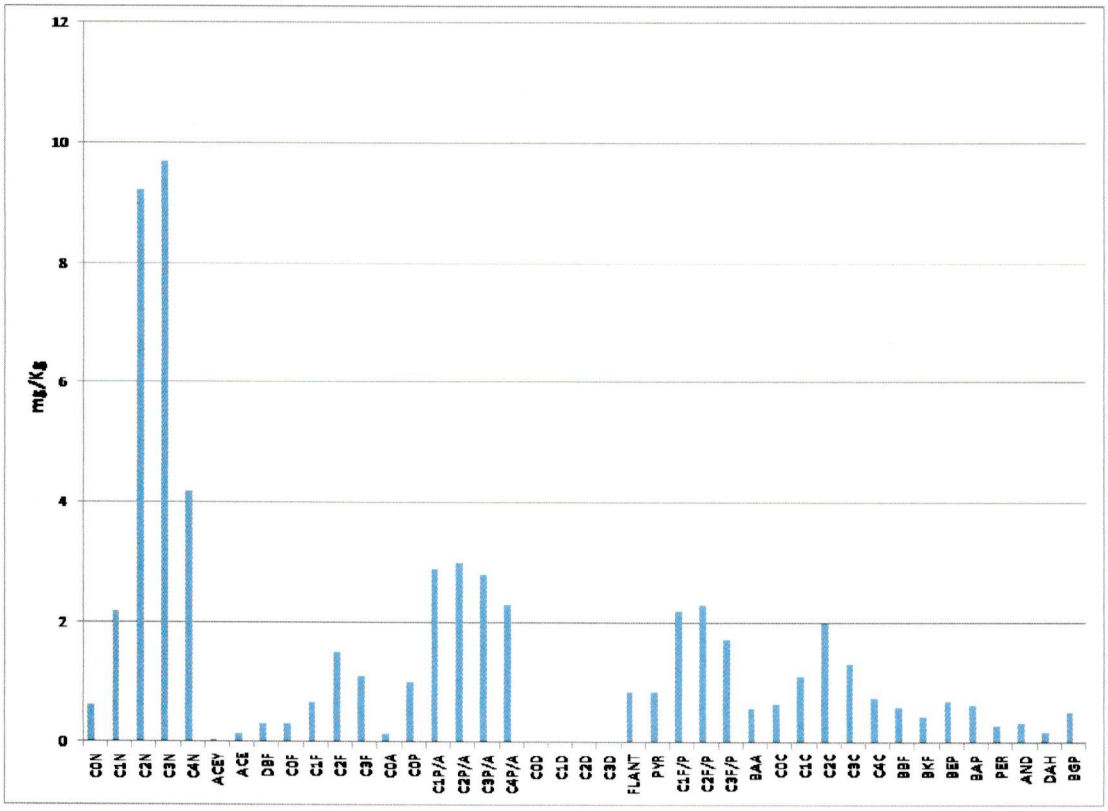


Figure 4. PAH concentrations in SW15-SLB03 0-0.5. Note the bell shaped distributions in phenanthrenes/anthracenes (P/A), fluoranthenes/pyrenes (F/P), and chrysenes (C), and the lower fluorene (F) concentrations.

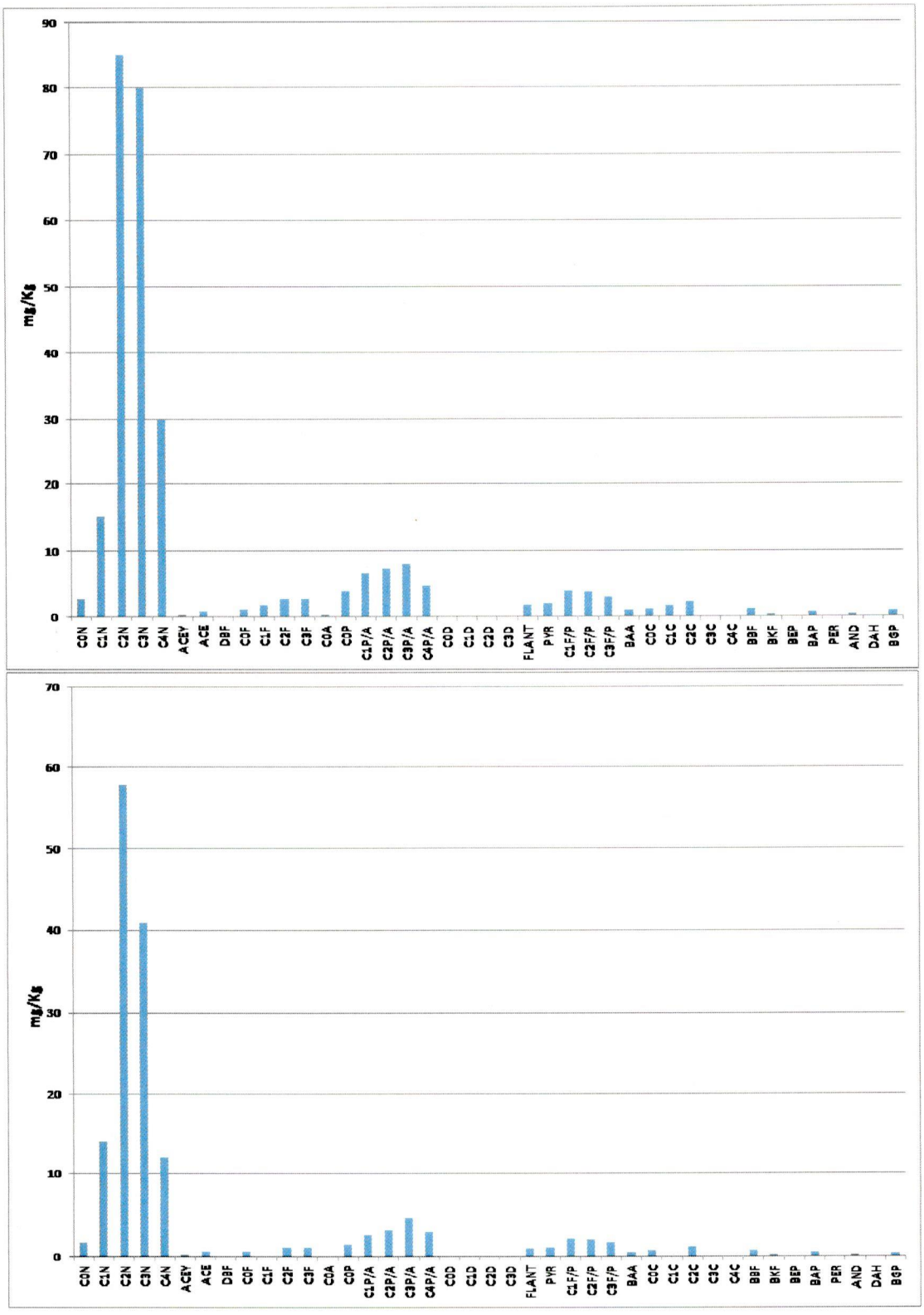


Figure 5. PAH concentrations in SW15-SLB03 4-6 (upper) and SW15-SLB03 8-10 (lower). Note the bell shaped distributions.

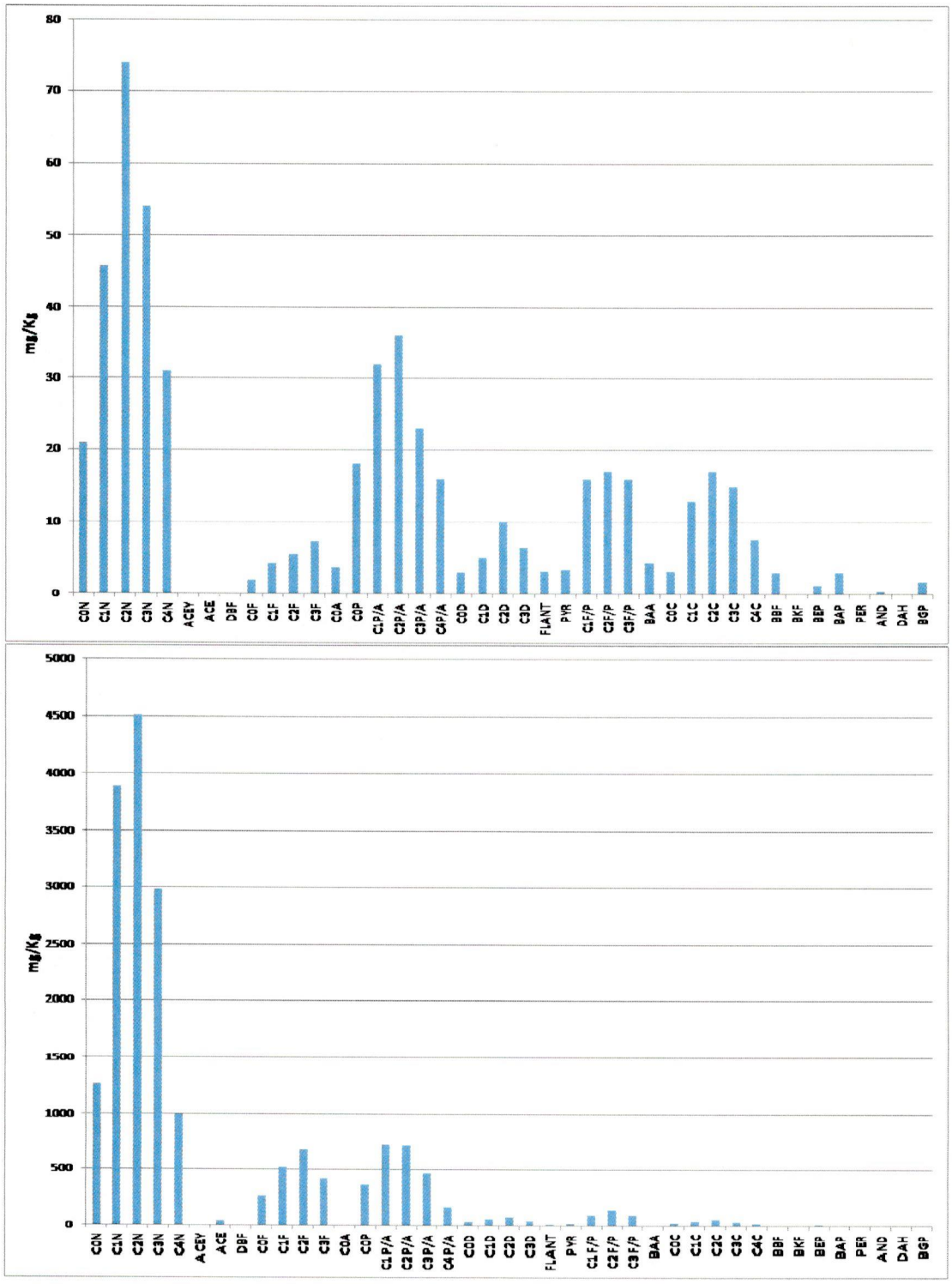


Figure 6. PAH concentrations in a coal (upper) and a crude oil (lower). Note the bell shaped distributions, and lower fluorene (F) than phenanthrenes/anthracenes (P/A) concentrations in the coal. Concentrations from Boehm (2006)

Appendix G

Historical Amoco Fuel Analytical Results – Gasoline Range

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
API GRAVITY	12	60.4	56.6	64.6	2	62.35	61.4	63.3	1	62.9	62.9	62.9
NITROGEN (N2)	0				0				0			
OXYGEN (O2)	0				0				0			
ARGON	0				0				0			
CARBON MONOXIDE	0				0				0			
CARBON DIOXIDE	0				0				0			
HYDROGEN (H2)	0				0				0			
HYDROGEN SULFIDE	0				0				0			
LITHIUM	11	8.91E-05	0.00004	0.00019	2	0.000075	0.00007	0.00008	0			
BORON	1	0.0004	0.0004	0.0004	1	0.0065	0.0065	0.0065	1	0.00155	0.00155	0.00155
SODIUM	11	0.001418	0.0007	0.0017	2	0.00135	0.0013	0.0014	1	0.0009	0.0009	0.0009
MAGNESIUM	0				0				0			
ALUMINUM	10	0.0019	0.001	0.0039	2	0.0014	0.0005	0.0023	1	0.0005	0.0005	0.0005
PHOSPHORUS (YELLOW OR WHITE)	5	0.002	0.0007	0.0041	2	0.001	0.0006	0.0014	1	0.0002	0.0002	0.0002
SULFUR	12	0.073325	0.0016	0.198	2	0.0506	0.0422	0.059	1	0.053	0.053	0.053
POTASSIUM	0				0				0			
CALCIUM	0				0				0			
TITANIUM	0				0				0			
CHROMIUM COMPOUNDS	0				0				0			
IRON	0				0				0			
SILICON	0				0				0			
BERYLLIUM COMPOUNDS	0				0				0			
VANADIUM	11	3.39E-06	1.8E-07	0.0000136	2	9.55E-07	5.9E-07	1.32E-06	1	7E-07	7E-07	7E-07
MANGANESE COMPOUNDS	6	1.53E-06	1.5E-07	0.0000054	1	3E-07	3E-07	3E-07	1	3E-07	3E-07	3E-07
COBALT COMPOUNDS	0				1	3E-07	3E-07	3E-07	1	4E-07	4E-07	4E-07
NICKEL COMPOUNDS	11	9.55E-06	3.8E-06	0.000025	2	9.75E-06	7.1E-06	1.24E-05	0			
COPPER COMPOUNDS	2	4.85E-06	3.3E-06	0.0000064	1	5E-07	5E-07	5E-07	0			
ZINC COMPOUNDS	4	4.3E-06	0.000001	0.0000101	1	0.000001	0.000001	0.000001	1	1.4E-06	1.4E-06	1.4E-06
GALLIUM	4	8.48E-06	5.5E-06	0.0000118	0				0			
GERMANIUM	7	1.09E-06	4.3E-07	0.0000033	2	1.04E-06	6.6E-07	1.41E-06	0			
ARSENIC COMPOUNDS	6	7.33E-07	4E-07	0.0000021	2	5.5E-07	4E-07	7E-07	1	3E-07	3E-07	3E-07
RUBIDIUM	0				0				0			
STRONTIUM	0				0				1	1.7E-07	1.7E-07	1.7E-07
ZIRCONIUM	0				1	1.1E-07	1.1E-07	1.1E-07	1	1.3E-07	1.3E-07	1.3E-07
NIOBIUM	0				0				0			
MOLYBDENUM	3	8.5E-07	1.4E-07	0.0000021	1	3.9E-07	3.9E-07	3.9E-07	1	5.6E-07	5.6E-07	5.6E-07
RUTHENIUM	1	1.7E-07	1.7E-07	1.7E-07	1	1E-07	1E-07	1E-07	0			
RHODIUM	0				0				0			
PALLADIUM	4	1.55E-05	2.7E-07	0.0000611	0				0			
SILVER COMPOUNDS	1	3.3E-06	3.3E-06	0.0000033	0				1	1.1E-07	1.1E-07	1.1E-07
CADMIUM COMPOUNDS	1	6.6E-07	6.6E-07	6.6E-07	0				0			
INDIUM	0				0				0			
TIN	6	3.7E-06	1.1E-07	0.0000213	1	8.2E-07	8.2E-07	8.2E-07	1	2.8E-07	2.8E-07	2.8E-07
ANTIMONY COMPOUNDS	1	1.1E-07	1.1E-07	1.1E-07	0				0			
TELLURIUM	3	2.2E-07	1.1E-07	3.2E-07	1	3E-07	3E-07	3E-07	1	2E-07	2E-07	2E-07
CESIUM	0				0				0			
BARIUM COMPOUNDS	3	1.52E-06	1.4E-07	0.0000039	1	6.1E-06	6.1E-06	6.1E-06	1	2.24E-06	2.24E-06	2.24E-06
LANTHANUM	0				0				0			
CERIUM	0				0				0			
PRAESEODYMIUM	0				0				0			
NEODYMIUM	4	3.1E-07	1.9E-07	5.4E-07	1	3.4E-07	3.4E-07	3.4E-07	0			
EUROPIUM	3	1.17E-07	1E-07	1.4E-07	1	1.5E-07	1.5E-07	1.5E-07	1	1E-07	1E-07	1E-07
SAMARIUM	0				1	1.7E-07	1.7E-07	1.7E-07	0			
GADOLINIUM	2	1.6E-07	1.4E-07	1.8E-07	1	1.4E-07	1.4E-07	1.4E-07	1	1.7E-07	1.7E-07	1.7E-07
TERBIUM	0				0				0			
DYSPROSIUM	1	1.4E-07	1.4E-07	1.4E-07	0				1	1.5E-07	1.5E-07	1.5E-07
HOLMIUM	0				0				0			
ERBIUM	1	1.5E-07	1.5E-07	1.5E-07	0				0			
THULIUM	0				0				0			
YTTERBIUM	3	2E-07	1.2E-07	2.6E-07	1	4.9E-07	4.9E-07	4.9E-07	0			
LUTETIUM	0				1	1.5E-07	1.5E-07	1.5E-07	0			
HAFNIUM	1	2E-07	2E-07	0.0000002	1	1.9E-07	1.9E-07	1.9E-07	0			
TANTALUM	0				0				0			
TUNGSTEN	1	1.3E-07	1.3E-07	1.3E-07	1	1.9E-07	1.9E-07	1.9E-07	0			
MERCURY COMPOUNDS	3	3.33E-07	3E-07	0.0000004	1	4E-07	4E-07	4E-07	1	3E-07	3E-07	3E-07
THALLIUM COMPOUNDS	0				0				0			
LEAD COMPOUNDS	3	1.02E-06	6.1E-07	1.35E-06	1	1.2E-07	1.2E-07	1.2E-07	1	1.23E-06	1.23E-06	1.23E-06
BISMUTH	0				0				0			
THORIUM	0				0				0			
URANIUM	0				0				0			
METHANE	0				0				0			
ACETYLENE	0				0				0			
ETHYLENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
ETHANE	0				0				0			
METHANOL	0				0				0			
ALLENE	0				0				0			
METHYL ACETYLENE	0				0				0			
PROPYLENE (PROPENE)	2	0.2	0.1	0.2	0				1	0.108	0.108	0.108
CYCLOPROPANE	0				0				0			
N-PROPANE	7	0.2	0.1	0.3	0				1	0.226	0.226	0.226
ETHANOL	0				1	10.193	10.193	10.193	1	4.598	4.598	4.598
CHLOROMETHANE (METHYL CHLORIDE)	0				0				0			
1,3-BUTADIENE	0				0				0			
T-2-BUTENE	10	0.3	0.1	0.6	1	0.12	0.12	0.12	1	0.444	0.444	0.444
C-2-BUTENE	10	0.2	0.1	0.5	1	0.117	0.117	0.117	1	0.283	0.283	0.283
CYCLOBUTANE	0				0				0			
1-BUTENE	0				0				0			
ISOBUTYLENE AND 1-BUTENE	8	0.3	0.1	0.9	0				1	0.67	0.67	0.67
ACETONE	0				0				0			
ISOBUTANE	12	1.8	0.2	7.0	2	0.3205	0.315	0.326	1	1.976	1.976	1.976
N-BUTANE	12	5.2	0.7	8.6	2	8.48	3.88	13.08	1	6.723	6.723	6.723
ETHYLENE GLYCOL	0				0				0			
VINYL CHLORIDE	0				0				0			
CHLOROETHANE (ETHYL CHLORIDE)	0				0				0			
CYCLOPENTENE	0				0				0			
C5 (UNSPECIFIED)	0				0				0			
3-METHYL-1-BUTENE	10	0.2	0.1	0.4	1	0.235	0.235	0.235	1	0.247	0.247	0.247
2-METHYL-1-BUTENE	12	1.2	0.4	2.3	2	0.876	0.445	1.307	1	0.972	0.972	0.972
1-PENTENE	12	0.6	0.2	1.2	2	0.389	0.159	0.619	1	0.814	0.814	0.814
T-2-PENTENE	12	1.3	0.4	2.4	2	0.794	0.399	1.189	1	1.191	1.191	1.191
C-2-PENTENE	12	0.8	0.2	1.8	2	0.5345	0.204	0.865	1	1.207	1.207	1.207
CYCLOPENTANE	12	0.6	0.3	1.0	2	0.8575	0.428	1.287	1	0.651	0.651	0.651
2-METHYL-2-BUTENE	12	2.4	0.9	4.0	2	2.7835	1.475	4.092	1	3.027	3.027	3.027
METHYL ETHYL KETONE	0				0				0			
ISOPENTANE	12	10.5	4.3	18.8	2	10.4005	5.092	15.709	1	7.246	7.246	7.246
N-PENTANE	12	4.9	2.2	9.1	2	3.1225	2.656	3.589	1	5.534	5.534	5.534
2,2-DIMETHYLPROPANE	0				0				0			
N-BUTANOL	0				0				0			
CARBON DISULFIDE	0				0				0			
BENZENE	12	2.4	0.4	4.3	2	0.9205	0.536	1.305	1	2.441	2.441	2.441
T-3-METHYL-1,3-PENTADIENE	0				0				0			
C6H10 BRANCHED OLEFINS	0				0				0			
C6H10	0				0				0			
1-METHYLCYCLOPENTENE	0				0				0			
4-METHYL-1-PENTENE	4	0.1	0.1	0.2	1	0.115	0.115	0.115	1	0.105	0.105	0.105
1-HEXENE	11	0.2	0.1	0.4	2	0.1965	0.09	0.303	1	0.339	0.339	0.339
T-2-HEXENE	12	0.4	0.2	0.5	2	0.3215	0.198	0.445	1	0.568	0.568	0.568
2-METHYL-2-PENTENE	12	0.4	0.3	0.6	2	0.441	0.28	0.602	1	0.557	0.557	0.557
C-2-HEXENE	11	0.2	0.1	0.4	2	0.2105	0.118	0.303	1	0.361	0.361	0.361
METHYLCYCLOPENTANE	12	1.7	1.0	2.7	2	1.4165	0.836	1.997	1	1.475	1.475	1.475
CYCLOHEXANE	12	0.6	0.1	1.4	2	0.286	0.173	0.399	1	0.734	0.734	0.734
T-3-HEXENE	0				0				0			
T-3-METHYL-2-PENTENE	0				0				0			
2-METHYL-1-PENTENE	0				0				0			
3-METHYL-2-PENTENE	0				0				0			
METHYLPENTENES	0				0				0			
VINYL ACETATE	0				0				0			
2,3-DIMETHYLBUTANE	12	1.1	0.5	1.9	2	0.8205	0.546	1.095	1	1.14	1.14	1.14
2-METHYLPENTANE	12	4.8	3.0	6.8	2	4.9415	3.651	6.232	1	4.363	4.363	4.363
3-METHYLPENTANE	12	2.8	1.8	3.7	2	3.1185	2.527	3.71	1	2.625	2.625	2.625
N-HEXANE	12	2.6	1.8	4.3	2	1.849	1.142	2.556	1	2.339	2.339	2.339
2,2-DIMETHYLBUTANE	11	0.9	0.2	2.7	2	0.535	0.453	0.617	1	0.207	0.207	0.207
METHYL TERT-BUTYL ETHER	3	1.7	0.2	4.4	1	10.383	10.383	10.383	0			
DIMETHYL DISULFIDE	0				0				0			
2-ETHOXY-2-METHYLBUTANE	0				0				0			
TOLUENE	12	8.3	2.8	18.7	2	3.381	2.297	4.465	1	6.493	6.493	6.493
PHENOL	0				0				0			
BROMOMETHANE (METHYL BROMIDE)	0				0				0			
C7H12 BRANCHED OLEFINS	0				0				0			
T-1,2-DICHLOROETHYLENE	0				0				0			
C-1,2-DICHLOROETHENE	0				0				0			
1,1-DICHLOROETHENE	0				0				0			
1,1-DIMETHYLCYCLOPENTANE	2	0.1	0.1	0.1	0				0			
T-1,3-DIMETHYLCYCLOPENTANE	12	0.3	0.2	0.4	2	0.2865	0.211	0.362	1	0.273	0.273	0.273
C-1,3-DIMETHYLCYCLOPENTANE	12	0.3	0.2	0.4	2	0.2885	0.233	0.344	1	0.274	0.274	0.274
T-1,2-DIMETHYLCYCLOPENTANE	12	0.2	0.1	0.3	2	0.1685	0.161	0.176	1	0.194	0.194	0.194

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1-HEPTENE	8	0.1	0.1	0.2	2	0.1425	0.125	0.16	1	0.177	0.177	0.177
T-3-HEPTENE	11	0.2	0.1	0.3	2	0.1675	0.13	0.205	1	0.291	0.291	0.291
C-3-HEPTENE	7	0.4	0.2	0.5	2	0.266	0.207	0.325	1	0.426	0.426	0.426
T-2-HEPTENE	10	0.1	0.1	0.2	2	0.117	0.091	0.143	1	0.239	0.239	0.239
C-2-HEPTENE	9	0.2	0.1	0.4	1	0.145	0.145	0.145	1	0.239	0.239	0.239
METHYLCYCLOHEXANE	12	0.6	0.3	1.7	2	0.3635	0.35	0.377	1	0.512	0.512	0.512
ETHYLCYCLOPENTANE	11	0.1	0.1	0.2	2	0.135	0.134	0.136	1	0.137	0.137	0.137
3,4-DIMETHYL-2-PENTENE	0				0				0			
2,3-DIMETHYL-2-PENTENE	0				0				0			
METHYL-2-HEXENE	0				0				0			
1,1-DICHLOROETHANE	0				0				0			
1,2-DICHLOROETHANE (ETHYLENE DICHLOR	0				0				0			
1-METHYL-2-PYRROLIDONE (NMP)	0				0				0			
T-AMYL-METHYLETHER	0				0				0			
4-METHYL-2-PENTANONE (MIBK)	0				0				0			
METHYL N-BUTYL KETONE	0				0				0			
2,2-DIMETHYLPENTANE	10	0.2	0.1	0.3	1	0.179	0.179	0.179	1	0.13	0.13	0.13
2,4-DIMETHYLPENTANE	12	0.5	0.1	1.3	2	0.3765	0.274	0.479	1	0.345	0.345	0.345
2,2,3-TRIMETHYLBUTANE	0				0				0			
3,3-DIMETHYLPENTANE	10	0.1	0.1	0.3	1	0.191	0.191	0.191	1	0.115	0.115	0.115
2-METHYLHEXANE	12	1.4	0.5	2.4	2	1.526	0.843	2.209	1	1.466	1.466	1.466
2,3-DIMETHYLPENTANE	12	1.0	0.2	3.1	2	0.6445	0.537	0.752	1	0.677	0.677	0.677
3-ETHYLPENTANE	11	0.2	0.1	0.2	2	0.14	0.095	0.185	1	0.155	0.155	0.155
N-HEPTANE	12	1.1	0.3	1.8	2	1.1065	0.366	1.847	1	1.183	1.183	1.183
3-METHYLHEXANE	12	1.6	0.6	2.7	2	1.5995	0.804	2.395	1	1.721	1.721	1.721
METHYL CELLOSOLVE	0				0				0			
METHYL ETHYL DISULFIDE	0				0				0			
ETHYL TERT-BUTYL ETHER (ETBE)	0				0				0			
STYRENE	0				0				0			
ETHYLBENZENE	12	0.7	0.2	1.4	2	0.495	0.309	0.681	1	0.656	0.656	0.656
M-XYLENE	12	2.0	0.5	4.6	2	1.183	0.793	1.573	1	1.689	1.689	1.689
P-XYLENE	12	0.8	0.2	1.8	2	0.952	0.28	1.624	1	0.69	0.69	0.69
O-XYLENE	12	1.0	0.2	2.2	2	0.589	0.359	0.819	1	0.689	0.689	0.689
2-CHLOROETHYL VINYL ETHER	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTENE	0				0				0			
1,1,3-TRIMETHYLCYCLOPENTANE	0				0				0			
C-1,3-DICHLOROPROPENE	0				0				0			
TRANS-1,3-DICHLOROPROPENE	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTANE	1	0.3	0.3	0.3	0				0			
T-1,2-DIMETHYLCYCLOHEXANE	0				0				0			
T-2-OCTENE	2	0.1	0.1	0.1	0				1	0.097	0.097	0.097
ISOPROPYLCYCLOPENTANE	0				0				0			
C-2-OCTENE	0				0				1	0.115	0.115	0.115
C-1,2-DIMETHYLCYCLOHEXANE	1	0.1	0.1	0.1	0				0			
N-PROPYLCYCLOPENTANE	1	0.1	0.1	0.1	0				1	0.158	0.158	0.158
C-1,3-DIMETHYLCYCLOHEXANE	0				0				0			
ETHYLCYCLOHEXANE	0				0				0			
4-METHYL-3-HEPTENE	0				0				0			
2,5-DIMETHYL-2-HEXENE	0				0				0			
2,3-DIMETHYL-2-HEXENE	0				0				0			
CTC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CCT-1,2,4-TRIMETHYLCYCLOPENTANE	1	0.1	0.1	0.1	0				0			
T-1,4-DIMETHYLCYCLOHEXANE	1	0.1	0.1	0.1	0				0			
1-OCTENE	7	0.1	0.1	0.1	1	0.084	0.084	0.084	1	0.11	0.11	0.11
CCC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CHLOROBENZENE	0				0				0			
1,2-DICHLOROPROPANE	0				0				0			
2,2-DIMETHYLHEXANE	1	0.1	0.1	0.1	1	0.087	0.087	0.087	0			
2,5-DIMETHYLHEXANE	11	0.2	0.1	0.4	2	0.17	0.168	0.172	1	0.176	0.176	0.176
2,2,3-TRIMETHYLPENTANE	3	0.2	0.1	0.3	0				0			
2-METHYLHEPTANE	12	0.5	0.3	0.9	2	0.5605	0.232	0.889	1	0.584	0.584	0.584
4-METHYLHEPTANE	12	0.2	0.1	0.6	2	0.2045	0.094	0.315	1	0.194	0.194	0.194
3-ETHYLHEXANE	9	0.1	0.1	0.2	1	0.155	0.155	0.155	1	0.107	0.107	0.107
N-OCTANE	12	0.4	0.1	0.9	2	0.456	0.125	0.787	1	0.381	0.381	0.381
2,3-DIMETHYLHEXANE	10	0.3	0.1	0.8	2	0.1605	0.14	0.181	1	0.241	0.241	0.241
2,3,4-TRIMETHYLPENTANE	0				0				0			
2,3,3-TRIMETHYLPENTANE	0				0				0			
DIMETHYLHEXANE (UNSPECIFIED)	0				0				0			
2,4-DIMETHYLHEXANE	12	0.2	0.1	0.4	2	0.2095	0.181	0.238	1	0.277	0.277	0.277
3-METHYLHEPTANE	12	0.5	0.3	0.9	2	0.56	0.236	0.884	1	0.572	0.572	0.572
2,2,4-TRIMETHYLPENTANE	8	1.0	0.2	1.7	1	0.419	0.419	0.419	1	0.708	0.708	0.708
C8-C9 BRANCHED ALKANES	0				0				0			
INDENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
INDAN	0				0				0			
CHLOROFORM	0				0				0			
CUMENE (Isopropyl Benzene)	3	0.2	0.1	0.3	0				0			
N-PROPYLBENZENE	12	0.3	0.1	0.5	2	0.1595	0.103	0.216	1	0.124	0.124	0.124
1-METHYL-3-ETHYLBENZENE	12	1.1	0.3	1.7	2	0.805	0.546	1.064	1	0.514	0.514	0.514
1-METHYL-4-ETHYLBENZENE	12	0.4	0.2	0.7	2	0.2755	0.188	0.363	1	0.153	0.153	0.153
MESITYLENE (1,2,5 TMB)	12	0.5	0.1	0.8	2	0.334	0.269	0.399	1	0.202	0.202	0.202
1-METHYL-2-ETHYLBENZENE	12	0.4	0.1	0.7	2	0.2465	0.171	0.322	1	0.134	0.134	0.134
1,2,4-TRIMETHYLBENZENE	12	1.6	0.4	2.8	2	1.4025	1.21	1.595	1	0.542	0.542	0.542
1,2,3-TRIMETHYLBENZENE	12	0.3	0.1	0.6	2	0.2335	0.217	0.25	1	0.122	0.122	0.122
TRIMETHYLBENZENES	0				0				0			
C9-C14 BRANCHED ALKANES	0				0				0			
2,4-DIMETHYLPHENOL	0				0				0			
4-CHLORO-3-METHYLPHENOL	0				0				0			
1,1,3-TRIMETHYLCYCLOHEXANE	0				0				0			
T-1,4-DICHLOROBUTENE	0				0				0			
BIS(2-CHLOROETHOXY)METHANE	0				0				0			
1,1,4-TRIMETHYLCYCLOHEXANE	0				0				0			
1,1,2-TRIMETHYLCYCLOHEXANE	0				0				0			
1-NONENE	0				0				0			
ISOBUTYLCYCLOPENTANE	0				0				0			
T-3-NONENE	1	0.1	0.1	0.1	0				0			
ISOPROPYLCYCLOHEXANE	0				0				0			
PROPYLCYCLOHEXANE	0				0				0			
N-PROPYLCYCLOHEXANE	0				0				0			
CCC-1,3,5-TRIMETHYLCYCLOHEXANE	0				0				0			
CTT-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0			
C-3-NONENE	6	0.1	0.1	0.2	0				1	0.108	0.108	0.108
T-2-NONENE	0				0				0			
METHYL-ETHYLCYCLOHEXANES	0				0				0			
C9H18 (UNSPECIFIED)	0				0				0			
CTC-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0			
C-2-NONENE	0				0				0			
NAPHTHALENE	9	0.3	0.1	0.6	2	0.269	0.156	0.382	0			
3,5-DIMETHYLHEPTANE	5	0.2	0.1	0.2	1	0.312	0.312	0.312	1	0.201	0.201	0.201
2,5-DIMETHYLHEPTANE	4	0.2	0.1	0.2	1	0.312	0.312	0.312	1	0.201	0.201	0.201
3,3-DIMETHYLHEPTANE	0				0				0			
2,3-DIMETHYLHEPTANE	1	0.1	0.1	0.1	1	0.085	0.085	0.085	0			
3,4-DIMETHYLHEPTANE(D)	0				0				0			
3,4-DIMETHYLHEPTANE(L)	0				0				0			
3,3-DIETHYLPENTANE	0				0				0			
N-NONANE	9	0.2	0.1	0.2	1	0.29	0.29	0.29	1	0.176	0.176	0.176
2,2,5-TRIMETHYLHEXANE	0				0				0			
2,3,4-TRIMETHYLHEXANE	0				0				0			
2,6-DIMETHYLHEPTANE	0				0				0			
2-METHYLOCTANE	10	0.1	0.1	0.2	1	0.189	0.189	0.189	0			
3-METHYLOCTANE	4	0.2	0.1	0.2	0				0			
4-BROMOPHENYLPHENYL ETHER	0				0				0			
TRICHLOROETHYLENE	0				0				0			
C10H12 (UNSPECIFIED)	0				0				0			
1,1,1-TRICHLOROETHANE (METHYL CHLORC	0				0				0			
1,1,2-TRICHLOROETHANE	0				0				0			
TERT-BUTYLBENZENE	0				0				0			
ISOBUTYLBENZENE	0				0				0			
SEC-BUTYLBENZENE	1	0.1	0.1	0.1	0				0			
1-METHYL-3-ISOPROPYLBENZENE	3	0.1	0.1	0.3	0				0			
1-METHYL-4-ISOPROPYLBENZENE	1	0.2	0.2	0.2	0				0			
1-METHYL-2-ISOPROPYLBENZENE	1	0.3	0.3	0.3	0				0			
N-BUTYLBENZENE	2	0.1	0.1	0.1	1	0.08	0.08	0.08	0			
1,2-DIETHYLBENZENE	1	0.1	0.1	0.1	0				0			
1-METHYL-2-N-PROPYLBENZENE	4	0.1	0.1	0.1	1	0.083	0.083	0.083	0			
1,4-DIMETHYL-2-ETHYLBENZENE	11	0.2	0.1	0.4	2	0.178	0.159	0.197	0			
1,2-DIMETHYL-4-ETHYLBENZENE	12	0.6	0.1	2.2	2	0.41	0.279	0.541	1	0.087	0.087	0.087
1,3-DIMETHYL-2-ETHYLBENZENE	0				0				0			
1,2,4,5-TETRAMETHYLBENZENE	9	0.2	0.1	0.2	2	0.145	0.136	0.154	0			
1,3-DIMETHYL-5-ETHYLBENZENE	12	0.3	0.1	0.9	2	0.2635	0.251	0.276	1	0.086	0.086	0.086
1,3-DIETHYLBENZENE	0				0				0			
1-METHYL-4-N-PROPYLBENZENE	8	0.1	0.1	0.3	2	0.1125	0.091	0.134	0			
1,3-DIMETHYL-4-ETHYLBENZENE	11	0.2	0.1	0.4	2	0.207	0.199	0.215	0			
1,2-DIMETHYL-3-ETHYLBENZENE	8	0.1	0.1	0.2	0				0			
TETRAMETHYLBENZENE (UNSPECIFIED)	0				0				0			
1,4-DIETHYLBENZENE	0				0				0			
PROPENYL OR ISOPROPENYL BENZENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1-METHYL-3-N-PROPYLBENZENE	11	0.2	0.1	0.4	2	0.223	0.199	0.247	1	0.082	0.082	0.082
2-METHYLBUTYLBENZENE	0				0				0			
(E)-DECAHYDRONAPHTHALENE (DECALIN)	0				0				0			
N-BUTYLCYCLOPENTANE	0				0				0			
(E)-1-METHYL-2-PROPYLCYCLOHEXANE	0				0				0			
ISOBUTYLCYCLOHEXANE	0				0				0			
1-DECENE	0				0				0			
2-METHYLNAPHTHALENE	5	0.2	0.1	0.4	1	0.37	0.37	0.37	0			
1-METHYLNAPHTHALENE	1	0.1	0.1	0.1	1	0.148	0.148	0.148	0			
2,2-DIMETHYLOCTANE	0				0				0			
3,3-DIMETHYLOCTANE	0				0				0			
2,3-DIMETHYLOCTANE	0				0				0			
2-METHYLNONANE	8	0.1	0.1	0.2	1	0.09	0.09	0.09	1	0.083	0.083	0.083
3-ETHYLOCTANE	0				0				0			
3-METHYLNONANE	3	0.1	0.1	0.1	0				0			
N-DECANE	8	0.1	0.1	0.1	2	0.1025	0.09	0.115	1	0.131	0.131	0.131
2,6-DIMETHYLOCTANE	0				0				0			
DIMETHYLOCTANE (UNSPECIFIED)	0				0				0			
3,5-DIMETHYLOCTANE	0				0				0			
2,3,6-TRIMETHTYLHEPTANE	0				0				0			
2,2,5-TRIMETHYLHEPTANE	0				0				0			
C10-C11 BRANCHED ALKANES	0				0				0			
C11 TETRAHYDRONAPHTHALENES	0				0				0			
TERT-1-BUTYL-2-METHYLBENZENE	0				0				0			
N-PENTYLBENZENE	0				0				0			
PENTAMETHYLBENZENE	0				0				0			
(E)-1-METHYL-2-(4-METHYLPENTYL)CYCLOP	0				0				0			
ACENAPHTHYLENE	0				0				0			
CARBON TETRACHLORIDE	0				0				0			
BIPHENYL	0				0				0			
ACENAPHTHENE	0				0				0			
ETHYLNAPHTHALENE	0				0				0			
DIMETHYLNAPHTHALENES	0				0				0			
N-UNDECANE	5	0.1	0.1	0.2	1	0.116	0.116	0.116	0			
2,4,6-TRIMETHYLOCTANE	0				0				0			
2,6-DIMETHYLNONANE	0				0				0			
C12-C14 BRANCHED ALKANES	0				0				0			
TRIMETHYLNAPHTHALENES	0				0				0			
C12 TETRAHYDRONAPHTHALENES	0				0				0			
TERT-1-BUTYL-3,5-DIMETHYLBENZENE	0				0				0			
1,3,5-TRIETHYLBENZENE	0				0				0			
1,2,4-TRIETHYLBENZENE	0				0				0			
N-HEXYLBENZENE	0				0				0			
1-TERT-BUTYL-4-ETHYLBENZENE	0				0				0			
BETA-CHLORONAPHTHALENE	0				0				0			
DIBROMOCHLOROMETHANE	0				0				0			
TETRACHLOROETHYLENE	0				0				0			
FLUORENE	0				0				0			
1,1,2,2-TETRACHLOROETHANE	0				0				0			
2-PHENYLPHENOL	0				0				0			
C13H14	0				0				0			
N-DODECANE	3	0.2	0.1	0.2	1	0.11	0.11	0.11	0			
PHENANTHRENE	0				0				0			
ANTHRACENE	0				0				0			
N-TRIDECANE	2	0.2	0.1	0.2	0				0			
C13 BRANCHED ALKANES	0				0				0			
1,2-DIBROMOETHANE (ETHYLENE DIBROMID	0				0				0			
N-TETRADECANE	0				0				0			
C14 PHENOL	0				0				0			
FLUORANTHENE	0				0				0			
PYRENE	0				0				0			
DICHLOROBROMOMETHANE	0				0				0			
N-PENTADECANE	0				0				0			
C15 BRANCHED ALKANE	0				0				0			
BENZO(A)ANTHRACENE	0				0				0			
N-HEXADECANE	0				0				0			
C16 BRANCHED ALKANES	0				0				0			
BENZO(A)PHENANTHRENE	0				0				0			
C16-C18 BRANCHED ALKANES	0				0				0			
BRANCHED ALKANE (PHYTANE)	0				0				0			
BENZO(B)FLUORANTHENE	0				0				0			
N-HEPTADECANE	0				0				0			
BENZO(K)FLUORANTHENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	9				9				9			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	IONAL, T/ UL REG				UL REG RFG				UL REG OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
BENZO(A)PYRENE	0				0				0			
BROMOFORM (TRIBROMOMETHANE)	0				0				0			
N-OCTADECANE	3	0.0	0.0	0.0	0				0			
	0				0				0			
Total Wt% by Analysis	12	80.8	64.2	93.6	2	77.59269	74.80419	80.3812	1	78.66416	78.66416	78.66416
TOTAL WT% BTEX	12	15.3	8.3	23.1	2	7.5205	7.511	7.53	1	12.658	12.658	12.658
TOTAL WT % HAPS	12	19.2	13.1	26.5	2	15.0405	9.4546	20.6264	1	15.7052	15.7052	15.7052
TOTAL WT% TNMNEHC	12	80.7	64.0	93.6	2	77.535	74.74	80.33	1	78.608	78.608	78.608
TOTAL WT% SARA313	12	16.6	11.3	23.6	2	13.26802	8.292623	18.24341	1	13.50021	13.50021	13.50021

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		10				10				10		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		SILVER				SILVER RFG				SILVER OXY		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
API GRAVITY	9	59.01111	55.4	64.8	1	60.1	60.1	60.1	2	61.10	60.80	61.40
NITROGEN (N2)	0				0				0			
OXYGEN (O2)	0				0				0			
ARGON	0				0				0			
CARBON MONOXIDE	0				0				0			
CARBON DIOXIDE	0				0				0			
HYDROGEN (H2)	0				0				0			
HYDROGEN SULFIDE	0				0				0			
LITHIUM	8	0.00008	0.00003	0.00014	0				1	0.00004	0.00004	0.00004
BORON	1	0.0001	0.0001	0.0001	1	0.00003	0.00003	0.00003	2	0.003915	0.00143	0.0064
SODIUM	10	0.001306	0.00006	0.0023	0				2	0.0008	0.0008	0.0008
MAGNESIUM	1	0.000008	0.000008	0.000008	1	0.0003	0.0003	0.0003	0			
ALUMINUM	8	0.001963	0.001	0.0031	1	0.0009	0.0009	0.0009	1	0.0012	0.0012	0.0012
PHOSPHORUS (YELLOW OR WHITE)	6	0.0011	0.0003	0.0027	1	0.0005	0.0005	0.0005	2	0.0004	0.0002	0.0006
SULFUR	8	0.078313	0.036	0.178	0				2	0.041	0.0363	0.0457
POTASSIUM	0				0				0			
CALCIUM	1	0.000065	0.000065	0.000065	0				0			
TITANIUM	0				0				0			
CHROMIUM COMPOUNDS	1	0.000065	0.000065	0.000065	0				0			
IRON	2	0.000028	0.000006	0.00005	1	0.00001	0.00001	0.00001	0			
SILICON	0				0				0			
BERYLLIUM COMPOUNDS	0				0				0			
VANADIUM	8	1.42E-05	3.6E-07	6.42E-05	1	7.8E-07	7.8E-07	7.8E-07	2	8.05E-07	7E-07	9.1E-07
MANGANESE COMPOUNDS	7	1.05E-05	1.8E-07	3.22E-05	0				2	2.25E-07	2E-07	2.5E-07
COBALT COMPOUNDS	0				1	1E-07	1E-07	1E-07	2	1.95E-07	1.4E-07	2.5E-07
NICKEL COMPOUNDS	8	2.69E-05	3.7E-06	0.000087	0				2	5.8E-06	4.6E-06	0.000007
COPPER COMPOUNDS	5	7.24E-06	0.000001	1.74E-05	0				0			
ZINC COMPOUNDS	5	6.26E-06	1.7E-06	1.62E-05	0				1	1.3E-06	1.3E-06	1.3E-06
GALLIUM	4	5.8E-05	0.000003	0.000187	1	1E-07	1E-07	1E-07	0			
GERMANIUM	6	3.4E-06	2.8E-07	0.00001	1	6.3E-07	6.3E-07	6.3E-07	2	5.2E-07	3.7E-07	6.7E-07
ARSENIC COMPOUNDS	3	6.33E-07	4E-07	0.000001	0				2	4.5E-07	4E-07	5E-07
RUBIDIUM	0				0				0			
STRONTIUM	0				0				0			
ZIRCONIUM	0				0				0			
NIOBIUM	0				1	1E-07	1E-07	1E-07	0			
MOLYBDENUM	1	0.000002	0.000002	0.000002	0				2	1.8E-07	1.6E-07	2E-07
RUTHENIUM	3	9.7E-07	1.2E-07	2.5E-06	0				0			
RHODIUM	0				0				0			
PALLADIUM	3	5.13E-06	3.4E-06	8.3E-06	0				0			
SILVER COMPOUNDS	1	0.00002	0.00002	0.00002	0				0			
CADMIUM COMPOUNDS	0				0				0			
INDIUM	0				1	1E-07	1E-07	1E-07	0			
TIN	3	8.33E-07	1.3E-07	0.000002	0				2	9.85E-07	3.9E-07	1.58E-06
ANTIMONY COMPOUNDS	0				1	1E-07	1E-07	1E-07	0			
TELLURIUM	2	1.6E-07	1.2E-07	2E-07	0				1	1.3E-07	1.3E-07	1.3E-07
CESIUM	0				0				0			
BARIUM COMPOUNDS	2	1.24E-06	1.8E-07	2.3E-06	0				2	4.94E-06	7.8E-07	9.1E-06
LANTHANUM	0				0				0			
CERIUM	0				0				0			
PRAESEODYMIUM	0				1	1E-07	1E-07	1E-07	0			
NEODYMIUM	3	2.87E-07	2.3E-07	3.4E-07	1	2.9E-07	2.9E-07	2.9E-07	1	2.4E-07	2.4E-07	2.4E-07
EUROPIUM	2	1.25E-07	1.2E-07	1.3E-07	0				1	1.1E-07	1.1E-07	1.1E-07
SAMARIUM	1	1E-07	1E-07	1E-07	1	1E-07	1E-07	1E-07	0			
GADOLINIUM	2	2.2E-07	2E-07	2.4E-07	0				1	1.7E-07	1.7E-07	1.7E-07
TERBIUM	0				0				0			
DYSPROSIUM	0				0				0			
HOLMIUM	0				0				0			
ERBIUM	0				0				0			
THULIUM	0				1	1E-07	1E-07	1E-07	0			
YTTERBIUM	3	4.47E-07	2E-07	6.2E-07	0				1	1.8E-07	1.8E-07	1.8E-07
LUTETIUM	0				0				0			
HAFNIUM	0				0				0			
TANTALUM	0				1	1E-07	1E-07	1E-07	0			
TUNGSTEN	3	1.7E-07	1.1E-07	2.7E-07	0				0			
MERCURY COMPOUNDS	2	3E-07	3E-07	3E-07	0				2	2E-07	2E-07	2E-07
THALLIUM COMPOUNDS	0				0				0			
LEAD COMPOUNDS	2	2.57E-05	2.04E-06	4.94E-05	0				2	1.33E-06	1.31E-06	1.35E-06
BISMUTH	0				0				0			
THORIUM	0				0				0			
URANIUM	0				0				0			
METHANE	0				0				0			
ACETYLENE	0				0				0			
ETHYLENE	0				0				0			

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		10				10				10		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		SILVER				SILVER RFG				SILVER OXY		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
ETHANE	0				0				0			
METHANOL	0				0				0			
ALLENE	0				0				0			
METHYL ACETYLENE	0				0				0			
PROPYLENE (PROPENE)	1	0.11	0.11	0.11	0				2	0.16	0.15	0.17
CYCLOPROPANE	0				0				0			
N-PROPANE	4	0.17	0.08	0.33	0				2	0.32	0.29	0.35
ETHANOL	0				0				2	4.90	4.88	4.92
CHLOROMETHANE (METHYL CHLORIDE)	0				0				0			
1,3-BUTADIENE	0				0				0			
T-2-BUTENE	7	0.32	0.09	0.73	1	0.34	0.34	0.34	2	0.63	0.61	0.64
C-2-BUTENE	8	0.18	0.08	0.29	1	0.16	0.16	0.16	2	0.60	0.58	0.63
CYCLOBUTANE	0				0				0			
1-BUTENE	0				0				0			
ISOBUTYLENE AND 1-BUTENE	5	0.25	0.10	0.52	1	0.18	0.18	0.18	2	0.73	0.69	0.78
ACETONE	0				0				0			
ISOBUTANE	10	1.62	0.10	6.83	1	0.65	0.65	0.65	2	2.04	1.88	2.21
N-BUTANE	10	4.68	0.35	10.61	1	7.83	7.83	7.83	2	8.03	7.37	8.70
ETHYLENE GLYCOL	0				0				0			
VINYL CHLORIDE	0				0				0			
CHLOROETHANE (ETHYL CHLORIDE)	0				0				0			
CYCLOPENTENE	0				0				0			
C5 (UNSPECIFIED)	0				0				0			
3-METHYL-1-BUTENE	7	0.19	0.10	0.35	1	0.12	0.12	0.12	2	0.25	0.25	0.25
2-METHYL-1-BUTENE	10	1.02	0.21	3.08	1	0.66	0.66	0.66	2	0.89	0.83	0.96
1-PENTENE	10	0.44	0.09	1.18	1	0.35	0.35	0.35	2	0.71	0.65	0.78
T-2-PENTENE	10	0.89	0.20	1.97	1	0.71	0.71	0.71	2	1.27	1.16	1.38
C-2-PENTENE	8	0.62	0.20	0.97	1	0.53	0.53	0.53	2	1.07	0.75	1.40
CYCLOPENTANE	10	0.50	0.24	0.92	0				2	0.63	0.51	0.75
2-METHYL-2-BUTENE	10	1.78	0.41	3.70	1	1.67	1.67	1.67	2	2.80	2.77	2.84
METHYL ETHYL KETONE	0				0				0			
ISOPENTANE	10	8.69	4.26	15.24	1	12.80	12.80	12.80	2	7.46	7.41	7.51
N-PENTANE	10	3.30	1.27	5.83	1	2.23	2.23	2.23	2	4.76	4.55	4.96
2,2-DIMETHYLPROPANE	0				0				0			
N-BUTANOL	0				0				0			
CARBON DISULFIDE	0				0				0			
BENZENE	10	1.73	0.38	2.73	1	0.62	0.62	0.62	2	2.22	2.19	2.26
T-3-METHYL-1,3-PENTADIENE	0				0				0			
C6H10 BRANCHED OLEFINS	0				0				0			
C6H10	0				0				0			
1-METHYLCYCLOPENTENE	0				0				0			
4-METHYL-1-PENTENE	3	0.08	0.08	0.09	0				2	0.09	0.09	0.09
1-HEXENE	9	0.14	0.09	0.20	1	0.20	0.20	0.20	2	0.32	0.32	0.33
T-2-HEXENE	10	0.30	0.21	0.35	1	0.35	0.35	0.35	2	0.43	0.41	0.45
2-METHYL-2-PENTENE	9	0.34	0.25	0.43	1	0.40	0.40	0.40	2	0.59	0.59	0.59
C-2-HEXENE	10	0.16	0.09	0.25	1	0.23	0.23	0.23	2	0.31	0.31	0.31
METHYLCYCLOPENTANE	10	1.33	0.82	1.90	1	2.09	2.09	2.09	2	1.22	1.13	1.30
CYCLOHEXANE	10	0.42	0.19	0.95	1	0.49	0.49	0.49	2	0.32	0.23	0.42
T-3-HEXENE	0				0				0			
T-3-METHYL-2-PENTENE	0				0				0			
2-METHYL-1-PENTENE	0				0				0			
3-METHYL-2-PENTENE	0				0				0			
METHYLPENTENES	0				0				0			
VINYL ACETATE	0				0				0			
2,3-DIMETHYLBUTANE	10	1.22	0.50	2.45	1	0.99	0.99	0.99	2	1.45	1.42	1.49
2-METHYLPENTANE	10	3.88	2.67	6.56	1	6.53	6.53	6.53	2	4.27	4.00	4.54
3-METHYLPENTANE	10	2.30	1.64	3.08	1	3.30	3.30	3.30	2	2.35	2.25	2.46
N-HEXANE	10	1.92	0.90	2.77	1	0.66	0.66	0.66	2	1.81	1.76	1.87
2,2-DIMETHYLBUTANE	9	0.92	0.19	2.23	1	0.47	0.47	0.47	2	0.20	0.19	0.20
METHYL TERT-BUTYL ETHER	4	1.98	0.26	5.91	1	7.91	7.91	7.91	0			
DIMETHYL DISULFIDE	0				0				0			
2-ETHOXY-2-METHYLBUTANE	0				0				0			
TOLUENE	10	7.47	1.95	12.76	1	2.55	2.55	2.55	2	6.00	5.80	6.20
PHENOL	0				0				0			
BROMOMETHANE (METHYL BROMIDE)	0				0				0			
C7H12 BRANCHED OLEFINS	0				0				0			
T-1,2-DICHLOROETHYLENE	0				0				0			
C-1,2-DICHLOROETHENE	0				0				0			
1,1-DICHLOROETHENE	0				0				0			
1,1-DIMETHYLCYCLOPENTANE	2	0.09	0.09	0.10	0				0			
T-1,3-DIMETHYLCYCLOPENTANE	10	0.22	0.12	0.31	1	0.32	0.32	0.32	2	0.21	0.20	0.21
C-1,3-DIMETHYLCYCLOPENTANE	10	0.22	0.11	0.30	1	0.30	0.30	0.30	2	0.21	0.20	0.21
T-1,2-DIMETHYLCYCLOPENTANE	8	0.17	0.08	0.28	1	0.16	0.16	0.16	2	0.11	0.11	0.12

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		10				10				10		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		SILVER				SILVER RFG				SILVER OXY		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1-HEPTENE	3	0.15	0.09	0.21	1	0.12	0.12	0.12	2	0.11	0.11	0.11
T-3-HEPTENE	10	0.14	0.09	0.16	1	0.18	0.18	0.18	2	0.27	0.27	0.28
C-3-HEPTENE	7	0.26	0.10	0.48	1	0.26	0.26	0.26	1	0.46	0.46	0.46
T-2-HEPTENE	9	0.10	0.09	0.11	1	0.11	0.11	0.11	2	0.22	0.22	0.22
C-2-HEPTENE	7	0.11	0.09	0.13	1	0.09	0.09	0.09	2	0.14	0.14	0.15
METHYLCYCLOHEXANE	10	0.51	0.13	1.27	1	0.34	0.34	0.34	2	0.29	0.28	0.29
ETHYLCYCLOPENTANE	7	0.13	0.09	0.19	1	0.11	0.11	0.11	2	0.10	0.09	0.10
3,4-DIMETHYL-2-PENTENE	0				0				0			
2,3-DIMETHYL-2-PENTENE	0				0				0			
METHYL-2-HEXENE	0				0				0			
1,1-DICHLOROETHANE	0				0				0			
1,2-DICHLOROETHANE (ETHYLENE DICHLOR	0				0				0			
1-METHYL-2-PYRROLIDONE (NMP)	0				0				0			
T-AMYL-METHYLETHER	0				0				0			
4-METHYL-2-PENTANONE (MIBK)	0				0				0			
METHYL N-BUTYL KETONE	0				0				0			
2,2-DIMETHYLPENTANE	7	0.11	0.08	0.19	0				2	0.13	0.12	0.13
2,4-DIMETHYLPENTANE	10	0.85	0.18	2.03	1	0.12	0.12	0.12	2	0.39	0.38	0.40
2,2,3-TRIMETHYLBUTANE	0				0				0			
3,3-DIMETHYLPENTANE	8	0.12	0.08	0.17	0				2	0.11	0.11	0.12
2-METHYLHEXANE	10	1.31	0.42	3.30	1	0.65	0.65	0.65	2	1.13	1.05	1.22
2,3-DIMETHYLPENTANE	9	1.71	0.32	5.60	1	0.20	0.20	0.20	2	0.67	0.65	0.69
3-ETHYLPENTANE	8	0.13	0.08	0.20	0				2	0.14	0.14	0.14
N-HEPTANE	10	0.81	0.14	1.67	1	0.27	0.27	0.27	2	0.66	0.56	0.75
3-METHYLHEXANE	10	1.23	0.39	2.14	1	0.55	0.55	0.55	2	1.32	1.19	1.44
METHYL CELLOSOLVE	0				0				0			
METHYL ETHYL DISULFIDE	0				0				0			
ETHYL TERT-BUTYL ETHER (ETBE)	1	1.30	1.30	1.30	0				0			
STYRENE	0				0				0			
ETHYLBENZENE	10	0.95	0.22	2.03	1	0.24	0.24	0.24	2	0.92	0.90	0.93
M-XYLENE	10	2.46	0.44	4.87	1	0.62	0.62	0.62	2	2.44	2.33	2.55
P-XYLENE	10	1.07	0.19	1.93	1	0.23	0.23	0.23	2	0.93	0.93	0.94
O-XYLENE	10	1.36	0.23	2.75	1	0.30	0.30	0.30	2	1.17	1.08	1.26
2-CHLOROETHYL VINYL ETHER	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTENE	0				0				0			
1,1,3-TRIMETHYLCYCLOPENTANE	0				0				0			
C-1,3-DICHLOROPROPENE	0				0				0			
TRANS-1,3-DICHLOROPROPENE	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTANE	3	1.02	0.33	2.13	0				0			
T-1,2-DIMETHYLCYCLOHEXANE	0				0				0			
T-2-OCTENE	1	0.12	0.12	0.12	0				2	0.09	0.09	0.09
ISOPROPYLCYCLOPENTANE	0				0				0			
C-2-OCTENE	0				0				2	0.10	0.09	0.10
C-1,2-DIMETHYLCYCLOHEXANE	1	0.09	0.09	0.09	0				0			
N-PROPYLCYCLOPENTANE	0				0				1	0.14	0.14	0.14
C-1,3-DIMETHYLCYCLOHEXANE	0				0				0			
ETHYLCYCLOHEXANE	0				0				0			
4-METHYL-3-HEPTENE	0				0				0			
2,5-DIMETHYL-2-HEXENE	0				0				0			
2,3-DIMETHYL-2-HEXENE	0				0				0			
CTC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CCT-1,2,4-TRIMETHYLCYCLOPENTANE	2	0.09	0.09	0.10	0				0			
T-1,4-DIMETHYLCYCLOHEXANE	0				0				0			
1-OCTENE	2	0.09	0.08	0.10	0				2	0.10	0.10	0.11
CCC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CHLOROBENZENE	0				0				0			
1,2-DICHLOROPROPANE	0				0				0			
2,2-DIMETHYLHEXANE	1	0.09	0.09	0.09	0				0			
2,5-DIMETHYLHEXANE	9	0.41	0.10	1.19	0				2	0.20	0.20	0.21
2,2,3-TRIMETHYLPENTANE	5	0.14	0.09	0.26	0				0			
2-METHYLHEPTANE	10	0.41	0.16	0.84	1	0.15	0.15	0.15	2	0.47	0.45	0.49
4-METHYLHEPTANE	8	0.25	0.09	0.51	0				2	0.20	0.20	0.21
3-ETHYLHEXANE	5	0.11	0.08	0.16	0				2	0.10	0.09	0.10
N-OCTANE	10	0.33	0.10	0.69	0				2	0.37	0.36	0.38
2,3-DIMETHYLHEXANE	8	0.49	0.10	1.56	0				2	0.35	0.34	0.35
2,3,4-TRIMETHYLPENTANE	2	3.10	1.60	4.60	0				0			
2,3,3-TRIMETHYLPENTANE	2	2.10	1.90	2.30	0				0			
DIMETHYLHEXANE (UNSPECIFIED)	1	1.80	1.80	1.80	0				0			
2,4-DIMETHYLHEXANE	10	0.46	0.11	1.63	0				2	0.33	0.33	0.33
3-METHYLHEPTANE	10	0.43	0.14	0.84	1	0.16	0.16	0.16	2	0.42	0.34	0.49
2,2,4-TRIMETHYLPENTANE	8	3.48	0.33	13.07	0				2	1.28	1.21	1.35
C8-C9 BRANCHED ALKANES	0				0				0			
INDENE	0				0				0			

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID		10				10				10			
STREAM NUMBER													
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME		SILVER				SILVER RFG				SILVER OXY			
STREAM TYPE		WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	
INDAN	0				0				0				
CHLOROFORM	0				0				0				
CUMENE (Isopropyl Benzene)	5	0.17	0.11	0.24	0				0				
N-PROPYLBENZENE	10	0.49	0.10	1.24	1	0.35	0.35	0.35	2	0.26	0.25	0.27	
1-METHYL-3-ETHYLBENZENE	10	1.85	0.52	4.05	1	1.95	1.95	1.95	2	0.89	0.87	0.91	
1-METHYL-4-ETHYLBENZENE	10	0.73	0.12	1.77	1	0.68	0.68	0.68	2	0.59	0.59	0.59	
MESITYLENE (1,2,5 TMB)	9	0.80	0.13	2.19	1	0.84	0.84	0.84	2	0.37	0.37	0.37	
1-METHYL-2-ETHYLBENZENE	9	0.75	0.28	1.71	1	0.53	0.53	0.53	2	0.25	0.25	0.26	
1,2,4-TRIMETHYLBENZENE	9	2.73	0.87	6.96	1	2.94	2.94	2.94	2	0.99	0.98	1.00	
1,2,3-TRIMETHYLBENZENE	10	0.56	0.17	1.51	1	0.47	0.47	0.47	2	0.22	0.22	0.22	
TRIMETHYLBENZENES	0				0				0				
C9-C14 BRANCHED ALKANES	0				0				0				
2,4-DIMETHYLPHENOL	0				0				0				
4-CHLORO-3-METHYLPHENOL	0				0				0				
1,1,3-TRIMETHYLCYCLOHEXANE	0				0				0				
T-1,4-DICHLOROBUTENE	0				0				0				
BIS(2-CHLOROETHOXY)METHANE	0				0				0				
1,1,4-TRIMETHYLCYCLOHEXANE	0				0				0				
1,1,2-TRIMETHYLCYCLOHEXANE	0				0				0				
1-NONENE	0				0				0				
ISOBUTYLCYCLOPENTANE	0				0				0				
T-3-NONENE	0				0				0				
ISOPROPYLCYCLOHEXANE	0				0				0				
PROPYLCYCLOHEXANE	0				0				0				
N-PROPYLCYCLOHEXANE	0				0				0				
CCC-1,3,5-TRIMETHYLCYCLOHEXANE	0				0				0				
CTT-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0				
C-3-NONENE	1	0.09	0.09	0.09	0				2	0.10	0.10	0.10	
T-2-NONENE	0				0				0				
METHYL-ETHYLCYCLOHEXANES	0				0				0				
C9H18 (UNSPECIFIED)	0				0				0				
CTC-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0				
C-2-NONENE	0				0				0				
NAPHTHALENE	9	0.46	0.11	1.01	1	0.51	0.51	0.51	0				
3,5-DIMETHYLHEPTANE	4	0.15	0.12	0.19	0				2	0.21	0.20	0.21	
2,5-DIMETHYLHEPTANE	3	0.16	0.13	0.19	0				2	0.21	0.20	0.21	
3,3-DIMETHYLHEPTANE	0				0				0				
2,3-DIMETHYLHEPTANE	1	0.12	0.12	0.12	0				0				
3,4-DIMETHYLHEPTANE(D)	0				0				0				
3,4-DIMETHYLHEPTANE(L)	0				0				0				
3,3-DIETHYLPENTANE	0				0				0				
N-NONANE	6	0.14	0.08	0.24	0				2	0.19	0.18	0.19	
2,2,5-TRIMETHYLHEXANE	1	2.10	2.10	2.10	0				0				
2,3,4-TRIMETHYLHEXANE	1	2.10	2.10	2.10	0				0				
2,6-DIMETHYLHEPTANE	0				0				0				
2-METHYLOCTANE	6	0.14	0.10	0.24	0				2	0.15	0.14	0.16	
3-METHYLOCTANE	3	0.17	0.11	0.25	0				0				
4-BROMOPHENYLPHENYL ETHER	0				0				0				
TRICHLOROETHYLENE	0				0				0				
C10H12 (UNSPECIFIED)	0				0				0				
1,1,1-TRICHLOROETHANE (METHYL CHLORO	0				0				0				
1,1,2-TRICHLOROETHANE	0				0				0				
TERT-BUTYLBENZENE	1	5.20	5.20	5.20	0				0				
ISOBUTYLBENZENE	2	0.15	0.14	0.16	0				0				
SEC-BUTYLBENZENE	2	0.15	0.14	0.16	0				0				
1-METHYL-3-ISOPROPYLBENZENE	3	0.14	0.09	0.19	1	0.11	0.11	0.11	0				
1-METHYL-4-ISOPROPYLBENZENE	1	0.12	0.12	0.12	0				0				
1-METHYL-2-ISOPROPYLBENZENE	2	0.13	0.11	0.15	0				0				
N-BUTYLBENZENE	3	0.17	0.08	0.23	0				0				
1,2-DIETHYLBENZENE	1	0.09	0.09	0.09	0				0				
1-METHYL-2-N-PROPYLBENZENE	6	0.11	0.08	0.17	1	0.10	0.10	0.10	0				
1,4-DIMETHYL-2-ETHYLBENZENE	9	0.31	0.14	0.74	1	0.27	0.27	0.27	2	0.09	0.09	0.09	
1,2-DIMETHYL-4-ETHYLBENZENE	9	0.78	0.25	1.82	1	0.46	0.46	0.46	2	0.15	0.15	0.15	
1,3-DIMETHYL-2-ETHYLBENZENE	1	0.08	0.08	0.08	0				0				
1,2,4,5-TETRAMETHYLBENZENE	9	0.27	0.10	0.71	1	0.25	0.25	0.25	0				
1,3-DIMETHYL-5-ETHYLBENZENE	9	0.46	0.22	1.08	1	0.41	0.41	0.41	2	0.14	0.14	0.14	
1,3-DIETHYLBENZENE	0				0				0				
1-METHYL-4-N-PROPYLBENZENE	9	0.15	0.10	0.24	1	0.15	0.15	0.15	0				
1,3-DIMETHYL-4-ETHYLBENZENE	9	0.26	0.15	0.50	1	0.32	0.32	0.32	2	0.10	0.10	0.11	
1,2-DIMETHYL-3-ETHYLBENZENE	8	0.16	0.09	0.34	1	0.12	0.12	0.12	0				
TETRAMETHYLBENZENE (UNSPECIFIED)	0				0				0				
1,4-DIETHYLBENZENE	0				0				0				
PROPENYL OR ISOPROPENYL BENZENE	0				0				0				

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID		10				10				10			
STREAM NUMBER													
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME		SILVER				SILVER RFG				SILVER OXY			
STREAM TYPE		WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	
1-METHYL-3-N-PROPYLBENZENE	8	0.27	0.10	0.45	1	0.33	0.33	0.33	2	0.14	0.14	0.14	
2-METHYLBUTYLBENZENE	0				0				0				
(E)-DECAHYDRONAPHTHALENE (DECALIN)	0				0				0				
N-BUTYLCYCLOPENTANE	0				0				0				
(E)-1-METHYL-2-PROPYLCYCLOHEXANE	0				0				0				
ISOBUTYLCYCLOHEXANE	0				0				0				
1-DECENE	0				0				0				
2-METHYLNAPHTHALENE	4	0.41	0.14	0.66	1	0.37	0.37	0.37	0				
1-METHYLNAPHTHALENE	3	0.20	0.11	0.25	1	0.15	0.15	0.15	0				
2,2-DIMETHYLOCTANE	0				0				0				
3,3-DIMETHYLOCTANE	0				0				0				
2,3-DIMETHYLOCTANE	0				0				0				
2-METHYLNONANE	4	0.47	0.10	1.49	0				2	0.09	0.09	0.09	
3-ETHYLOCTANE	0				0				0				
3-METHYLNONANE	1	0.10	0.10	0.10	0				0				
N-DECANE	3	0.15	0.09	0.18	1	0.14	0.14	0.14	2	0.12	0.12	0.12	
2,6-DIMETHYLOCTANE	0				0				0				
DIMETHYLOCTANE (UNSPECIFIED)	0				0				0				
3,5-DIMETHYLOCTANE	0				0				0				
2,3,6-TRIMETHTYLHEPTANE	0				0				0				
2,2,5-TRIMETHYLHEPTANE	0				0				0				
C10-C11 BRANCHED ALKANES	0				0				0				
C11 TETRAHYDRONAPHTHALENES	0				0				0				
TERT-1-BUTYL-2-METHYLBENZENE	0				0				0				
N-PENTYLBENZENE	0				0				0				
PENTAMETHYLBENZENE	0				0				0				
(E)-1-METHYL-2-(4-METHYLPENTYL)CYCLOP	0				0				0				
ACENAPHTHYLENE	0				0				0				
CARBON TETRACHLORIDE	0				0				0				
BIPHENYL	0				0				0				
ACENAPHTHENE	0				0				0				
ETHYLNAPHTHALENE	0				0				0				
DIMETHYLNAPHTHALENES	0				0				0				
N-UNDECANE	4	0.14	0.08	0.21	1	0.18	0.18	0.18	0				
2,4,6-TRIMETHYLOCTANE	0				0				0				
2,6-DIMETHYLNONANE	0				0				0				
C12-C14 BRANCHED ALKANES	0				0				0				
TRIMETHYLNAPHTHALENES	0				0				0				
C12 TETRAHYDRONAPHTHALENES	0				0				0				
TERT-1-BUTYL-3,5-DIMETHYLBENZENE	0				0				0				
1,3,5-TRIETHYLBENZENE	0				0				0				
1,2,4-TRIETHYLBENZENE	0				0				0				
N-HEXYLBENZENE	0				0				0				
1-TERT-BUTYL-4-ETHYLBENZENE	0				0				0				
BETA-CHLORONAPHTHALENE	0				0				0				
DIBROMOCHLOROMETHANE	0				0				0				
TETRACHLOROETHYLENE	0				0				0				
FLUORENE	0				0				0				
1,1,2,2-TETRACHLOROETHANE	0				0				0				
2-PHENYLPHENOL	0				0				0				
C13H14	0				0				0				
N-DODECANE	4	0.16	0.08	0.24	1	0.16	0.16	0.16	0				
PHENANTHRENE	0				0				0				
ANTHRACENE	0				0				0				
N-TRIDECANE	2	0.25	0.20	0.30	1	0.08	0.08	0.08	0				
C13 BRANCHED ALKANES	0				0				0				
1,2-DIBROMOETHANE (ETHYLENE DIBROMID	0				0				0				
N-TETRADECANE	0				0				0				
C14 PHENOL	0				0				0				
FLUORANTHENE	0				0				0				
PYRENE	0				0				0				
DICHLOROBROMOMETHANE	0				0				0				
N-PENTADECANE	0				0				0				
C15 BRANCHED ALKANE	0				0				0				
BENZO(A)ANTHRACENE	0				0				0				
N-HEXADECANE	0				0				0				
C16 BRANCHED ALKANES	0				0				0				
BENZO(A)PHENANTHRENE	0				0				0				
C16-C18 BRANCHED ALKANES	0				0				0				
BRANCHED ALKANE (PHYTANE)	0				0				0				
BENZO(B)FLUORANTHENE	0				0				0				
N-HEPTADECANE	0				0				0				
BENZO(K)FLUORANTHENE	0				0				0				

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		10				10				10		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		SILVER				SILVER RFG				SILVER OXY		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
BENZO(A)PYRENE	0				0				0			
BROMOFORM (TRIBROMOMETHANE)	0				0				0			
N-OCTADECANE	3				0				0			
	0				0				0			
Total Wt% by Analysis	10	80.38	64.90	87.49	1	72.33	72.33	72.33	2	80.09	77.59	82.59
TOTAL WT% BTEX	10	15.05	6.07	25.37	1	4.55	4.55	4.55	2	13.68	13.23	14.13
TOTAL WT % HAPS	10	21.04	13.37	32.12	1	13.63	13.63	13.63	2	16.77	16.30	17.24
TOTAL WT% TNMNEHC	10	80.31	64.81	87.49	1	72.33	72.33	72.33	2	80.04	77.55	82.53
TOTAL WT% SARA313	10	16.77	6.79	26.43	1	13.45	13.45	13.45	2	14.16	13.79	14.53

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
API GRAVITY	10	60.48	52.4	65.5	3	62.63333	58	68.4	2	58.25	57.8	58.7
NITROGEN (N2)	0				0				0			
OXYGEN (O2)	0				0				0			
ARGON	0				0				0			
CARBON MONOXIDE	0				0				0			
CARBON DIOXIDE	0				0				0			
HYDROGEN (H2)	0				0				0			
HYDROGEN SULFIDE	0				0				0			
LITHIUM	6	8.67E-05	0.00003	0.00012	2	0.000065	0.00005	0.00008	0			
BORON	1	0.00015	0.00015	0.00015	1	0.0001	0.0001	0.0001	2	0.00223	0.00143	0.00303
SODIUM	10	0.00143	0.001	0.0027	3	0.001	0.0001	0.0015	2	0.0008	0.0008	0.0008
MAGNESIUM	0				0				0			
ALUMINUM	9	0.0018	0.001	0.0033	3	0.001267	0.0001	0.0028	0			
PHOSPHORUS (YELLOW OR WHITE)	4	0.00195	0.0013	0.0027	2	0.00065	0.0002	0.0011	2	0.0002	0.0002	0.0002
SULFUR	9	0.051067	0.0189	0.109	3	0.0427	0.0001	0.07	2	0.0344	0.0325	0.0363
POTASSIUM	0				0				0			
CALCIUM	0				0				0			
TITANIUM	1	0.000045	0.000045	0.000045	0				0			
CHROMIUM COMPOUNDS	0				0				0			
IRON	1	0.00004	0.00004	0.00004	0				0			
SILICON	0				0				0			
BERYLLIUM COMPOUNDS	0				0				0			
VANADIUM	9	3.28E-06	5E-07	9.4E-06	3	3.97E-07	1.5E-07	5.8E-07	2	7.65E-07	7E-07	8.3E-07
MANGANESE COMPOUNDS	5	7.38E-07	1.3E-07	2.7E-06	2	1.4E-07	1E-07	1.8E-07	2	3E-07	2E-07	4E-07
COBALT COMPOUNDS	0				0				1	1.4E-07	1.4E-07	1.4E-07
NICKEL COMPOUNDS	6	8.85E-06	6.7E-06	1.85E-05	3	4.53E-06	1E-07	6.8E-06	2	6.95E-06	6.9E-06	0.000007
COPPER COMPOUNDS	2	3.6E-06	3.3E-06	3.9E-06	0				0			
ZINC COMPOUNDS	4	3.2E-06	1.1E-06	6.5E-06	1	1E-07	1E-07	1E-07	1	1.3E-06	1.3E-06	1.3E-06
GALLIUM	3	6.03E-06	2.3E-06	1.25E-05	0				0			
GERMANIUM	5	1.88E-06	5.8E-07	4.5E-06	3	4E-07	1.3E-07	5.9E-07	2	7.9E-07	6.7E-07	9.1E-07
ARSENIC COMPOUNDS	3	4E-07	3E-07	5E-07	3	2.33E-07	1E-07	4E-07	2	5E-07	5E-07	5E-07
RUBIDIUM	0				0				0			
STRONTIUM	0				0				0			
ZIRCONIUM	0				0				0			
NIOBIUM	0				0				0			
MOLYBDENUM	2	1.63E-06	3.5E-07	2.9E-06	1	1E-07	1E-07	1E-07	2	2.7E-07	1.6E-07	3.8E-07
RUTHENIUM	1	1.4E-07	1.4E-07	1.4E-07	1	1.6E-07	1.6E-07	1.6E-07	0			
RHODIUM	0				0				0			
PALLADIUM	1	0.000124	0.000124	0.000124	0				0			
SILVER COMPOUNDS	1	8.3E-06	8.3E-06	8.3E-06	0				0			
CADMIUM COMPOUNDS	0				0				0			
INDIUM	0				0				0			
TIN	5	2.42E-07	1.2E-07	4.1E-07	2	2.4E-07	1.8E-07	3E-07	2	9E-07	2.2E-07	1.58E-06
ANTIMONY COMPOUNDS	0				0				0			
TELLURIUM	4	2.3E-07	1.4E-07	3.6E-07	2	1.4E-07	1E-07	1.8E-07	1	1.3E-07	1.3E-07	1.3E-07
CESIUM	0				0				0			
BARIUM COMPOUNDS	1	4.1E-06	4.1E-06	4.1E-06	0				2	4.96E-06	8.1E-07	9.1E-06
LANTHANUM	0				0				0			
CERIUM	0				0				0			
PRAESEODYMIUM	0				0				0			
NEODYMIUM	3	1.93E-07	1.3E-07	3.1E-07	0				0			
EUROPIUM	4	1.25E-07	1E-07	1.4E-07	2	1.35E-07	1.3E-07	1.4E-07	1	2.4E-07	2.4E-07	2.4E-07
SAMARIUM	1	1.5E-07	1.5E-07	1.5E-07	0				0			
GADOLINIUM	2	1.25E-07	1.2E-07	1.3E-07	0				1	1.7E-07	1.7E-07	1.7E-07
TERBIUM	0				0				0			
DYSPROSIUM	0				0				0			
HOLMIUM	0				0				0			
ERBIUM	0				0				0			
THULIUM	0				0				0			
YTTERBIUM	2	1.8E-07	1.5E-07	2.1E-07	0				1	3.8E-07	3.8E-07	3.8E-07
LUTETIUM	0				0				0			
HAFNIUM	0				1	1.2E-07	1.2E-07	1.2E-07	1	1.7E-07	1.7E-07	1.7E-07
TANTALUM	0				0				0			
TUNGSTEN	4	1.95E-07	1.3E-07	2.6E-07	0				1	1.6E-07	1.6E-07	1.6E-07
MERCURY COMPOUNDS	5	3E-07	2E-07	4E-07	1	2E-07	2E-07	2E-07	2	3.5E-07	2E-07	5E-07
THALLIUM COMPOUNDS	1	1E-07	1E-07	1E-07	0				0			
LEAD COMPOUNDS	3	8.5E-07	1E-07	1.25E-06	0				2	1.75E-06	1.35E-06	2.14E-06
BISMUTH	1	1E-07	1E-07	1E-07	0				0			
THORIUM	1	1E-07	1E-07	1E-07	0				0			
URANIUM	1	1E-07	1E-07	1E-07	0				0			
METHANE	0				0				0			
ACETYLENE	0				0				0			
ETHYLENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
ETHANE	0				0				0			
METHANOL	0				0				0			
ALLENE	0				0				0			
METHYL ACETYLENE	0				0				0			
PROPYLENE (PROPENE)	2	0.17	0.159	0.181	0				1	0.106	0.106	0.106
CYCLOPROPANE	0				0				0			
N-PROPANE	3	0.232	0.134	0.289	1	0.141	0.141	0.141	2	0.2325	0.196	0.269
ETHANOL	0				0				2	5.708	5.638	5.778
CHLOROMETHANE (METHYL CHLORIDE)	0				0				0			
1,3-BUTADIENE	0				0				0			
T-2-BUTENE	10	0.3649	0.091	0.676	3	0.222333	0.119	0.416	2	0.3665	0.341	0.392
C-2-BUTENE	9	0.367667	0.15	0.66	2	0.213	0.118	0.308	2	0.2345	0.229	0.24
CYCLOBUTANE	0				0				0			
1-BUTENE	0				0				0			
ISOBUTYLENE AND 1-BUTENE	7	0.318714	0.09	0.776	1	0.156	0.156	0.156	2	0.6005	0.571	0.63
ACETONE	0				0				0			
ISOBUTANE	10	1.5328	0.139	5.452	3	2.746667	0.234	5.259	2	2.6865	2.394	2.979
N-BUTANE	10	7.9854	1.233	15.435	3	7.925333	4.506	10.884	2	7.975	7.499	8.451
ETHYLENE GLYCOL	0				0				0			
VINYL CHLORIDE	0				0				0			
CHLOROETHANE (ETHYL CHLORIDE)	0				0				0			
CYCLOPENTENE	0				0				0			
C5 (UNSPECIFIED)	0				0				0			
3-METHYL-1-BUTENE	9	0.235222	0.099	0.583	3	0.284333	0.093	0.519	2	0.1795	0.171	0.188
2-METHYL-1-BUTENE	10	1.1098	0.583	2.713	3	1.131333	0.626	1.724	2	0.704	0.65	0.758
1-PENTENE	10	0.652	0.218	1.86	3	0.596333	0.273	0.923	2	0.512	0.458	0.566
T-2-PENTENE	10	1.2949	0.571	4.113	3	1.144333	0.631	1.812	2	0.898	0.808	0.988
C-2-PENTENE	10	0.7496	0.332	1.675	3	0.835	0.515	1.051	2	0.7365	0.472	1.001
CYCLOPENTANE	10	0.3313	0.108	0.99	2	1.6575	1.438	1.877	2	0.6095	0.47	0.749
2-METHYL-2-BUTENE	10	2.6267	1.128	7.015	3	3.084	2.042	4.125	2	1.8725	1.828	1.917
METHYL ETHYL KETONE	0				0				0			
ISOPENTANE	10	12.1506	6.666	19.642	3	9.358667	5.879	11.198	2	8.339	8.244	8.434
N-PENTANE	10	3.6614	1.158	7.867	3	3.129	1.88	4.32	2	5.053	4.818	5.288
2,2-DIMETHYLPROPANE	0				0				0			
N-BUTANOL	0				0				0			
CARBON DISULFIDE	0				0				0			
BENZENE	10	1.0505	0.236	4.078	3	0.629	0.355	0.938	2	2.4515	2.385	2.518
T-3-METHYL-1,3-PENTADIENE	0				0				0			
C6H10 BRANCHED OLEFINS	0				0				0			
C6H10	0				0				0			
1-METHYLCYCLOPENTENE	0				0				0			
4-METHYL-1-PENTENE	3	0.135667	0.124	0.153	1	0.127	0.127	0.127	0			
1-HEXENE	7	0.176571	0.112	0.29	3	0.162	0.091	0.227	2	0.1805	0.172	0.189
T-2-HEXENE	10	0.28	0.069	0.649	3	0.281667	0.166	0.444	2	0.323	0.306	0.34
2-METHYL-2-PENTENE	10	0.332	0.063	0.758	3	0.373	0.245	0.602	2	0.372	0.37	0.374
C-2-HEXENE	10	0.1761	0.089	0.341	3	0.158	0.104	0.248	2	0.174	0.171	0.177
METHYLCYCLOPENTANE	10	0.8885	0.449	1.91	3	0.739667	0.466	1.254	2	0.9985	0.923	1.074
CYCLOHEXANE	6	0.388167	0.216	0.898	1	0.447	0.447	0.447	2	0.2565	0.201	0.312
T-3-HEXENE	0				0				0			
T-3-METHYL-2-PENTENE	0				0				0			
2-METHYL-1-PENTENE	0				0				0			
3-METHYL-2-PENTENE	0				0				0			
METHYLPENTENES	0				0				0			
VINYL ACETATE	0				0				0			
2,3-DIMETHYLBUTANE	10	1.7035	0.416	2.962	2	1.2125	0.928	1.497	2	1.4065	1.219	1.594
2-METHYLPENTANE	10	2.7795	1.586	4.202	3	2.336667	1.712	2.849	2	4.084	4.016	4.152
3-METHYLPENTANE	10	1.5196	0.83	2.591	3	1.215	0.955	1.469	2	2.2175	2.072	2.363
N-HEXANE	10	1.0293	0.207	3.657	3	0.885	0.318	1.807	2	1.7685	1.747	1.79
2,2-DIMETHYLBUTANE	8	0.372625	0.105	1.586	1	0.138	0.138	0.138	2	0.2095	0.209	0.21
METHYL TERT-BUTYL ETHER	2	3.357	2.013	4.701	3	7.519333	6.764	8.268	0			
DIMETHYL DISULFIDE	0				0				0			
2-ETHOXY-2-METHYLBUTANE	0				0				0			
TOLUENE	10	6.1248	0.708	11.633	3	3.417667	1.214	6.005	2	6.826	6.737	6.915
PHENOL	0				0				0			
BROMOMETHANE (METHYL BROMIDE)	0				0				0			
C7H12 BRANCHED OLEFINS	0				0				0			
T-1,2-DICHLOROETHYLENE	0				0				0			
C-1,2-DICHLOROETHENE	0				0				0			
1,1-DICHLOROETHENE	0				0				0			
1,1-DIMETHYLCYCLOPENTANE	2	0.098	0.08	0.116	0				0			
T-1,3-DIMETHYLCYCLOPENTANE	6	0.197833	0.087	0.349	3	0.137	0.08	0.24	2	0.1225	0.118	0.127
C-1,3-DIMETHYLCYCLOPENTANE	6	0.208667	0.091	0.358	3	0.136667	0.084	0.231	2	0.11	0.11	0.11
T-1,2-DIMETHYLCYCLOPENTANE	3	0.209333	0.154	0.314	1	0.186	0.186	0.186	0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1-HEPTENE	2	0.17	0.112	0.228	0				0			
T-3-HEPTENE	4	0.169	0.081	0.289	2	0.112	0.097	0.127	2	0.1355	0.129	0.142
C-3-HEPTENE	3	0.154	0.102	0.245	1	0.234	0.234	0.234	2	0.209	0.189	0.229
T-2-HEPTENE	3	0.139	0.097	0.221	1	0.093	0.093	0.093	2	0.111	0.104	0.118
C-2-HEPTENE	2	0.147	0.096	0.198	0				0			
METHYLCYCLOHEXANE	7	0.238143	0.082	0.642	3	0.192667	0.083	0.379	2	0.1625	0.158	0.167
ETHYLCYCLOPENTANE	2	0.1195	0.085	0.154	1	0.081	0.081	0.081	0			
3,4-DIMETHYL-2-PENTENE	0				0				0			
2,3-DIMETHYL-2-PENTENE	0				0				0			
METHYL-2-HEXENE	0				0				0			
1,1-DICHLOROETHANE	0				0				0			
1,2-DICHLOROETHANE (ETHYLENE DICHLOR	0				0				0			
1-METHYL-2-PYRROLIDONE (NMP)	0				0				0			
T-AMYL-METHYLETHER	0				0				0			
4-METHYL-2-PENTANONE (MIBK)	0				0				0			
METHYL N-BUTYL KETONE	1	0.181	0.181	0.181	0				0			
2,2-DIMETHYLPENTANE	3	0.106333	0.084	0.15	0				2	0.1515	0.151	0.152
2,4-DIMETHYLPENTANE	10	1.564	0.137	2.682	3	0.948	0.137	1.495	2	0.5335	0.524	0.543
2,2,3-TRIMETHYLBUTANE	1	0.084	0.084	0.084	0				0			
3,3-DIMETHYLPENTANE	2	0.1095	0.081	0.138	0				2	0.1365	0.132	0.141
2-METHYLHEXANE	10	0.603	0.193	2.166	3	0.422667	0.208	0.759	2	1.013	1	1.026
2,3-DIMETHYLPENTANE	10	2.9305	0.221	4.566	3	1.676333	0.213	2.886	2	1.051	0.978	1.124
3-ETHYLPENTANE	2	0.1365	0.087	0.186	0				2	0.142	0.137	0.147
N-HEPTANE	8	0.40825	0.103	1.176	2	0.285	0.115	0.455	2	0.6885	0.679	0.698
3-METHYLHEXANE	10	0.567	0.193	1.431	3	0.420667	0.198	0.75	2	1.285	1.165	1.405
METHYL CELLOSOLVE	0				0				0			
METHYL ETHYL DISULFIDE	0				0				0			
ETHYL TERT-BUTYL ETHER (ETBE)	2	1.3	1.2	1.4	1	1.3	1.3	1.3	0			
STYRENE	0				0				0			
ETHYLBENZENE	9	1.159	0.416	2.645	3	0.885667	0.105	2.016	2	1.661	1.649	1.673
M-XYLENE	10	2.5203	0.149	5.818	3	2.243333	0.225	5.006	2	3.63	3.567	3.693
P-XYLENE	9	1.135667	0.36	2.579	3	1.264	0.1	2.144	2	1.5425	1.507	1.578
O-XYLENE	10	1.4308	0.109	3.512	3	1.325	0.116	2.823	2	2	1.979	2.021
2-CHLOROETHYL VINYL ETHER	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTENE	0				0				0			
1,1,3-TRIMETHYLCYCLOPENTANE	0				0				0			
C-1,3-DICHLOROPROPENE	0				0				0			
TRANS-1,3-DICHLOROPROPENE	0				0				0			
1-ETHYL-1-METHYLCYCLOPENTANE	2	0.715	0.08	1.35	0				0			
T-1,2-DIMETHYLCYCLOHEXANE	0				0				0			
T-2-OCTENE	1	0.111	0.111	0.111	0				0			
ISOPROPYLCYCLOPENTANE	0				0				0			
C-2-OCTENE	0				0				0			
C-1,2-DIMETHYLCYCLOHEXANE	1	0.299	0.299	0.299	0				0			
N-PROPYLCYCLOPENTANE	0				0				0			
C-1,3-DIMETHYLCYCLOHEXANE	0				0				0			
ETHYLCYCLOHEXANE	0				0				0			
4-METHYL-3-HEPTENE	0				0				0			
2,5-DIMETHYL-2-HEXENE	0				0				0			
2,3-DIMETHYL-2-HEXENE	0				0				0			
CTC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CCT-1,2,4-TRIMETHYLCYCLOPENTANE	0				0				0			
T-1,4-DIMETHYLCYCLOHEXANE	0				0				0			
1-OCTENE	1	0.098	0.098	0.098	0				0			
CCC-1,2,3-TRIMETHYLCYCLOPENTANE	0				0				0			
CHLOROBENZENE	0				0				0			
1,2-DICHLOROPROPANE	0				0				0			
2,2-DIMETHYLHEXANE	1	0.082	0.082	0.082	0				0			
2,5-DIMETHYLHEXANE	9	0.743	0.081	1.158	2	0.6465	0.465	0.828	2	0.284	0.272	0.296
2,2,3-TRIMETHYLPENTANE	7	0.257286	0.103	0.482	2	0.256	0.17	0.342	0			
2-METHYLHEPTANE	7	0.199286	0.114	0.281	2	0.138	0.11	0.166	2	0.4235	0.397	0.45
4-METHYLHEPTANE	4	0.1655	0.117	0.275	0				2	0.1985	0.184	0.213
3-ETHYLHEXANE	2	0.0595	0.036	0.083	0				2	0.1005	0.1	0.101
N-OCTANE	6	0.229167	0.15	0.345	1	0.169	0.169	0.169	2	0.4135	0.402	0.425
2,3-DIMETHYLHEXANE	8	0.9575	0.376	1.332	2	0.5515	0.423	0.68	2	0.594	0.571	0.617
2,3,4-TRIMETHYLPENTANE	4	3	1.9	3.5	2	2.65	2.4	2.9	0			
2,3,3-TRIMETHYLPENTANE	6	2.886667	1.6	3.82	2	2.8	2.7	2.9	0			
DIMETHYLHEXANE (UNSPECIFIED)	1	2.43	2.43	2.43	0				0			
2,4-DIMETHYLHEXANE	10	0.8165	0.08	1.29	2	0.691	0.645	0.737	2	0.5125	0.487	0.538
3-METHYLHEPTANE	7	0.229429	0.12	0.352	2	0.1415	0.09	0.193	2	0.48	0.461	0.499
2,2,4-TRIMETHYLPENTANE	9	6.780222	0.399	12.133	2	4.049	3.711	4.387	2	2.4405	2.439	2.442
C8-C9 BRANCHED ALKANES	0				0				0			
INDENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
INDAN	0				0				0			
CHLOROFORM	0				0				0			
CUMENE (Isopropyl Benzene)	8	0.13875	0.106	0.2	3	0.124667	0.084	0.17	2	0.1115	0.109	0.114
N-PROPYLBENZENE	10	0.6315	0.212	1.106	3	0.599	0.536	0.689	2	0.461	0.443	0.479
1-METHYL-3-ETHYLBENZENE	10	1.9149	0.244	4.01	3	2.206333	2.088	2.42	1	1.44	1.44	1.44
1-METHYL-4-ETHYLBENZENE	10	0.9421	0.328	1.523	3	0.827667	0.789	0.875	2	0.7365	0.547	0.926
MESITYLENE (1,2,5 TMB)	10	0.8751	0.422	1.754	3	0.879667	0.855	0.905	2	0.519	0.478	0.56
1-METHYL-2-ETHYLBENZENE	10	0.7475	0.331	1.19	3	0.700333	0.632	0.771	2	0.41	0.391	0.429
1,2,4-TRIMETHYLBENZENE	10	3.1605	0.83	5.715	3	2.928	2.729	3.077	2	1.938	1.828	2.048
1,2,3-TRIMETHYLBENZENE	10	0.5545	0.231	1.174	3	0.392333	0.359	0.419	2	0.3525	0.331	0.374
TRIMETHYLBENZENES	0				0				0			
C9-C14 BRANCHED ALKANES	0				0				0			
2,4-DIMETHYLPHENOL	0				0				0			
4-CHLORO-3-METHYLPHENOL	0				0				0			
1,1,3-TRIMETHYLCYCLOHEXANE	0				0				0			
T-1,4-DICHLOROBUTENE	0				0				0			
BIS(2-CHLOROETHOXY)METHANE	0				0				0			
1,1,4-TRIMETHYLCYCLOHEXANE	0				0				0			
1,1,2-TRIMETHYLCYCLOHEXANE	0				0				0			
1-NONENE	0				0				0			
ISOBUTYLCYCLOPENTANE	0				0				0			
T-3-NONENE	0				0				0			
ISOPROPYLCYCLOHEXANE	0				0				0			
PROPYLCYCLOHEXANE	0				0				0			
N-PROPYLCYCLOHEXANE	0				0				0			
CCC-1,3,5-TRIMETHYLCYCLOHEXANE	0				0				0			
CTT-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0			
C-3-NONENE	1	0.085	0.085	0.085	0				0			
T-2-NONENE	0				0				0			
METHYL-ETHYLCYCLOHEXANES	0				0				0			
C9H18 (UNSPECIFIED)	0				0				0			
CTC-1,2,4-TRIMETHYLCYCLOHEXANE	0				0				0			
C-2-NONENE	0				0				0			
NAPHTHALENE	10	0.241	0.117	0.588	3	0.265	0.182	0.353	2	0.1025	0.095	0.11
3,5-DIMETHYLHEPTANE	6	0.161167	0.081	0.262	2	0.1165	0.102	0.131	2	0.1975	0.194	0.201
2,5-DIMETHYLHEPTANE	4	0.19925	0.133	0.262	2	0.1165	0.102	0.131	2	0.1975	0.194	0.201
3,3-DIMETHYLHEPTANE	0				0				0			
2,3-DIMETHYLHEPTANE	1	0.213	0.213	0.213	0				1	0.106	0.106	0.106
3,4-DIMETHYLHEPTANE(D)	0				0				0			
3,4-DIMETHYLHEPTANE(L)	0				0				0			
3,3-DIETHYLPENTANE	0				0				0			
N-NONANE	8	0.162125	0.119	0.206	1	0.201	0.201	0.201	2	0.176	0.166	0.186
2,2,5-TRIMETHYLHEXANE	3	1.3	0.4	2.2	0				0			
2,3,4-TRIMETHYLHEXANE	1	0.6	0.6	0.6	0				0			
2,6-DIMETHYLHEPTANE	0				0				0			
2-METHYLOCTANE	3	0.157	0.122	0.216	0				2	0.135	0.123	0.147
3-METHYLOCTANE	3	0.149	0.08	0.191	1	0.117	0.117	0.117	0			
4-BROMOPHENYLPHENYL ETHER	0				0				0			
TRICHLOROETHYLENE	0				0				0			
C10H12 (UNSPECIFIED)	0				0				0			
1,1,1-TRICHLOROETHANE (METHYL CHLORC	0				0				0			
1,1,2-TRICHLOROETHANE	0				0				0			
TERT-BUTYLBENZENE	2	0.671	0.08	1.262	0				0			
ISOBUTYLBENZENE	1	0.174	0.174	0.174	0				0			
SEC-BUTYLBENZENE	1	0.178	0.178	0.178	0				0			
1-METHYL-3-ISOPROPYLBENZENE	5	0.1262	0.1	0.176	3	0.127667	0.097	0.15	1	0.085	0.085	0.085
1-METHYL-4-ISOPROPYLBENZENE	0				0				0			
1-METHYL-2-ISOPROPYLBENZENE	0				0				0			
N-BUTYLBENZENE	4	0.11	0.083	0.161	1	0.115	0.115	0.115	0			
1,2-DIETHYLBENZENE	0				0				0			
1-METHYL-2-N-PROPYLBENZENE	8	0.120125	0.088	0.159	2	0.112	0.099	0.125	1	0.081	0.081	0.081
1,4-DIMETHYL-2-ETHYLBENZENE	10	0.2399	0.125	0.484	3	0.196667	0.141	0.245	2	0.1315	0.126	0.137
1,2-DIMETHYL-4-ETHYLBENZENE	10	0.3835	0.149	0.866	3	0.342333	0.259	0.401	2	0.2345	0.223	0.246
1,3-DIMETHYL-2-ETHYLBENZENE	1	0.172	0.172	0.172	0				0			
1,2,4,5-TETRAMETHYLBENZENE	9	0.212889	0.11	0.388	3	0.18	0.134	0.208	2	0.1245	0.115	0.134
1,3-DIMETHYL-5-ETHYLBENZENE	10	0.3514	0.147	0.768	3	0.325	0.26	0.361	2	0.218	0.211	0.225
1,3-DIETHYLBENZENE	0				0				0			
1-METHYL-4-N-PROPYLBENZENE	9	0.155778	0.093	0.229	3	0.129667	0.095	0.157	2	0.0935	0.085	0.102
1,3-DIMETHYL-4-ETHYLBENZENE	10	0.2281	0.116	0.4	3	0.222333	0.177	0.246	2	0.1555	0.142	0.169
1,2-DIMETHYL-3-ETHYLBENZENE	5	0.1466	0.095	0.251	2	0.1015	0.093	0.11	0			
TETRAMETHYLBENZENE (UNSPECIFIED)	0				0				0			
1,4-DIETHYLBENZENE	0				0				0			
PROPENYL OR ISOPROPENYL BENZENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1-METHYL-3-N-PROPYLBENZENE	10	0.3548	0.155	0.559	3	0.298333	0.215	0.353	2	0.2175	0.206	0.229
2-METHYLBUTYLBENZENE	0				0				0			
(E)-DECAHYDRONAPHTHALENE (DECALIN)	0				0				0			
N-BUTYLCYCLOPENTANE	0				0				0			
(E)-1-METHYL-2-PROPYLCYCLOHEXANE	0				0				0			
ISOBUTYLCYCLOHEXANE	0				0				0			
1-DECENE	0				0				0			
2-METHYLNAPHTHALENE	7	0.127143	0.082	0.287	3	0.096333	0.082	0.112	0			
1-METHYLNAPHTHALENE	1	0.106	0.106	0.106	0				0			
2,2-DIMETHYLOCTANE	0				0				0			
3,3-DIMETHYLOCTANE	0				0				0			
2,3-DIMETHYLOCTANE	0				0				0			
2-METHYLNONANE	5	0.3022	0.171	0.413	2	0.2435	0.227	0.26	2	0.085	0.08	0.09
3-ETHYLOCTANE	0				0				0			
3-METHYLNONANE	1	0.085	0.085	0.085	0				0			
N-DECANE	2	0.0875	0.082	0.093	1	0.133	0.133	0.133	0			
2,6-DIMETHYLOCTANE	0				0				0			
DIMETHYLOCTANE (UNSPECIFIED)	0				0				0			
3,5-DIMETHYLOCTANE	0				0				0			
2,3,6-TRIMETHTYLHEPTANE	1	0.9	0.9	0.9	0				0			
2,2,5-TRIMETHYLHEPTANE	0				0				0			
C10-C11 BRANCHED ALKANES	0				0				0			
C11 TETRAHYDRONAPHTHALENES	0				0				0			
TERT-1-BUTYL-2-METHYLBENZENE	0				0				0			
N-PENTYLBENZENE	0				0				0			
PENTAMETHYLBENZENE	0				0				0			
(E)-1-METHYL-2-(4-METHYLPENTYL)CYCLOP	0				0				0			
ACENAPHTHYLENE	0				0				0			
CARBON TETRACHLORIDE	0				0				0			
BIPHENYL	0				0				0			
ACENAPHTHENE	0				0				0			
ETHYLNAPHTHALENE	0				0				0			
DIMETHYLNAPHTHALENES	0				0				0			
N-UNDECANE	0				0				0			
2,4,6-TRIMETHYLOCTANE	0				0				0			
2,6-DIMETHYLNONANE	0				0				0			
C12-C14 BRANCHED ALKANES	0				0				0			
TRIMETHYLNAPHTHALENES	0				0				0			
C12 TETRAHYDRONAPHTHALENES	0				0				0			
TERT-1-BUTYL-3,5-DIMETHYLBENZENE	0				0				0			
1,3,5-TRIETHYLBENZENE	0				0				0			
1,2,4-TRIETHYLBENZENE	0				0				0			
N-HEXYLBENZENE	0				0				0			
1-TERT-BUTYL-4-ETHYLBENZENE	0				0				0			
BETA-CHLORONAPHTHALENE	0				0				0			
DIBROMOCHLOROMETHANE	0				0				0			
TETRACHLOROETHYLENE	0				0				0			
FLUORENE	0				0				0			
1,1,2,2-TETRACHLOROETHANE	0				0				0			
2-PHENYLPHENOL	0				0				0			
C13H14	0				0				0			
N-DODECANE	0				0				0			
PHENANTHRENE	0				0				0			
ANTHRACENE	0				0				0			
N-TRIDECANE	1	0.103	0.103	0.103	0				0			
C13 BRANCHED ALKANES	0				0				0			
1,2-DIBROMOETHANE (ETHYLENE DIBROMID	0				0				0			
N-TETRADECANE	0				0				0			
C14 PHENOL	0				0				0			
FLUORANTHENE	0				0				0			
PYRENE	0				0				0			
DICHLOROBROMOMETHANE	0				0				0			
N-PENTADECANE	0				0				0			
C15 BRANCHED ALKANE	0				0				0			
BENZO(A)ANTHRACENE	0				0				0			
N-HEXADECANE	0				0				0			
C16 BRANCHED ALKANES	0				0				0			
BENZO(A)PHENANTHRENE	0				0				0			
C16-C18 BRANCHED ALKANES	0				0				0			
BRANCHED ALKANE (PHYTANE)	0				0				0			
BENZO(B)FLUORANTHENE	0				0				0			
N-HEPTADECANE	0				0				0			
BENZO(K)FLUORANTHENE	0				0				0			

ANALYTICAL LAB	PRODUCT CODE				PRODUCT CODE				PRODUCT CODE			
LAB SAMPLE ID	11				11				11			
STREAM NUMBER												
SAMPLE ID	PRODUCT NAME				PRODUCT NAME				PRODUCT NAME			
STREAM NAME	ULTIMATE				ULTIMATE RFG				ULTIMATE OXY			
STREAM TYPE	WT%				WT%				WT%			
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
BENZO(A)PYRENE	0				0				0			
BROMOFORM (TRIBROMOMETHANE)	0				0				0			
N-OCTADECANE	3	0	0	0	0				0			
	0				0				0			
Total Wt% by Analysis	10	88.95149	76.55373	102.8211	3	80.65482	76.98966	85.2074	2	85.65115	85.11275	86.18954
TOTAL WT% BTEX	10	13.1916	1.346	22.525	3	9.764667	2.354	18.932	2	18.111	17.866	18.356
TOTAL WT % HAPS	10	21.34728	6.281	26.316	3	21.25843	14.3012	29.53	2	22.5342	22.2562	22.8122
TOTAL WT% TNMNEHC	10	88.9016	76.499	102.818	3	80.60933	76.917	85.207	2	85.6135	85.074	86.153
TOTAL WT% SARA313	10	14.48269	1.778008	25.48501	3	17.82311	9.384208	28.17	2	18.63472	18.37721	18.89222

Appendix H

Historical Amoco Fuel Analytical Results – Diesel, Jet, Kerosene, and Higher Distillates

	ANALYTICAL LAB			PRODUCT CODE				PRODUCT CODE		
	LAB SAMPLE ID			16				17		
	STREAM NUMBER									
	SAMPLE ID			PRODUCT NAME				PRODUCT NAME		
	STREAM NAME			DISTILLATE				No. 1 FO		
	STREAM TYPE			WT%				WT%		
Sort order		**MW**	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
1	API GRAVITY		11	36.6	27.8	40.9	2	43.9	42.5	45.2
5	CARBON MONOXIDE	28.010	0				0			
6	CARBON DIOXIDE	44.010	0				0			
8	HYDROGEN SULFIDE	34.076	0				0			
14	PHOSPHORUS (YELLOW OR WH	123.895	4	0.00075	0.0006	0.0009	0			
19	CHROMIUM COMPOUNDS	51.996	0				0			
22	BERYLLIUM COMPOUNDS	9.013	0				0			
23	VANADIUM	50.942	5	2.85E-05	8.9E-06	0.000056	1	0.000015	0.000015	0.000015
24	MANGANESE COMPOUNDS	54.938	3	9.8E-06	0.000008	1.08E-05	2	1.68E-05	1.51E-06	0.000032
25	COBALT COMPOUNDS	58.930	0				1	3.1E-07	3.1E-07	3.1E-07
26	NICKEL COMPOUNDS	58.690	10	3.68E-05	2.4E-06	0.000157	1	6.01E-05	6.01E-05	6.01E-05
27	COPPER COMPOUNDS	63.546	4	0.00012	2.7E-06	0.000458	2	2.17E-05	1.07E-05	3.26E-05
28	ZINC COMPOUNDS	65.390	4	2.26E-05	0.000003	4.41E-05	2	1.8E-05	1.34E-05	2.25E-05
31	ARSENIC COMPOUNDS	74.920	0				0			
36	MOLYBDENUM	95.940	1	2.2E-06	2.2E-06	2.2E-06	1	5.3E-06	5.3E-06	5.3E-06
40	SILVER COMPOUNDS	107.860	0				0			
41	CADMIUM COMPOUNDS	112.410	1	2.6E-06	2.6E-06	2.6E-06	1	6.6E-06	6.6E-06	6.6E-06
44	ANTIMONY COMPOUNDS	121.750	0				0			
47	BARIUM COMPOUNDS	137.330	1	1.17E-05	1.17E-05	1.17E-05	1	0.00007	0.00007	0.00007
65	MERCURY COMPOUNDS	200.590	0				0			
66	THALLIUM COMPOUNDS	204.383	0				0			
67	LEAD COMPOUNDS	207.200	2	2.86E-05	3.4E-06	5.37E-05	2	3.96E-06	1.32E-06	6.6E-06
71	METHANE	16.040	0				0			
72	ACETYLENE	26.020	0				0			
73	ETHYLENE	28.050	0				0			
74	ETHANE	30.070	0				0			
75	METHANOL	32.040	0				0			
78	PROPYLENE (PROPENE)	42.080	0				0			
80	N-PROPANE	44.090	0				0			
81	ETHANOL	46.070	0				0			
82	CHLOROMETHANE (METHYL CHL	50.490	0				0			
83	1,3-BUTADIENE	54.090	0				0			
89	ACETONE	58.080	0				0			
91	N-BUTANE	58.120	0				0			
92	ETHYLENE GLYCOL	62.070	0				0			
93	VINYL CHLORIDE	62.500	0				0			
94	CHLOROETHANE (ETHYL CHLOR	64.520	0				0			
102	CYCLOPENTANE	70.130	0				0			
104	METHYL ETHYL KETONE	72.100	0				0			
106	N-PENTANE	72.150	0				0			
109	CARBON DISULFIDE	76.140	0				0			
110	BENZENE	78.110	0				0			
121	CYCLOHEXANE	84.160	0				1	0.1	0.1	0.1
127	VINYL ACETATE	86.090	0				0			
131	N-HEXANE	86.170	0				0			
133	METHYL TERT-BUTYL ETHER	88.150	0				0			
136	TOLUENE	92.130	5	0.098	0.086	0.111	1	0.3	0.3	0.3
137	PHENOL	94.110	0				0			
138	BROMOMETHANE (METHYL BRO	94.950	0				0			
140	T-1,2-DICHLOROETHYLENE	96.940	0				0			
152	METHYLCYCLOHEXANE	98.180	8	0.138	0.091	0.245	1	0.3	0.3	0.3
157	1,1-DICHLOROETHANE	98.960	0				0			
158	1,2-DICHLOROETHANE (ETHYLEI	98.960	0				0			
162	METHYL N-BUTYL KETONE	100.160	0				0			
170	N-HEPTANE	100.200	4	0.114	0.081	0.169	1	0.2	0.2	0.2
175	STYRENE	104.140	0				0			
176	ETHYLBENZENE	106.160	2	0.104	0.083	0.124	1	0.2	0.2	0.2
177	M-XYLENE	106.160	8	0.182	0.124	0.234	1	0.7	0.7	0.7
178	P-XYLENE	106.160	2	0.156	0.081	0.231	1	0.1	0.1	0.1
179	O-XYLENE	106.160	7	0.117	0.097	0.155	1	0.3	0.3	0.3
180	2-CHLOROETHYL VINYL ETHER	106.550	0				0			
184	TRANS-1,3-DICHLOROPROPENE	110.970	0				0			
202	CHLOROBENZENE	112.560	0				0			
203	1,2-DICHLOROPROPANE	112.990	0				0			

	ANALYTICAL LAB			PRODUCT CODE				PRODUCT CODE		
	LAB SAMPLE ID			16				17		
	STREAM NUMBER									
	SAMPLE ID			PRODUCT NAME				PRODUCT NAME		
	STREAM NAME			DISTILLATE				No. 1 FO		
	STREAM TYPE			WT%				WT%		
Sort order		**MW**	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
210	N-OCTANE	114.220	8	0.157	0.109	0.199	1	0.4	0.4	0.4
217	2,2,4-TRIMETHYLPENTANE	114.220	0				0			
219	INDENE	116.150	0				0			
221	CHLOROFORM	119.390	0				0			
222	CUMENE	120.190	0				0			
226	MESITYLENE	120.190	7	0.104	0.085	0.122	2	0.6	0.1	1.1
228	1,2,4-TRIMETHYLBENZENE	120.190	9	0.317	0.113	0.548	2	0.7	0.4	1.1
232	2,4-DIMETHYLPHENOL	122.160	0				0			
235	T-1,4-DICHLOROBUTENE	124.990	0				0			
253	NAPHTHALENE	128.160	8	0.613	0.121	1.245	2	0.3	0.2	0.5
261	N-NONANE	128.250	8	0.424	0.166	0.563	2	1.4	0.4	2.3
268	TRICHLOROETHYLENE	131.400	0				0			
270	1,1,1-TRICHLOROETHANE (METH	133.420	0				0			
271	1,1,2-TRICHLOROETHANE	133.420	0				0			
320	ACENAPHTHYLENE	152.180	0				0			
321	CARBON TETRACHLORIDE	153.840	0				0			
322	BIPHENYL	154.200	3	0.216	0.195	0.243	0			
323	ACENAPHTHENE	154.210	1	0.148	0.148	0.148	0			
337	BETA-CHLORONAPHTHALENE	162.610	0				0			
338	DIBROMOCHLOROMETHANE	162.830	0				0			
339	TETRACHLOROETHYLENE	165.850	0				0			
340	FLUORENE	166.210	4	0.183	0.140	0.262	0			
341	1,1,2,2-TETRACHLOROETHANE	167.860	0				0			
342	2-PHENYLPHENOL	170.200	0				0			
345	PHENANTHRENE	178.220	4	0.351	0.110	0.762	0			
346	ANTHRACENE	178.220	2	0.417	0.088	0.745	0			
349	1,2-DIBROMOETHANE (ETHYLEN	187.880	0				0			
352	FLUORANTHENE	202.240	0				0			
353	PYRENE	202.240	0				1	0.1	0.1	0.1
354	DICHLOROBROMOMETHANE	206.280	0				0			
360	BENZO(A)PHENANTHRENE	228.280	0				0			
366	BENZO(A)PYRENE	252.300	0				0			
367	BROMOFORM (TRIBROMOMETHA	252.770	0				0			
368	N-OCTADECANE	254.480	9	1.221	0.000	4.436	1	0.1	0.1	0.1
							0			
	Total Wt% by Analysis		11	27.75	18.74	40.66	2	29.8	20.2	39.5
	TOTAL WT% BTEX		11	0.30		0.66	2	0.8	0.0	1.6
	TOTAL WT % HAPS		11	0.80		1.99	2	1.1	0.2	2.1
	TOTAL WT% TNMNEHC		11	27.48	18.59	40.32	2	29.8	20.2	39.5
	TOTAL WT% SARA313		11	0.88	0.00	1.99	2	1.2	0.2	2.2
	TOTAL WT% PAHs									

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		17				18				19		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		PDF/DIESEL				No. 2 FO/RR40				Jet Naptha (JP-4)		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
API GRAVITY	6	36.1	34.1	38.7	10	33.6	30.1	36.2	3	57.6	55.2	61.5
CARBON MONOXIDE	0				0				0			
CARBON DIOXIDE	0				0				0			
HYDROGEN SULFIDE	0				0				0			
PHOSPHORUS (YELLOW OR WH	0				6	0.000683	0.0004	0.001	4	0.001225	0.0006	0.0021
CHROMIUM COMPOUNDS	0				1	0.000063	0.000063	0.000063	0			
BERYLLIUM COMPOUNDS	0				0				0			
VANADIUM	3	2.19E-05	0.000002	3.97E-05	6	7.55E-06	1.2E-07	2.61E-05	4	2.29E-05	2.6E-06	3.73E-05
MANGANESE COMPOUNDS	4	2.04E-05	2.4E-06	4.45E-05	3	2.41E-05	6.2E-06	4.44E-05	3	1.77E-05	2.3E-06	4.46E-05
COBALT COMPOUNDS	0				0				0			
NICKEL COMPOUNDS	4	4.59E-05	5.8E-06	9.96E-05	7	5.58E-05	1.6E-06	0.000169	3	3.56E-05	2.23E-05	5.44E-05
COPPER COMPOUNDS	4	5.85E-05	8.6E-06	0.000198	4	1.74E-05	2.1E-06	4.82E-05	3	9.4E-06	6.3E-06	0.000015
ZINC COMPOUNDS	5	1.61E-05	2.3E-06	2.54E-05	6	1.66E-05	2.6E-06	3.39E-05	3	7.67E-06	2.4E-06	1.65E-05
ARSENIC COMPOUNDS	2	2.4E-06	2.2E-06	2.6E-06	1	2.1E-06	2.1E-06	2.1E-06	1	2.3E-06	2.3E-06	2.3E-06
MOLYBDENUM	1	5.1E-06	5.1E-06	5.1E-06	2	4.65E-06	0.000004	5.3E-06	1	2.1E-06	2.1E-06	2.1E-06
SILVER COMPOUNDS	0				1	0.000002	0.000002	0.000002	1	2.5E-06	2.5E-06	2.5E-06
CADMIUM COMPOUNDS	1	7.5E-06	7.5E-06	7.5E-06	2	5.05E-06	3.8E-06	6.3E-06	1	0.000005	0.000005	0.000005
ANTIMONY COMPOUNDS	0				0				0			
BARIUM COMPOUNDS	0				2	6.05E-06	4.3E-06	7.8E-06	1	3.7E-06	3.7E-06	3.7E-06
MERCURY COMPOUNDS	0				0				0			
THALLIUM COMPOUNDS	0				0				0			
LEAD COMPOUNDS	3	1.11E-05	2.6E-06	0.000018	4	8.7E-06	3.4E-06	1.33E-05	1	1.45E-05	1.45E-05	1.45E-05
METHANE	0				0				0			
ACETYLENE	0				0				0			
ETHYLENE	0				0				0			
ETHANE	0				0				0			
METHANOL	0				0				0			
PROPYLENE (PROPENE)	0				0				0			
N-PROPANE	0				0				0			
ETHANOL	0				0				0			
CHLOROMETHANE (METHYL CHL	0				0				0			
1,3-BUTADIENE	0				0				0			
ACETONE	0				0				0			
N-BUTANE	0				0				3	1.60	0.29	4.20
ETHYLENE GLYCOL	0				0				0			
VINYL CHLORIDE	0				0				0			
CHLOROETHANE (ETHYL CHLOR	0				0				0			
CYCLOPENTANE	0				0				3	0.15	0.08	0.19
METHYL ETHYL KETONE	0				0				0			
N-PENTANE	0				0				3	1.61	1.11	1.89
CARBON DISULFIDE	0				0				0			
BENZENE	0				0				5	1.68	0.62	2.81
CYCLOHEXANE	0				0				5	5.38	1.73	10.27
VINYL ACETATE	0				0				0			
N-HEXANE	0				0				5	5.15	2.59	9.31
METHYL TERT-BUTYL ETHER	0				0				0			
TOLUENE	2	0.09	0.08	0.10	4	0.127	0.096	0.162	5	3.89	1.66	7.71
PHENOL	0				0				0			
BROMOMETHANE (METHYL BRO	0				0				0			
T-1,2-DICHLOROETHYLENE	0				0				0			
METHYLCYCLOHEXANE	6	0.12	0.08	0.17	8	0.098	0.080	0.120	5	6.46	3.12	11.00
1,1-DICHLOROETHANE	0				0				0			
1,2-DICHLOROETHANE (ETHYLEI	0				0				0			
METHYL N-BUTYL KETONE	0				0				1	0.26	0.26	0.26
N-HEPTANE	0				1	0.088	0.088	0.088	5	6.18	1.78	11.12
STYRENE	0				0				0			
ETHYLBENZENE	0				2	0.094	0.093	0.095	5	0.39	0.14	0.97
M-XYLENE	6	0.15	0.10	0.25	9	0.189	0.102	0.276	4	2.15	0.10	3.56
P-XYLENE	0				7	0.103	0.084	0.141	3	0.90	0.65	1.13
O-XYLENE	2	0.11	0.11	0.11	5	0.141	0.101	0.187	4	1.04	0.13	1.63
2-CHLOROETHYL VINYL ETHER	0				0				0			
TRANS-1,3-DICHLOROPROPENE	0				0				0			
CHLOROBENZENE	0				0				0			
1,2-DICHLOROPROPANE	0				0				0			

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		17				18				19		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		PDF/DIESEL				No. 2 FO/RR40				Jet Naptha (JP-4)		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
N-OCTANE	6	0.12	0.10	0.15	6	0.148	0.089	0.206	5	2.24	0.90	4.71
2,2,4-TRIMETHYLPENTANE	0				0				0			
INDENE	0				0				0			
CHLOROFORM	0				0				0			
CUMENE	0				0				3	0.17	0.13	0.21
MESITYLENE	2	0.24	0.24	0.24	6	0.205	0.082	0.514	3	1.12	0.29	1.66
1,2,4-TRIMETHYLBENZENE	6	0.31	0.10	0.82	11	0.438	0.122	1.069	4	1.44	0.20	2.50
2,4-DIMETHYLPHENOL	0				0				0			
T-1,4-DICHLOROBUTENE	0				0				0			
NAPHTHALENE	6	0.24	0.12	0.36	10	0.378	0.085	0.765	1	0.23	0.23	0.23
N-NONANE	6	0.44	0.14	0.96	11	0.371	0.095	1.070	4	4.88	0.30	8.94
TRICHLOROETHYLENE	0				0				0			
1,1,1-TRICHLOROETHANE (METH	0				0				0			
1,1,2-TRICHLOROETHANE	0				0				0			
ACENAPHTHYLENE	0				0				0			
CARBON TETRACHLORIDE	0				0				0			
BIPHENYL	5	0.18	0.11	0.27	4	0.151	0.083	0.240	0			
ACENAPHTHENE	0				2	0.129	0.089	0.169	0			
BETA-CHLORONAPHTHALENE	0				0				0			
DIBROMOCHLOROMETHANE	0				0				0			
TETRACHLOROETHYLENE	0				0				0			
FLUORENE	5	0.139	0.121	0.179	9	0.166	0.090	0.285	0			
1,1,2,2-TETRACHLOROETHANE	0				0				0			
2-PHENYLPHENOL	0				0				0			
PHENANTHRENE	5	0.226	0.110	0.460	7	0.259	0.123	0.455	0			
ANTHRACENE	2	0.120	0.109	0.131	6	0.379	0.148	0.683	0			
1,2-DIBROMOETHANE (ETHYLEN	0				0				0			
FLUORANTHENE	0				0				0			
PYRENE	1	0.384	0.384	0.384	0				0			
DICHLOROBROMOMETHANE	0				0				0			
BENZO(A)PHENANTHRENE	0				0				0			
BENZO(A)PYRENE	0				0				0			
BROMOFORM (TRIBROMOMETHA	0				0				0			
N-OCTADECANE	6	1.823	1.104	3.305	11	1.285	0.615	2.218	2	0.000	0.000	0.000
Total Wt% by Analysis	6	31.12	20.91	47.80	11	25.77	11.09	40.22	5	80.21	70.44	94.35
TOTAL WT% BTEX	6	0.22	0.10	0.45	11	0.35	0.00	0.80	5	9.06	6.21	14.28
TOTAL WT % HAPS	6	0.61	0.35	1.02	11	0.75	0.00	1.57	5	14.36	10.85	18.23
TOTAL WT% TNMNEHC	6	30.97	20.80	47.79	11	25.62	11.05	40.21	5	80.14	70.25	94.15
TOTAL WT% SARA313	6	0.65	0.47	1.02	11	0.95	0.00	2.01	5	14.59	10.02	22.18
TOTAL WT% PAHs	6	0.65	0.48	0.94								

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		19.1				20				22		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		Jet Naptha (JP-8)				Jet Ker. (JET A)				F.O.#6/RESID		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
API GRAVITY	1	44.4	44.4	44.4	7	40.1	23.1	45.0	3	18.8	4.1	41.0
CARBON MONOXIDE	0				0				0			
CARBON DIOXIDE	0				0				0			
HYDROGEN SULFIDE	0				0				0			
PHOSPHORUS (YELLOW OR WH	0				1	0.0006	0.0006	0.0006	2	0.00085	0.0007	0.001
CHROMIUM COMPOUNDS	0				0				2	1.45E-05	0.000009	0.00002
BERYLLIUM COMPOUNDS	0				0				0			
VANADIUM	1	2.1E-07	2.1E-07	2.1E-07	3	3.45E-05	1.88E-05	6.01E-05	5	0.0041	2.22E-05	0.008241
MANGANESE COMPOUNDS	1	1.9E-07	1.9E-07	1.9E-07	2	2.86E-05	1.15E-05	4.56E-05	5	4.44E-05	4.6E-06	0.00015
COBALT COMPOUNDS	0				0				3	6.84E-05	2.05E-05	0.000104
NICKEL COMPOUNDS	0				5	3.8E-05	4.5E-06	0.000111	5	0.001989	0.000142	0.003894
COPPER COMPOUNDS	0				4	8.38E-06	2.7E-06	1.28E-05	5	2.24E-05	1.25E-05	5.12E-05
ZINC COMPOUNDS	0				4	1.25E-05	5.8E-06	1.96E-05	5	0.000161	1.89E-05	0.000495
ARSENIC COMPOUNDS	0				1	2.8E-06	2.8E-06	2.8E-06	0			
MOLYBDENUM	0				2	3.65E-06	2.2E-06	5.1E-06	4	3.24E-05	4.8E-06	0.000073
SILVER COMPOUNDS	0				1	2.1E-06	2.1E-06	2.1E-06	3	2.85E-05	0.00001	0.00004
CADMIUM COMPOUNDS	0				2	3.95E-06	3.9E-06	0.000004	1	1.2E-06	1.2E-06	1.2E-06
ANTIMONY COMPOUNDS	0				0				3	1.76E-05	4.9E-06	0.000043
BARIUM COMPOUNDS	0				0				4	5.54E-05	3.1E-06	0.00011
MERCURY COMPOUNDS	1	3E-07	3E-07	3E-07	0				0			
THALLIUM COMPOUNDS	0				0				0			
LEAD COMPOUNDS	0				3	0.000006	3.1E-06	1.07E-05	4	3.42E-05	8.6E-06	0.000053
METHANE	0				0				0			
ACETYLENE	0				0				0			
ETHYLENE	0				0				0			
ETHANE	0				0				0			
METHANOL	0				0				0			
PROPYLENE (PROPENE)	0				0				0			
N-PROPANE	0				0				0			
ETHANOL	0				0				0			
CHLOROMETHANE (METHYL CHL	0				0				0			
1,3-BUTADIENE	0				0				0			
ACETONE	0				0				0			
N-BUTANE	0				0				0			
ETHYLENE GLYCOL	0				0				0			
VINYL CHLORIDE	0				0				0			
CHLOROETHANE (ETHYL CHLOR	0				0				0			
CYCLOPENTANE	0				0				0			
METHYL ETHYL KETONE	0				0				0			
N-PENTANE	0				0				0			
CARBON DISULFIDE	0				0				0			
BENZENE	0				0				0			
CYCLOHEXANE	1	0.102	0.102	0.102	0				0			
VINYL ACETATE	0				0				0			
N-HEXANE	1	0.15	0.15	0.15	1	0.10	0.10	0.10	0			
METHYL TERT-BUTYL ETHER	0				0				0			
TOLUENE	1	0.155	0.155	0.155	5	0.14	0.09	0.18	1	0.08	0.08	0.08
PHENOL	0				0				0			
BROMOMETHANE (METHYL BRO	0				0				0			
T-1,2-DICHLOROETHYLENE	0				0				0			
METHYLCYCLOHEXANE	1	0.292	0.292	0.292	5	0.20	0.12	0.28	1	0.11	0.11	0.11
1,1-DICHLOROETHANE	0				0				0			
1,2-DICHLOROETHANE (ETHYLEI	0				0				0			
METHYL N-BUTYL KETONE	0				0				0			
N-HEPTANE	1	0.171	0.171	0.171	4	0.15	0.09	0.26	0			
STYRENE	0				0				0			
ETHYLBENZENE	1	0.101	0.101	0.101	4	0.10	0.08	0.14	0			
M-XYLENE	1	0.254	0.254	0.254	7	0.29	0.12	0.68	1	0.19	0.19	0.19
P-XYLENE	1	0.095	0.095	0.095	2	0.22	0.22	0.22	0			
O-XYLENE	1	0.148	0.148	0.148	7	0.17	0.10	0.30	1	0.11	0.11	0.11
2-CHLOROETHYL VINYL ETHER	0				0				0			
TRANS-1,3-DICHLOROPROPENE	0				0				0			
CHLOROBENZENE	0				0				0			
1,2-DICHLOROPROPANE	0				0				0			

ANALYTICAL LAB		PRODUCT CODE				PRODUCT CODE				PRODUCT CODE		
LAB SAMPLE ID		19.1				20				22		
STREAM NUMBER												
SAMPLE ID		PRODUCT NAME				PRODUCT NAME				PRODUCT NAME		
STREAM NAME		Jet Naptha (JP-8)				Jet Ker. (JET A)				F.O.#6/RESID		
STREAM TYPE		WT%				WT%				WT%		
er	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX	N	AVE.	MIN	MAX
N-OCTANE	1	0.38	0.38	0.38	6	0.32	0.12	0.56	1	0.16	0.16	0.16
2,2,4-TRIMETHYLPENTANE	0				0				0			
INDENE	0				0				0			
CHLOROFORM	0				0				0			
CUMENE	0				0				0			
MESITYLENE	1	0.186	0.186	0.186	6	0.33	0.08	1.02	1	0.12	0.12	0.12
1,2,4-TRIMETHYLBENZENE	1	0.735	0.735	0.735	7	0.72	0.14	1.71	2	0.23	0.08	0.38
2,4-DIMETHYLPHENOL	0				0				0			
T-1,4-DICHLOROBUTENE	0				0				0			
NAPHTHALENE	1	0.19	0.19	0.19	7	0.61	0.37	0.94	2	0.44	0.21	0.67
N-NONANE	1	0.86	0.86	0.86	6	1.22	0.46	2.28	1	0.54	0.54	0.54
TRICHLOROETHYLENE	0				0				0			
1,1,1-TRICHLOROETHANE (METH	0				0				0			
1,1,2-TRICHLOROETHANE	0				0				0			
ACENAPHTHYLENE	0				0				0			
CARBON TETRACHLORIDE	0				0				0			
BIPHENYL	0				6	0.20	0.11	0.30	1	0.25	0.25	0.25
ACENAPHTHENE	0				1	0.203	0.203	0.203	0			
BETA-CHLORONAPHTHALENE	0				0				0			
DIBROMOCHLOROMETHANE	0				0				0			
TETRACHLOROETHYLENE	0				0				0			
FLUORENE	0				1	0.359	0.359	0.359	1	0.101	0.101	0.101
1,1,2,2-TETRACHLOROETHANE	0				0				0			
2-PHENYLPHENOL	0				0				0			
PHENANTHRENE	0				1	0.797	0.797	0.797	2	0.377	0.111	0.643
ANTHRACENE	0				0				0			
1,2-DIBROMOETHANE (ETHYLEN	0				0				0			
FLUORANTHENE	0				0				0			
PYRENE	0				2	0.126	0.120	0.132	1	0.458	0.458	0.458
DICHLOROBROMOMETHANE	0				0				0			
BENZO(A)PHENANTHRENE	0				0				1	0.192	0.192	0.192
BENZO(A)PYRENE	0				0				0			
BROMOFORM (TRIBROMOMETHA	0				0				0			
N-OCTADECANE	0				3	0.393	0.088	0.996	1	0.099	0.099	0.099
Total Wt% by Analysis	1	22.87702	22.87702	22.87702	7	34.61	18.34	50.24	5	7.75	0.02	32.00
TOTAL WT% BTEX	1	0.753	0.753	0.753	7	0.69	0.21	1.46	5	0.08		0.39
TOTAL WT % HAPS	1	1.093	1.093	1.093	7	1.48	0.97	2.26	5	0.30		1.31
TOTAL WT% TNMNEHC	1	22.764	22.764	22.764	7	34.45	17.91	50.24	5	7.21		31.79
TOTAL WT% SARA313	1	1.045001	1.045001	1.045001	7	1.47	0.97	2.26	5	0.31	0.01	1.31
TOTAL WT% PAHs												

Appendix I

Historical Amoco Fuel Analytical Results Summary

	Fuel Type	Gasoline Grade								
Depth Interval (ft)	**Product**	Product Code 9			Product Code 10			Product Code 11		
TOC (mg/kg)	**Fuel Grade**	UL Reg	UL Reg RFG	UL Reg Oxy	Silver	Silver RFG	Silver Oxy	Ultimate	Ultimate RFG	Ultimate Oxy
PCB Aroclors	**AVE**									
Total PCBs (ND=0)	**value used**									
PAH	**Units**									
2-Methylnapthalene	µg/kg	2,022,000	3,700,000		4,105,000	3,730,000		1,271,428	963,333	
Acenaphthlene	µg/kg									
Acenapthylene	µg/kg									
Anthracene	µg/kg									
Benzo(a)anthracene	µg/kg									
Benzo(a)pyrene	µg/kg									
Benzo(b)fluoranthene	µg/kg									
Benzo(e)pyrene	µg/kg									
Benzo(g,h,i)perylene	µg/kg									
Benzo(k)flouranthene	µg/kg									
Chrysene	µg/kg									
Dibenzo(a,h)anthracene	µg/kg									
Flouranthene	µg/kg									
Flourene	µg/kg									
Indeno(1,2,3-cd)pyrene	µg/kg									
Napthalene	µg/kg	2,912,222	2,690,000		4,550,000	5,080,000		2,410,000	2,650,000	1,025,000
Phenanthrene	µg/kg									
Pyrene	µg/kg									
TOTAL PAH17 (ND=1/2RL)										
Metals										
Aluminum	µg/kg	19,000	14,000	5,000	19,625	9,000	12,000	18,000	12,667	
Antimony	µg/kg	1.1				1				
Arsenic	µg/kg	7.33	5.5		6.33		4.5	4	1	5
Barium	µg/kg	15.23	61	22.4	12.4		49.4	41		49.55
Beryllium	µg/kg									
Cadmium	µg/kg	6.6								
Calcium	µg/kg				650					
Chromium	µg/kg				650					
Cobalt	µg/kg		3			1	1.95			1.4
Copper	µg/kg	48.5	5		72.4			36		
Iron	µg/kg				280	100		400		
Lead	µg/kg	10.23	1.2	12.3	257.2		13.3	8.5		17.45
Magnesium	µg/kg				80	3,000			1	
Manganese	µg/kg	15.33	3		104.53		2.25	7.38	1.4	3
Mercury	µg/kg	3.33	4	3	3		2	3	2	3.5
Nickel	µg/kg	95.54	97.5		268.62		58	88.5	45.33	69.5
Potassium	µg/kg									

	Fuel Type	Gasoline Grade								
Depth Interval (ft)	**Product**	Product Code 9			Product Code 10			Product Code 11		
Selenium	µg/kg									
Silver	µg/kg	33		1.1	200			83		
Sodium	µg/kg	14,181	13,500	9,000	13,060		8,000	14,300	10,000	8,000
Thallium	µg/kg							1		
Vanadium	µg/kg	33.89	9.55	7	142.24	7.8	8.05	32.78	3.97	7.65
Zinc	µg/kg	43	10	14	62.6		13	32	1	13
VOCS	µg/kg									
Benzene	µg/kg	2,490,000	9,205,000	24,410,000	17,343,000	6,160,000	22,215,000	10,505,000	6,290,000	24,515,000
Xylene	µg/kg	37,845,633	14,320,000	30,680,000	48,949,000	11,500,000	45,420,000	50,867,666	48,323,333	71,725,000

	Middle Distillates							
Depth Interval (ft)	Product Code 16	Product Code 17	Product Code 17	Product Code 18	Product Code 19	Product Code 19.1	Product Code 20	Product Code 22
TOC (mg/kg)	Distillate	No 1 FD	PDR Diesel	No. 2 FO/RR40	Jet Naptha (JP-4)	Jet Naptha (JP-8)	Jet Ker. (Jet A)	F.O.#6/RESID
PCB Aroclors								
Total PCBs (ND=0)								
PAH								
2-Methylnapthalene	6,231,818	3,145,000	4,830,000		1,650,000	2,860,000	7,447,142	4,276,666
Acenaphthlene	1,480,000			1,290,000			2,030,000	
Acenapthylene								
Anthracene	4,165,000		1,200,000	3,790,000				
Benzo(a)anthracene								
Benzo(a)pyrene								
Benzo(b)fluoranthene								
Benzo(e)pyrene								
Benzo(g,h,i)perylene								
Benzo(k)flouranthene								
Chrysene								
Dibenzo(a,h)anthracene								
Flouranthene								
Flourene	1,827,500		1,388,000	1,662,222			3,590,000	1,010,000
Indeno(1,2,3-cd)pyrene								
Napthalene	6,131,250	6,131,250	2,413,333	3,780,000	2,290,000	1,900,000	6,127,142	4,380,000
Phenanthrene	3,510,000		2,264,000	2,590,000			7,970,000	3,770,000
Pyrene		1,270,000	3,840,000				1,260,000	4,580,000
TOTAL PAH17 (ND=1/2RL)								
Metals								
Aluminum					24,000			6,100
Antimony								176.3
Arsenic			24	21	23		28	
Barium	117	700		60.5	37			553.5
Beryllium								
Cadmium	26	66	75	50.5	50		39	12
Calcium				530				10,767
Chromium				630				145
Cobalt		3.1						684
Copper	1203	216.5	584.75	173.5	94		83.75	224
Iron	6,600	500	14,400	715			450	22,500
Lead	285.5	39.6	110.67	87	145		60	342
Magnesium				100				3,005
Manganese	98	167.55	203.75	241	177.33	1.9	285.5	444
Mercury						3		
Nickel	368.2	601	458.5	557.85	355.67		380.4	19,889
Potassium								2,000

	Middle Distillates							
Depth Interval (ft)	Product Code 16	Product Code 17	Product Code 17	Product Code 18	Product Code 19	Product Code 19.1	Product Code 20	Product Code 22
Selenium								
Silver				20	25		21	285
Sodium				1,900	15,666			13,433
Thallium								
Vanadium	284.6	150	219.33	75.48	228.5	2.1	345	222
Zinc	226.25	179.5	161.2	166.33	76.67		124.75	1,608
VOCS								
Benzene					16,836,000			
Xylene	4,546,250	11,000,000	2,653,333	4,332,444	40,878,333	4,970,000	6,864,286	3,050,000

Appendix J

USGS Report on Powder River Basin Coal Quality

Chapter PQ

COAL QUALITY AND GEOCHEMISTRY, POWDER RIVER BASIN, WYOMING AND MONTANA

By G.D. Stricker and M.S. Ellis

in U.S. Geological Survey Professional Paper 1625-A

Contents

Figures

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Figures-*continued*

Table

COAL QUALITY AND GEOCHEMISTRY, POWDER RIVER BASIN, WYOMING AND MONTANA

Actively mined coal from the Wyodak-Anderson coal zone in the Powder River Basin in Wyoming and Montana (fig. PQ-1) is considered to be "clean coal." For the location and description of this coal zone, see Chapter PF-Framework Geology of Fort Union coal in the Powder River Basin. This coal zone contains a low-contaminant, subbituminous coal resource that has the following arithmetic mean values (on an as-received basis) for coal that is not presently being mined or under lease to be mined in the future: **moisture**–27.66 percent, **ash**–6.44 percent, **total sulfur**–0.48 percent, **calorific value**–8,220 Btu/lb, **lb SO_2 per million Btu**–1.24, and **moist, mineral-matter-free Btu**–8,820. Arithmetic mean concentration (in parts per million and on whole-coal and remnant-moisture basis) of elements of environmental concern for coal in the Wyodak-Anderson coal zone (and stratigraphically equivalent beds in Montana and Wyoming) are: **antimony**–0.50, **arsenic**–2.6, **beryllium**–0.54, **cadmium**–0.21, **chromium**–6.1, **cobalt**–1.9, **lead**–3.0, **manganese**–26, **mercury**-–0.13, **nickel**–4.6, **selenium**–1.1, and **uranium**–1.3. Table PQ-1 is a summary of coal quality of the Wyodak-Anderson coal zone in Wyoming and Montana. Coal from the Wyodak-Anderson coal zone is produced from 23 mines in the Powder River Basin. This coal is utilized for electric power generation at power plants in 26 states. The Wyodak-Anderson coal is sometimes blended with higher sulfur coal to produce a compliant fuel.

Both proprietary and public data are used in the summary data tables, but is not shown on location maps or on other graphic displays. A common problem in statistical summaries of trace-element data arises when element values are below the limits of detection. This results in a censored distribution. To compute

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1999 Resource assessment of selected Tertiary coal beds and zones in the Northern Rocky Mountains and Great Plains region, U.S. Geological Survey Professional Paper 1625-A

unbiased estimates of censored data for the elements in this table, we adopted the protocol of reducing all “less than” values by 50 percent to generate a real value for these data. Summary statistics of range (minimum, with an “L” indicating “less than”, and maximum values) and arithmetic means were generated using the modified data. Moisture values are reported on an as-received basis (American Society for Testing and Materials, 1994b, designation D3180-89). Because no equilibrium moisture values are available for this report, apparent ranks can not reliably be determined.

Between 1974 and 1994, the U.S. Geological Survey analyzed samples of coal for major-, minor-, and trace-element contents. Prior to performing the analyses, most of the coal samples were dried at room temperature and humidity for as much as 80 hours. Some samples, however, may have only been dried enough to allow grinding (to less than 100 mesh). Moisture content in the samples is unknown, although moisture contents were probably similar to that which would remain after air-dry loss determination (American Society for Testing and Materials, 1994c, D3302-91). Since the actual moisture content of the samples analyzed between 1974 and 1994 is unknown and can not be determined, the major-, minor-, and trace-element contents are reported on a remnant moisture basis. Also, the elemental analysis of the samples cannot be converted to any other moisture basis. In addition, these analyses can only provide an approximation of load factors (such as, pounds of mercury per trillion Btu).

For the following graphical displays, figures PQ-2 through PQ-17, show public data locations and values for variables listed in table PQ-1, except for calorific value and moisture, for the Wyodak-Anderson coal zone. The locations of public data points used in this summary are shown on figure PQ-2. When more than one

analysis was available per location, the analytical values were weight averaged on coal sample thickness. For ash and total sulfur (figs. PQ-3 and PQ-4), the values are color coded low, medium, and high, following guidelines established in U.S. Geological Survey Circular 891 (Wood and others, 1983). For moist, mineral-matter-free Btu, which is used in conjunction with other factors to determine apparent rank (fig. PQ-5), we utilized the apparent rank designations established by American Society for Testing and Materials, (1994a), designation D388-92a. For pounds of SO_2 per million Btu (lb SO_2**)** (fig. PQ-6), values are color coded to the U.S. Environmental Protection Agency's Phase I, Phase II, and non-compliant limits for sulfur emission from coal-fired power plants (U.S. Environmental Protection Agency, 1996).

No guidelines have been established for the elements of environmental concern (also referred to as "hazardous air pollutants" or "HAPs"). Analytical values for these elements (figs. PQ-7 through PQ-18) are color keyed based on the following parameters: (1) each element of environmental concern was ranked from the lowest to highest value for all data in the Northern Rocky Mountains and Great Plains region and (2) quartiles were established for each element such that low represents those values that are less than the .25 quartile (also known as the lower quartile or the 25th percentile), medium represents those values that are within the .25 to .75 quartiles (two quartiles representing 50 percent of the values or between the 25th to 75th percentile), and high represents those values that are in the upper .25 quartile (or greater than the 75th percentile).

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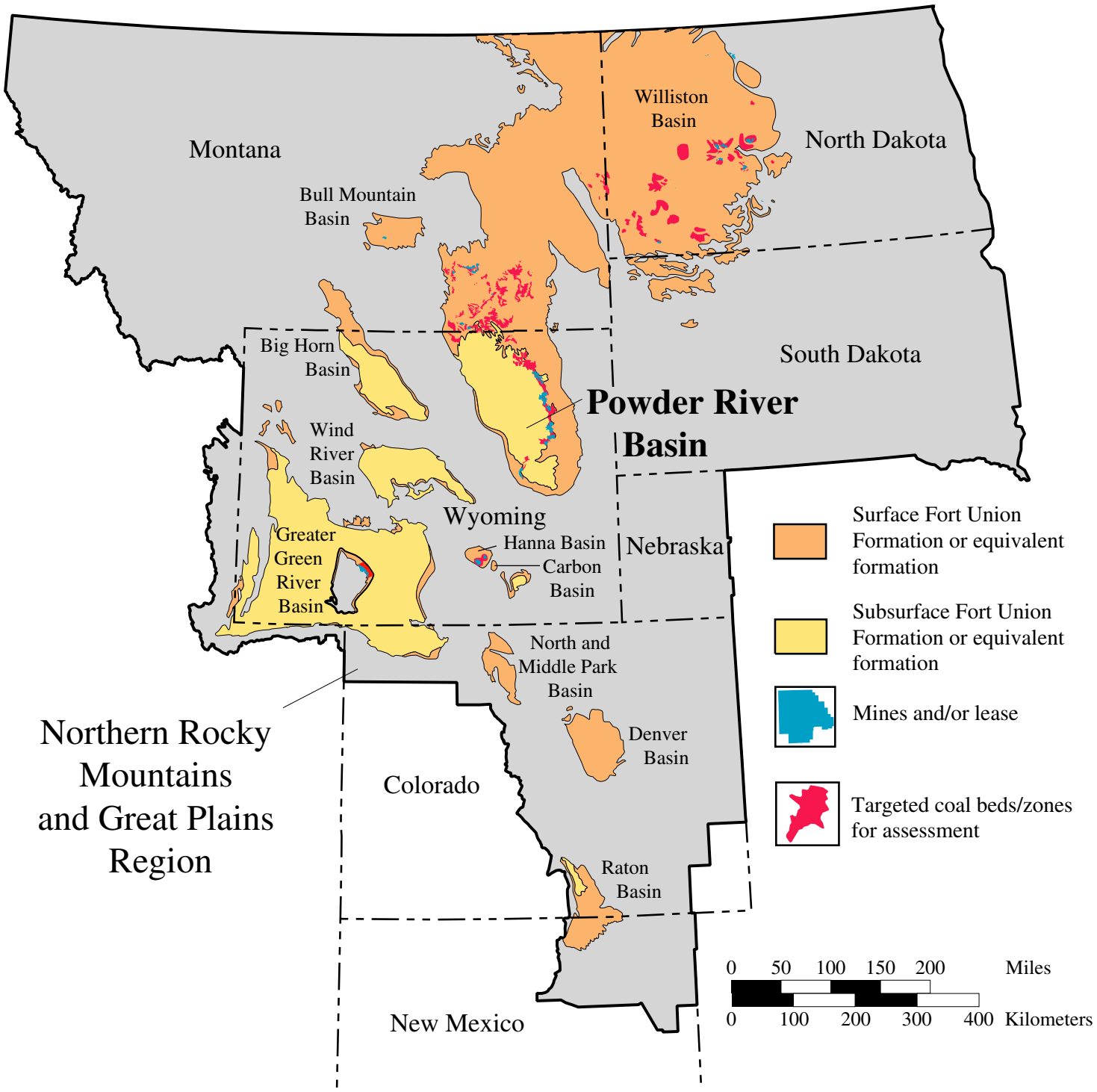

Figure PQ-1. Index map showing Powder River Basin, Wyoming and Montana

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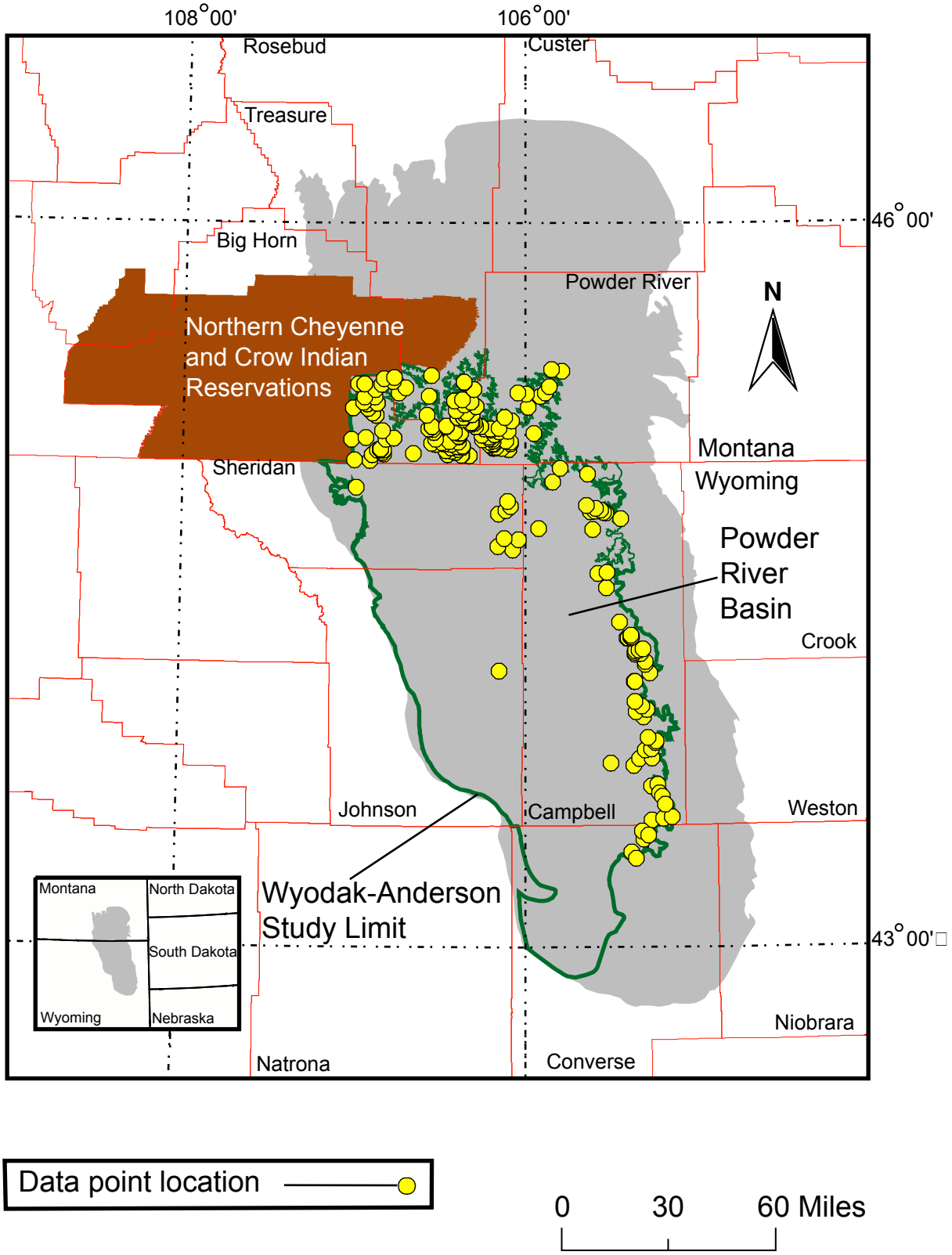

Figure PQ-2. Index map showing coal quality data distribution in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

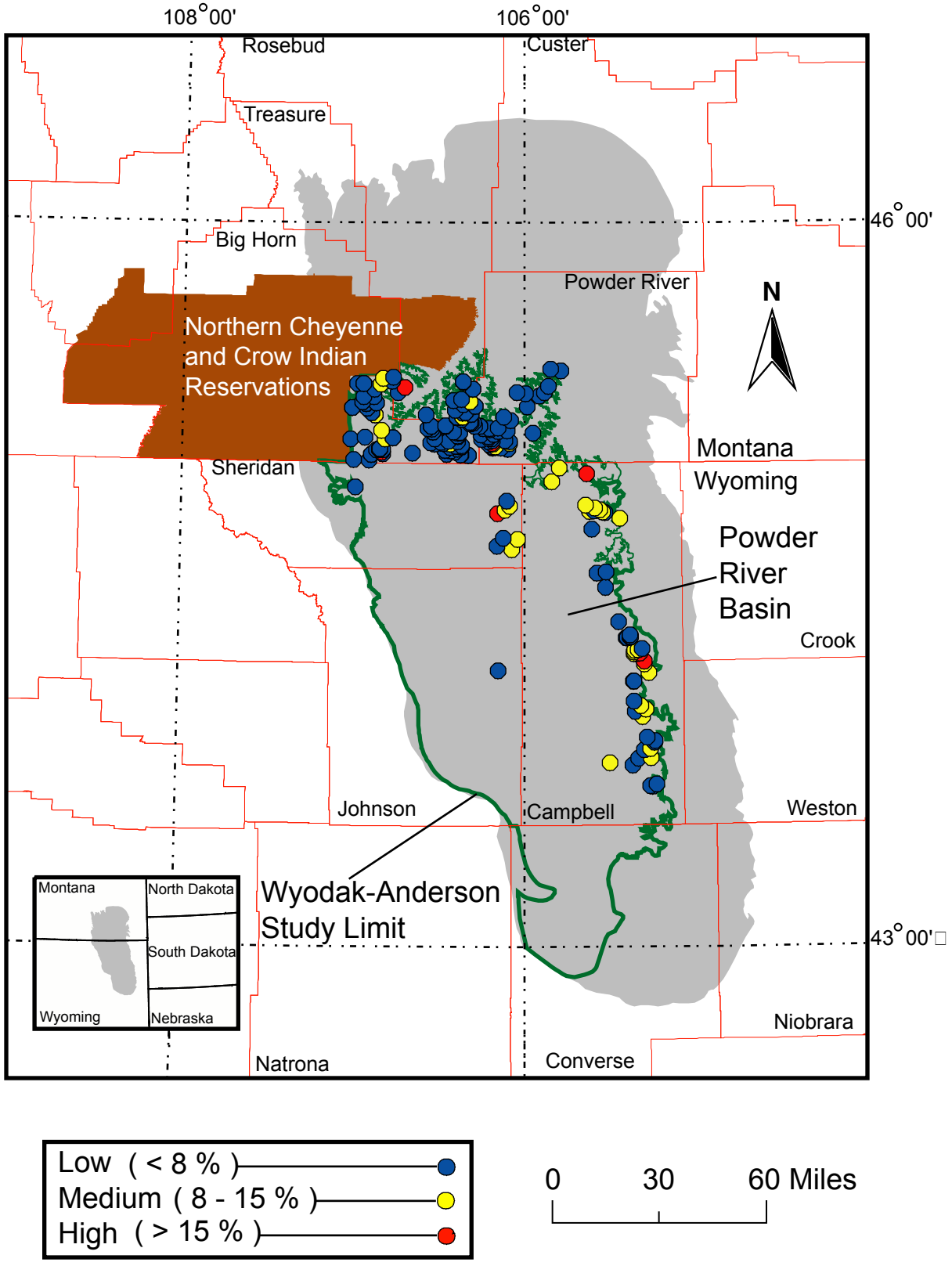

Figure PQ-3 Ash yield in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

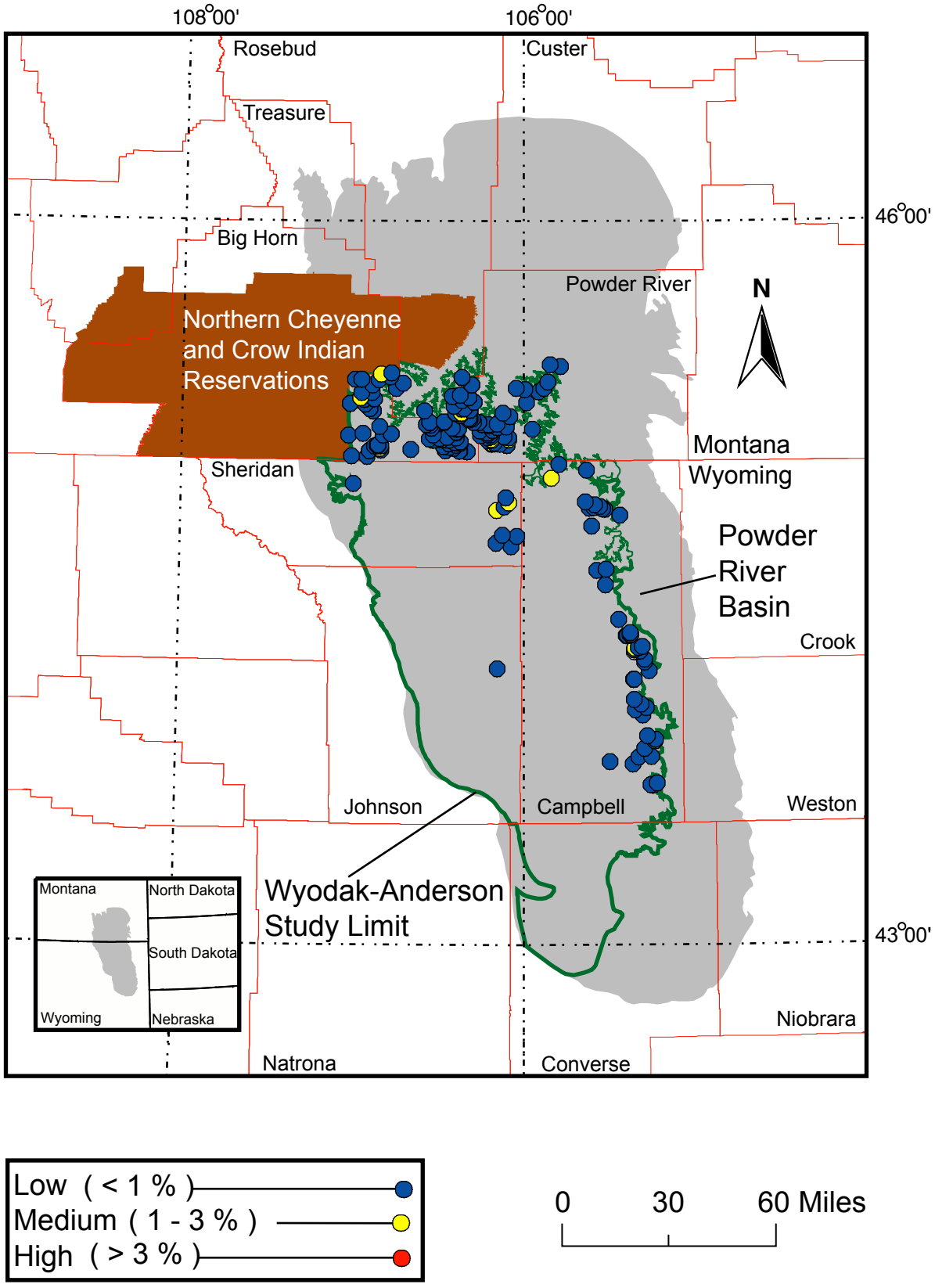

Figure PQ-4. Sulfur content in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

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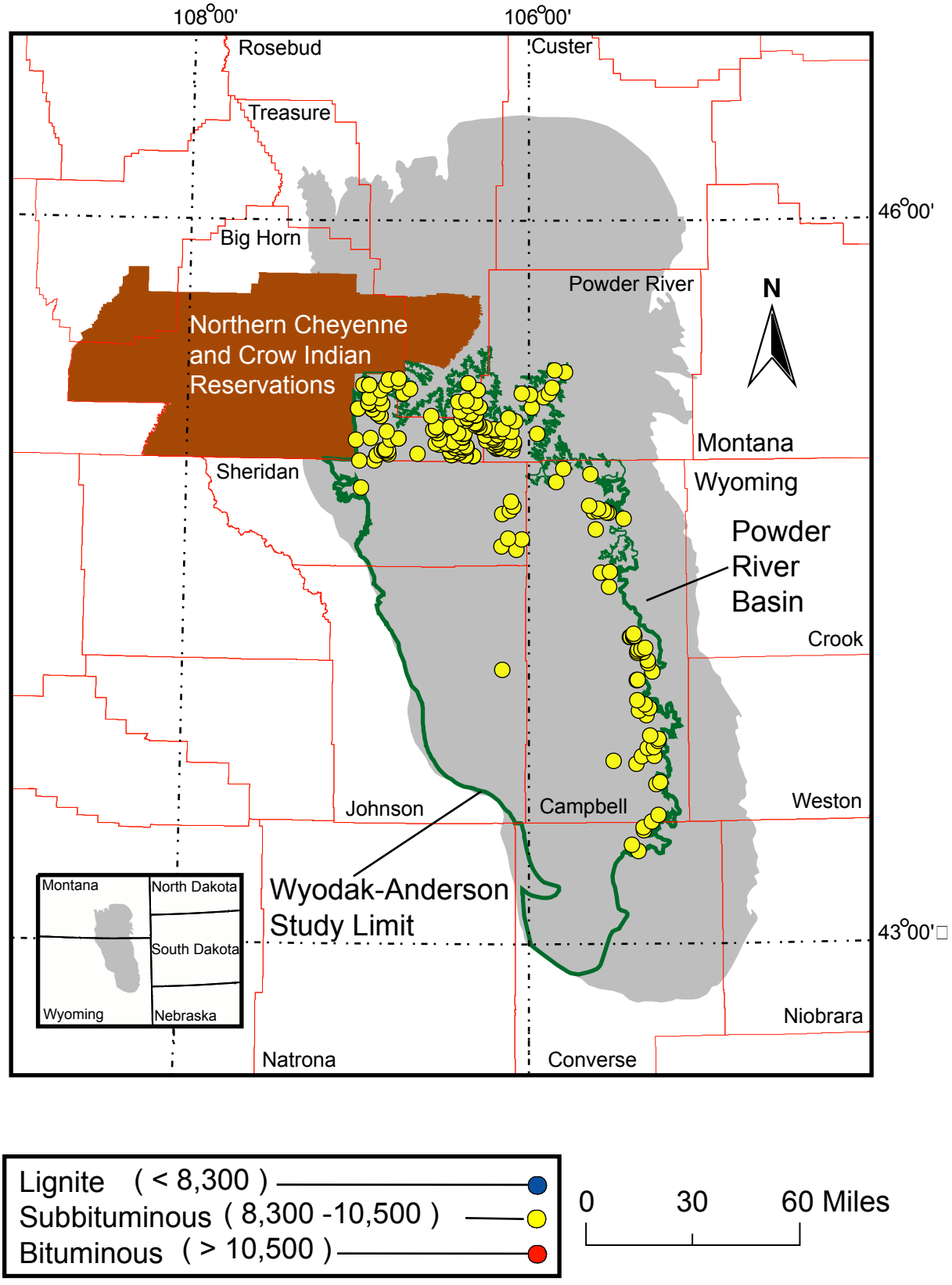

Figure PQ-5. Moist, mineral-matter-free Btu in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

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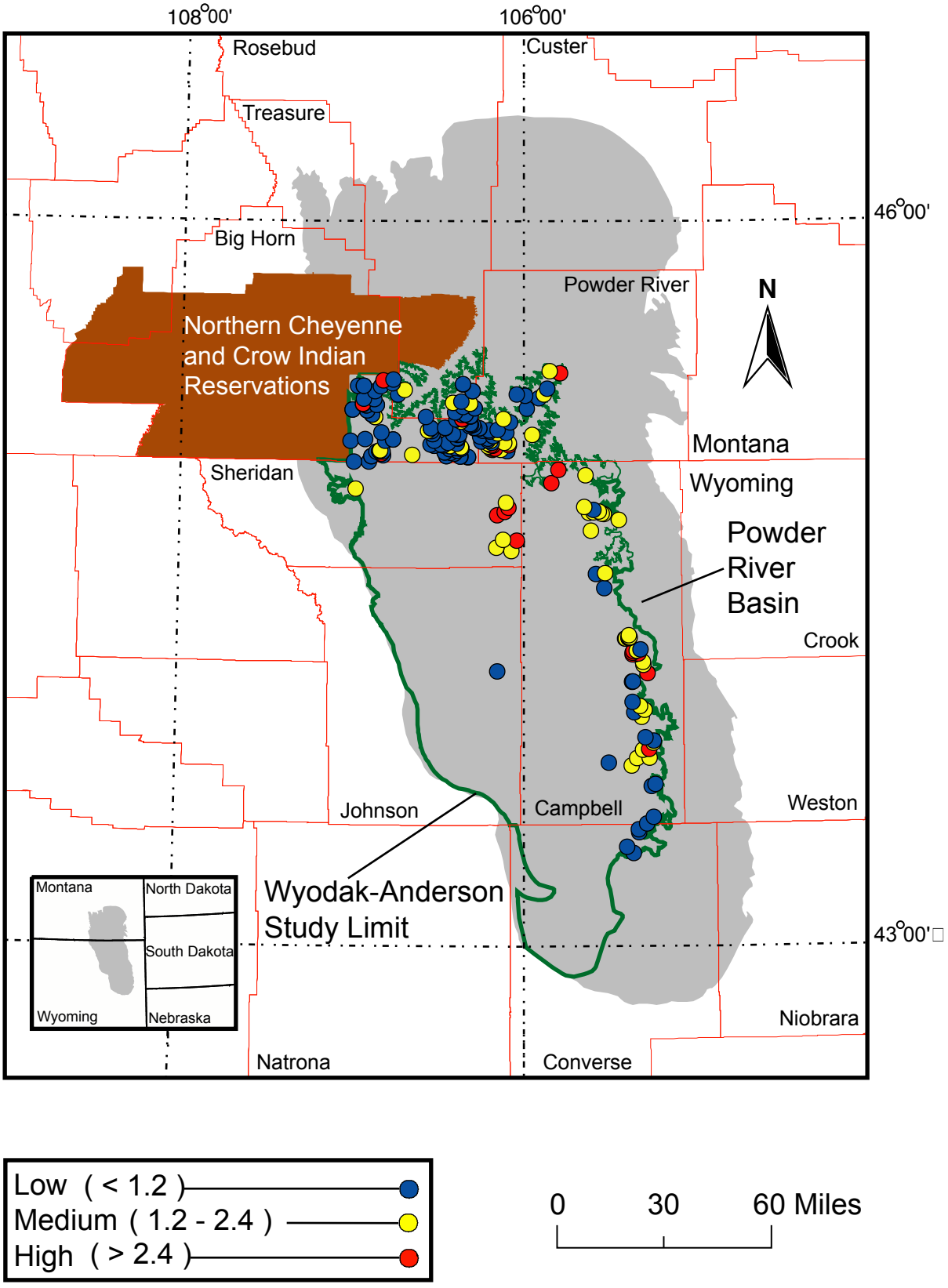

Figure PQ-6. Pounds of sulfur dioxide per million Btu in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

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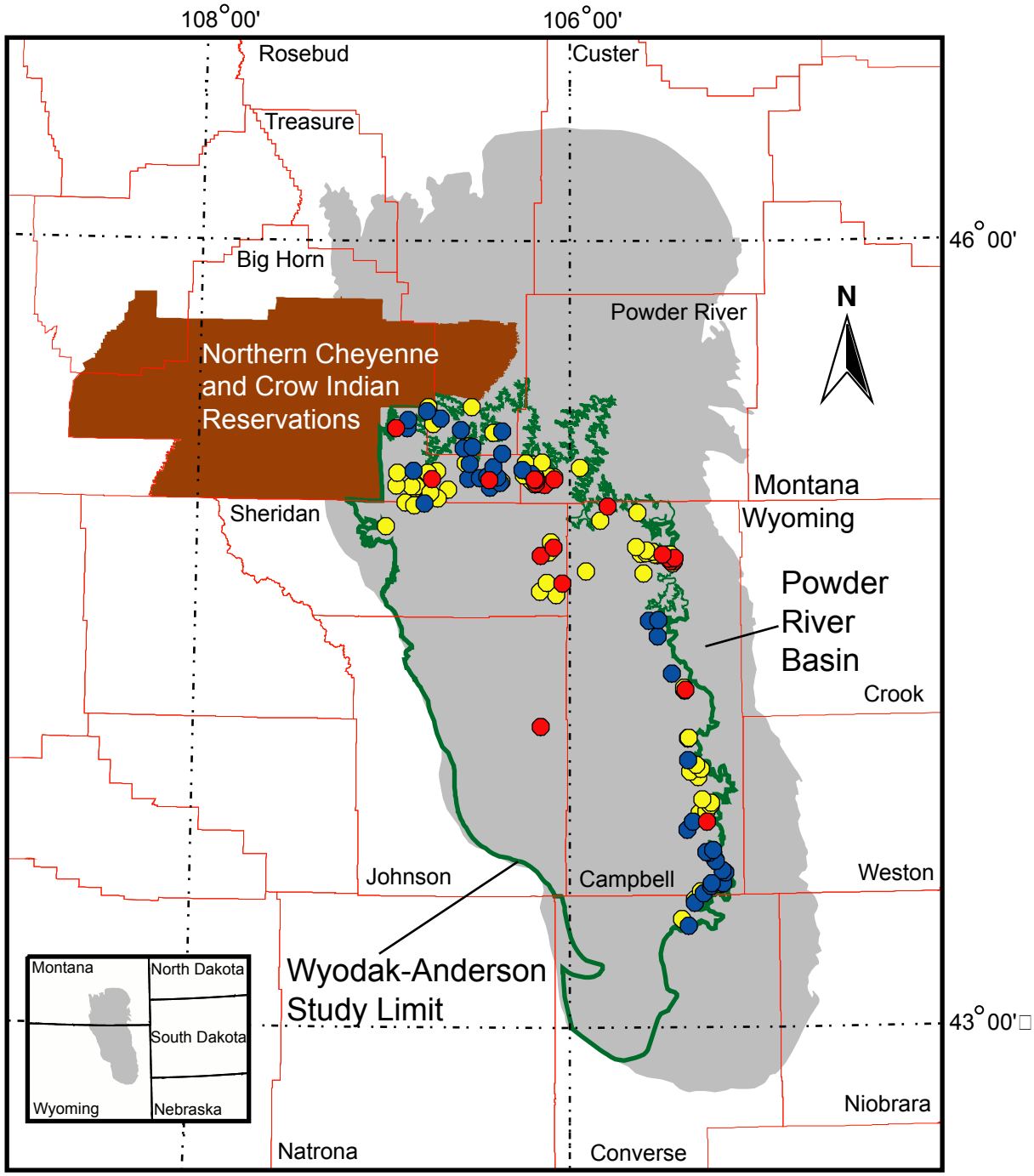

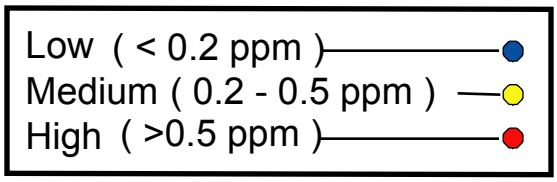

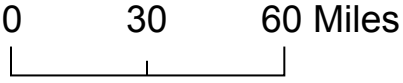

Figure PQ-7. Antimony concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

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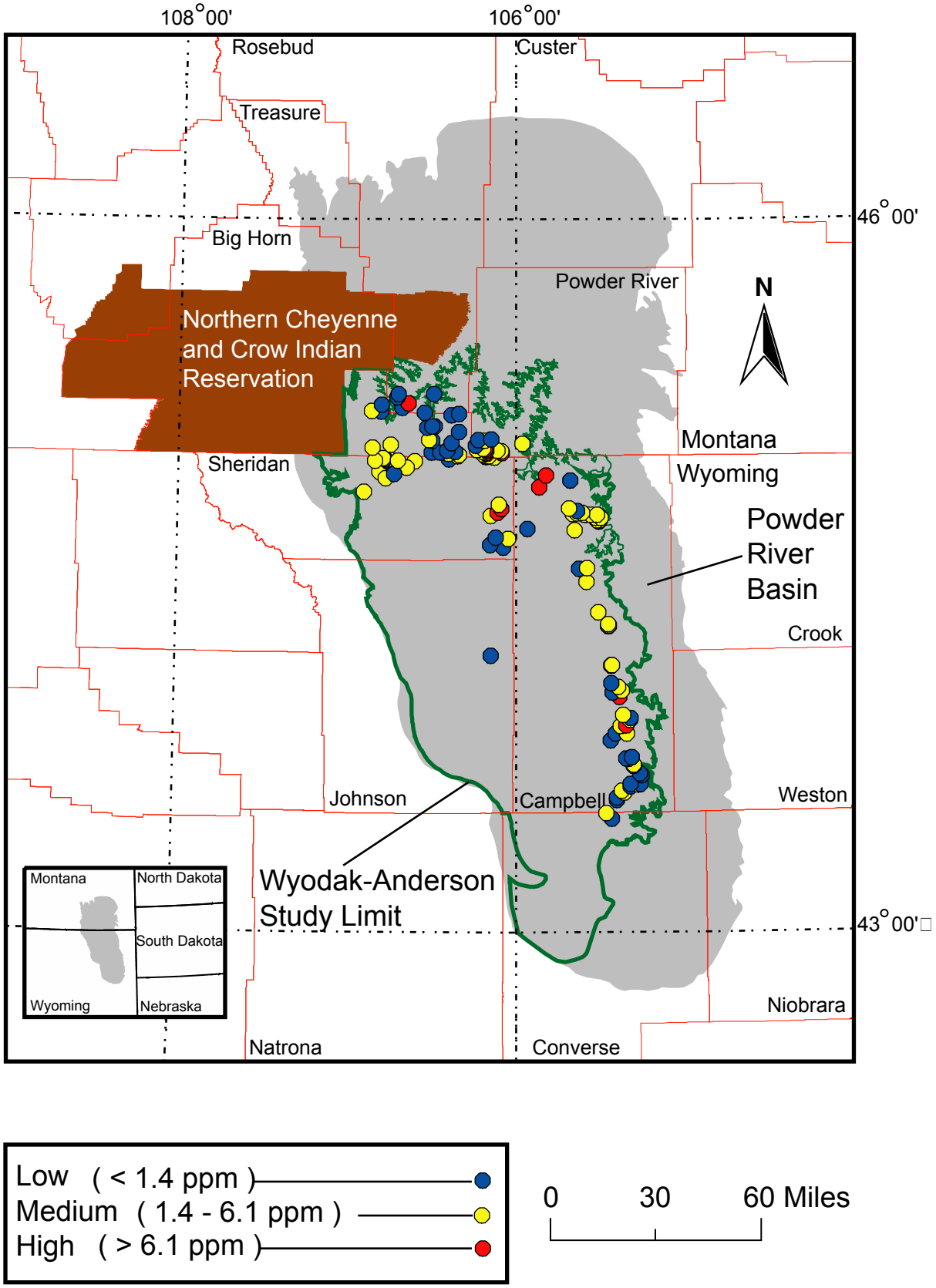

Figure PQ-8. Arsenic concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

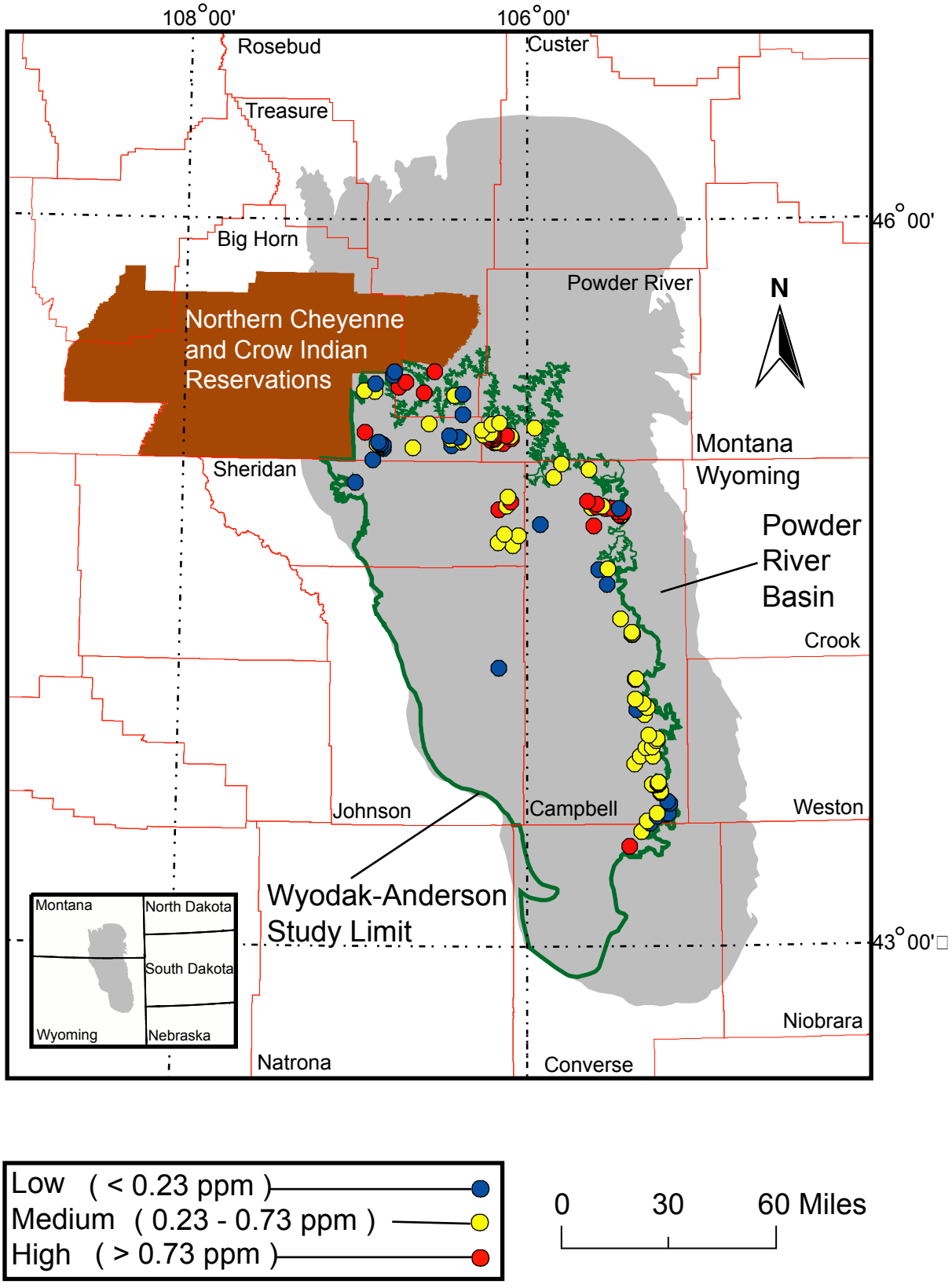

Figure PQ-9. Beryllium concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

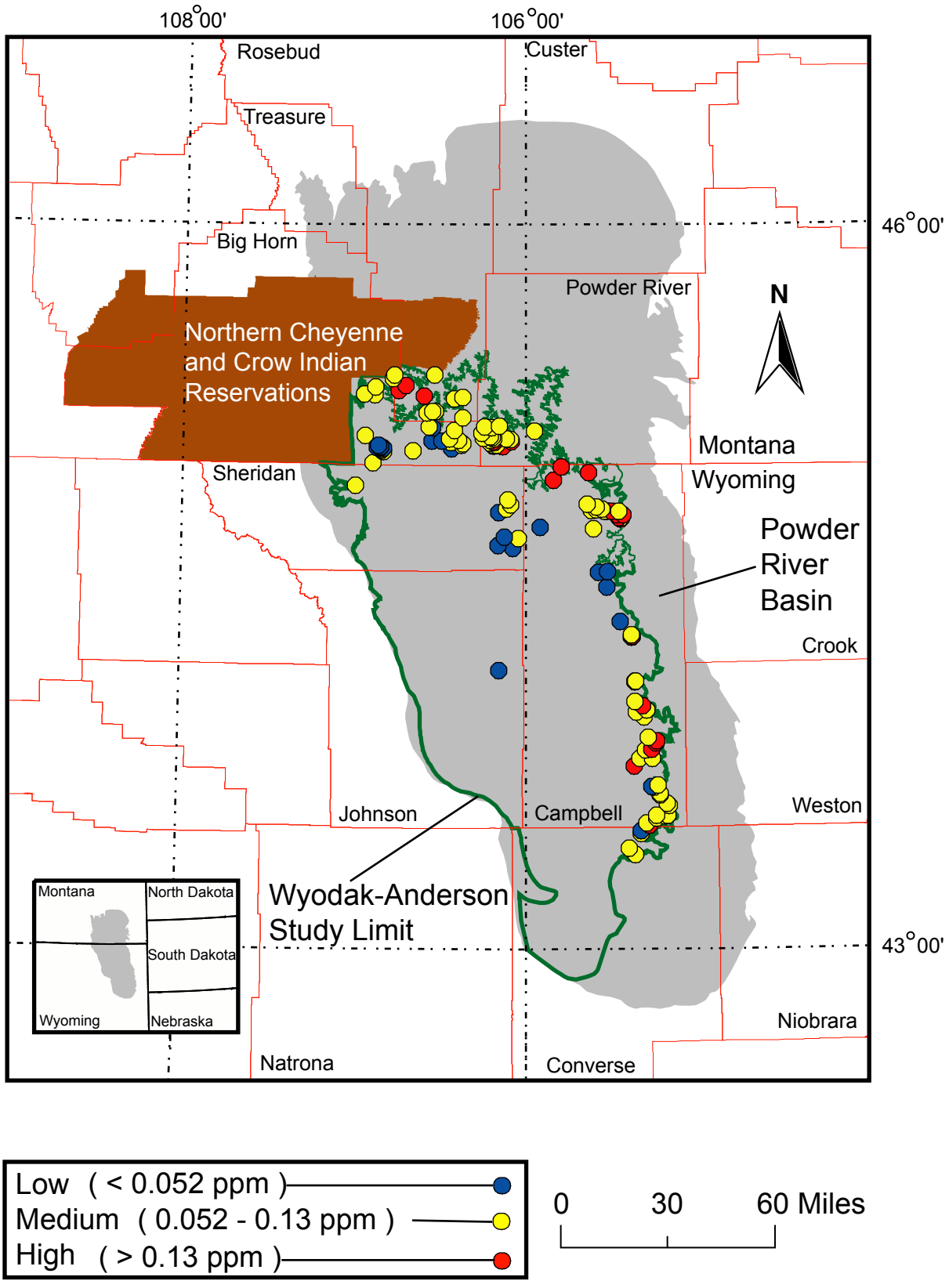

Figure PQ-10. Cadmium concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

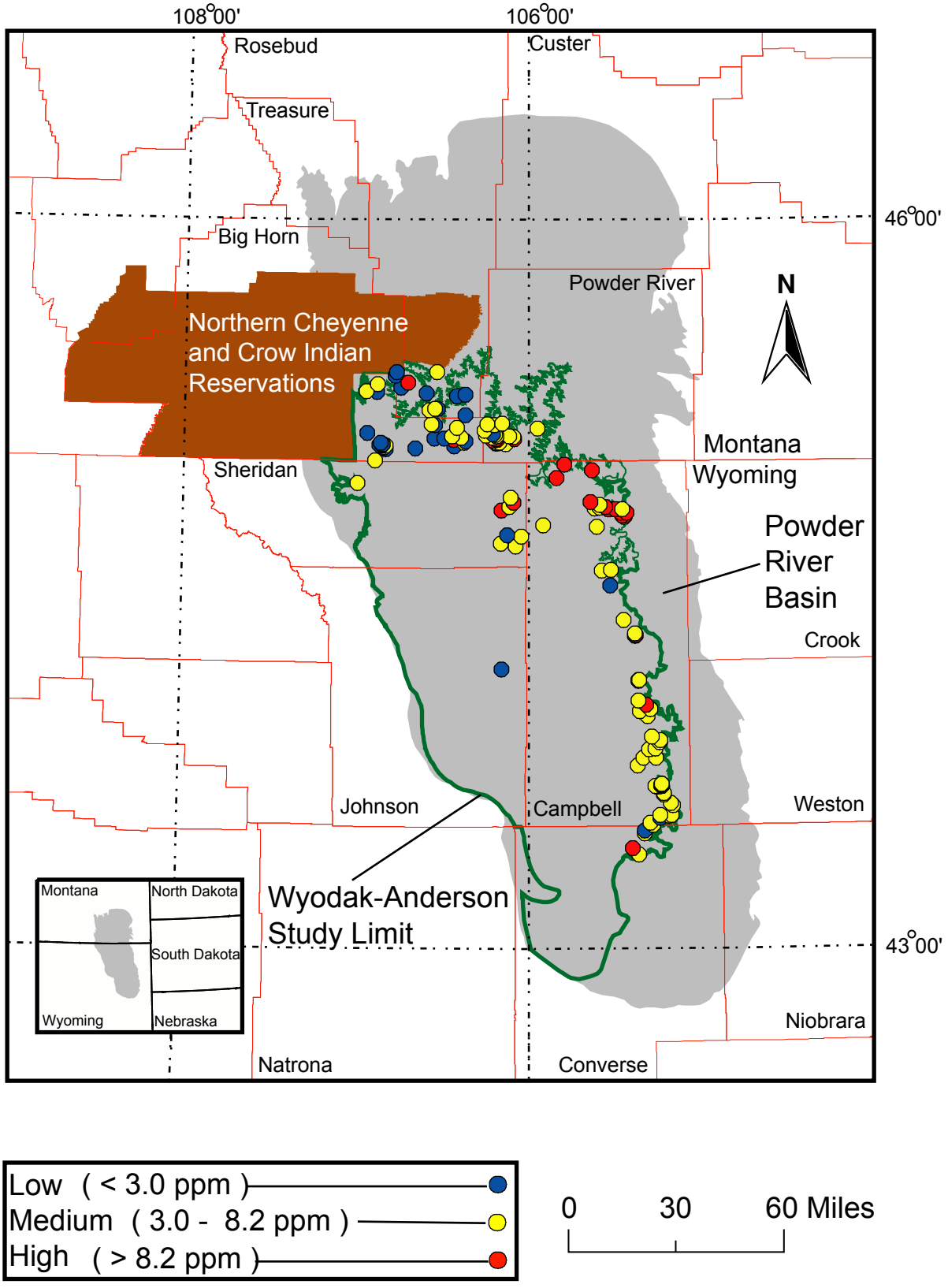

Figure PQ-11. Chromium concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

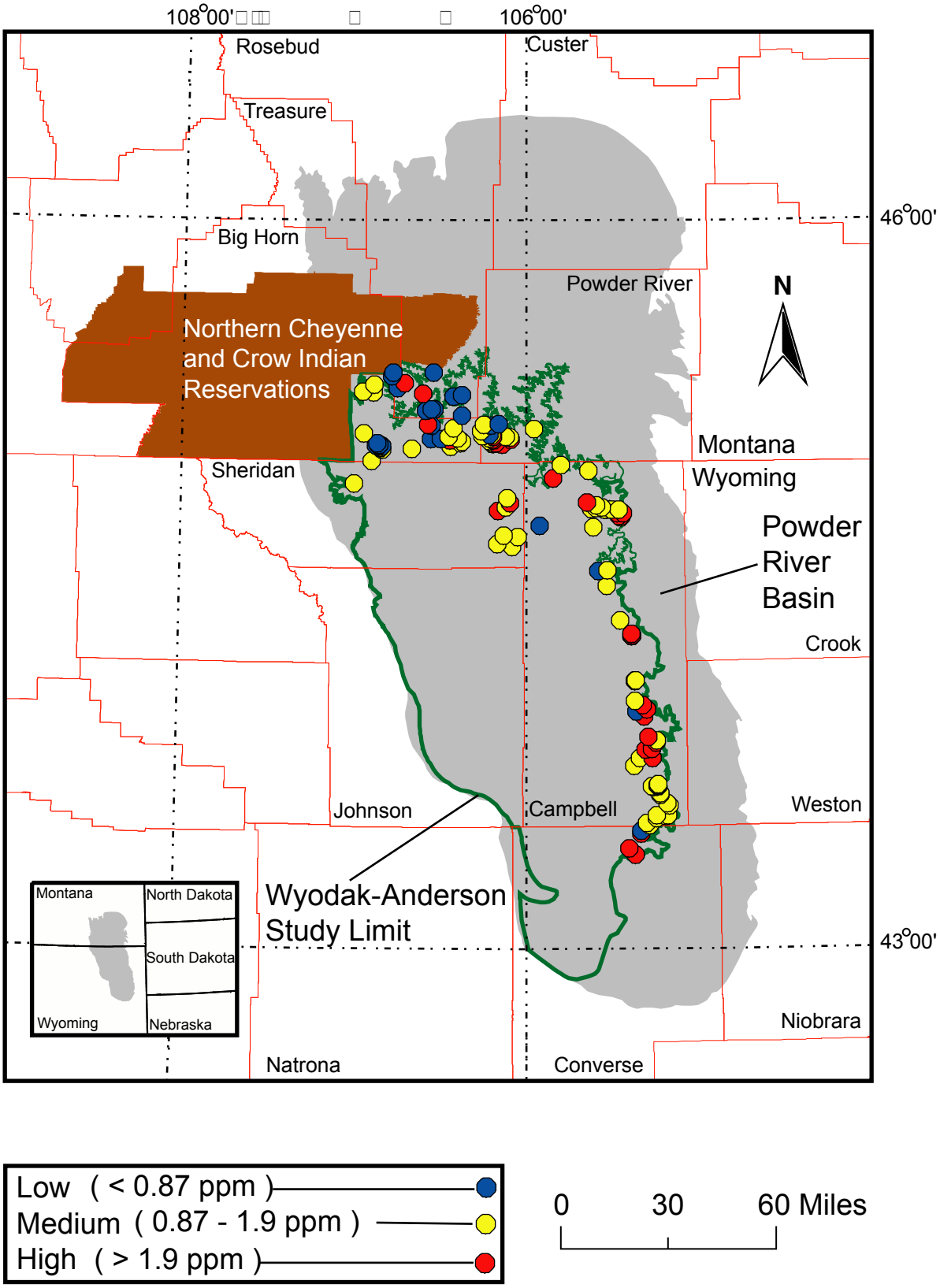

Figure PQ-12. Cobalt concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

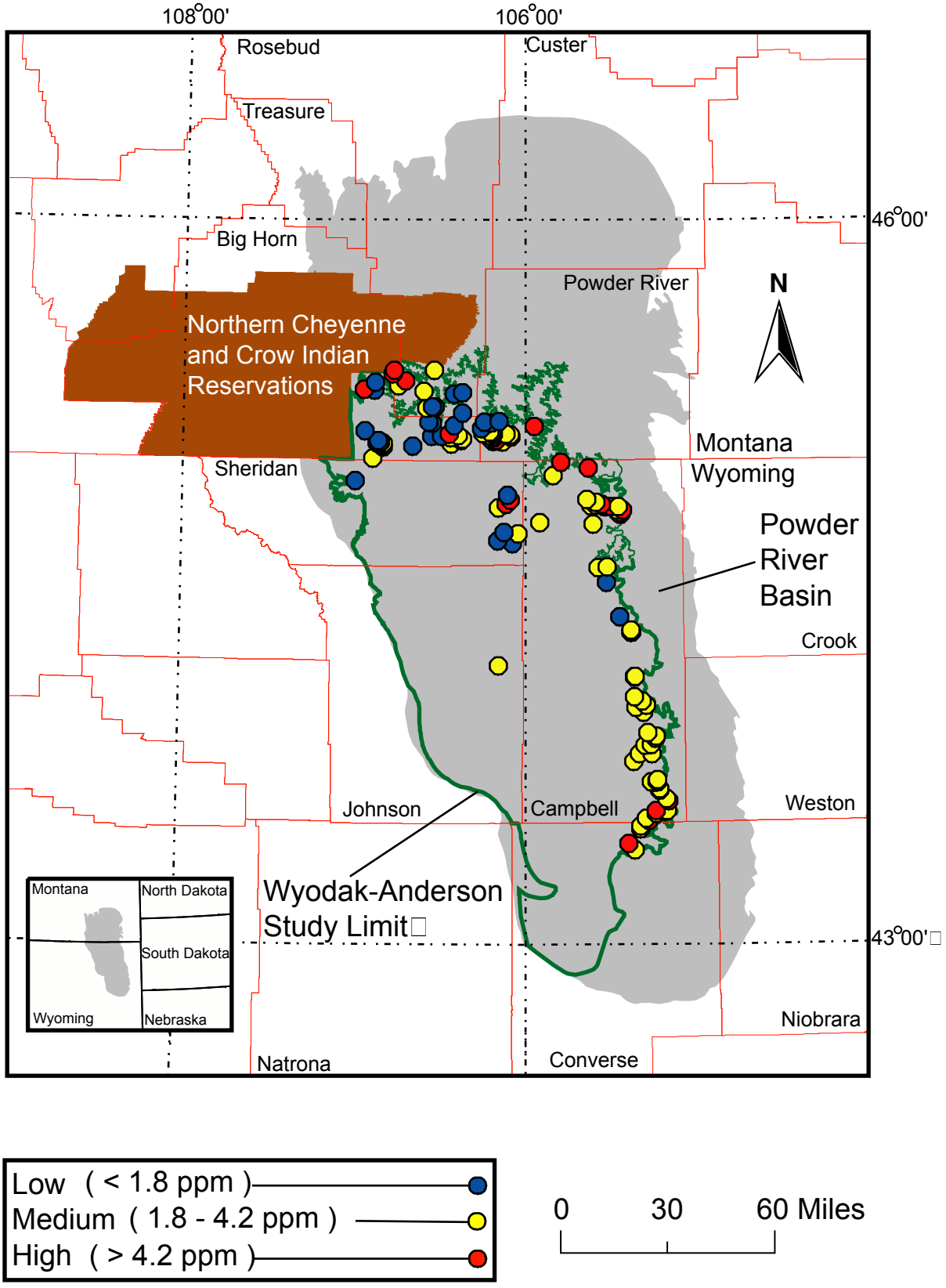

Figure PQ-13. Lead concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

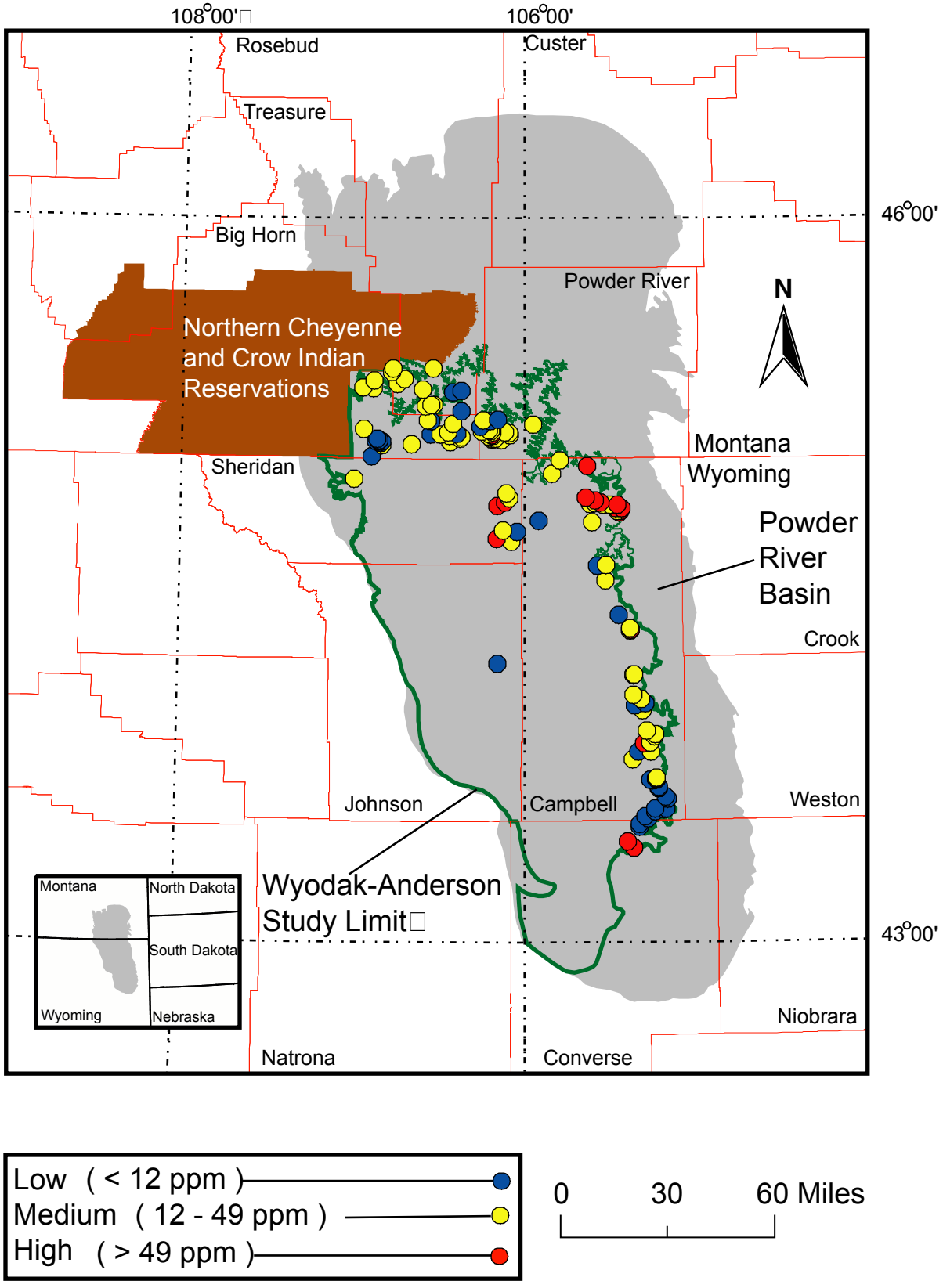

Figure PQ-14. Manganese concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

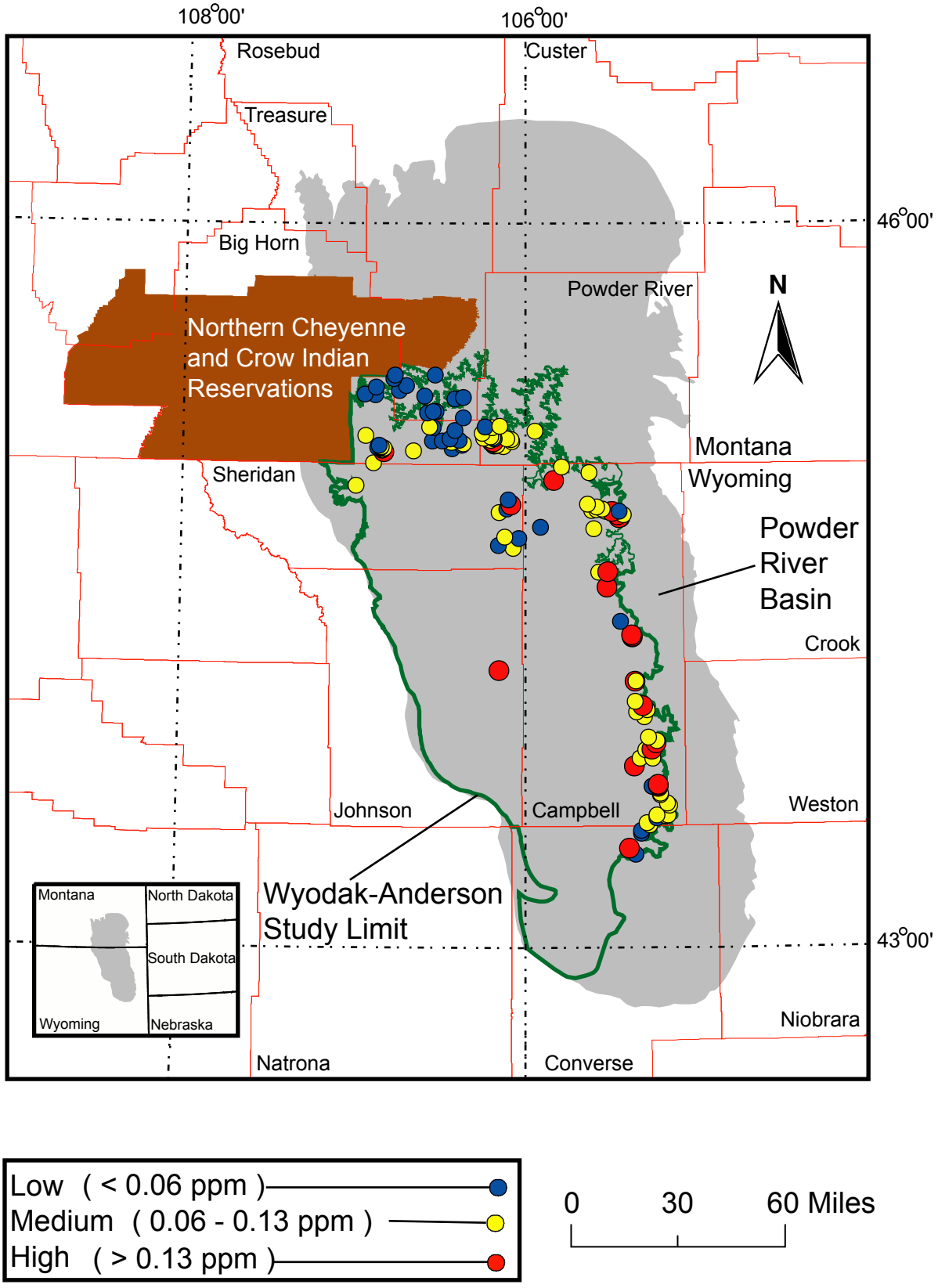

Figure PQ-15. Mercury concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

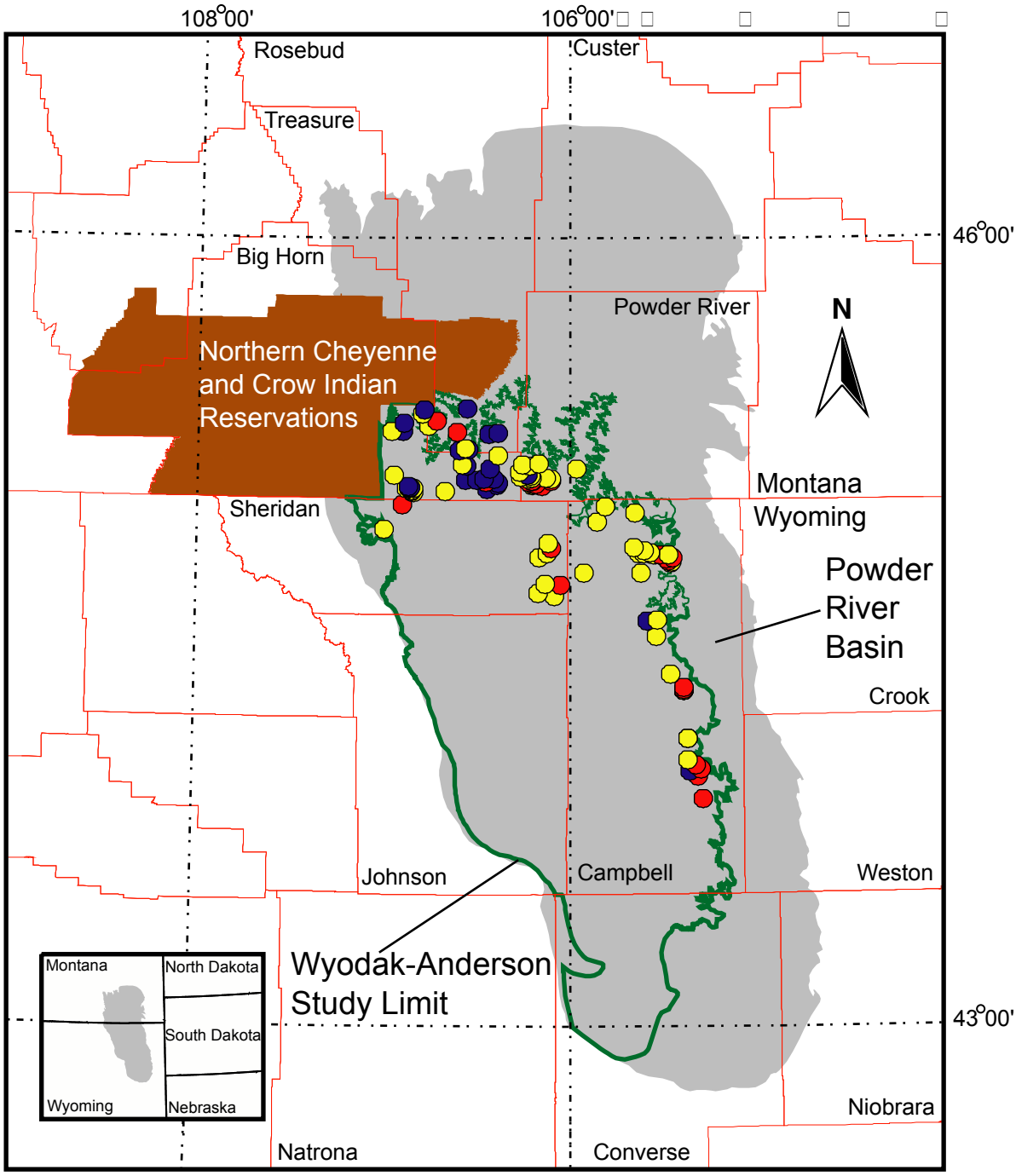

Figure PQ-16. Nickel concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

Click here or on this symbol
in the toolbar to return.

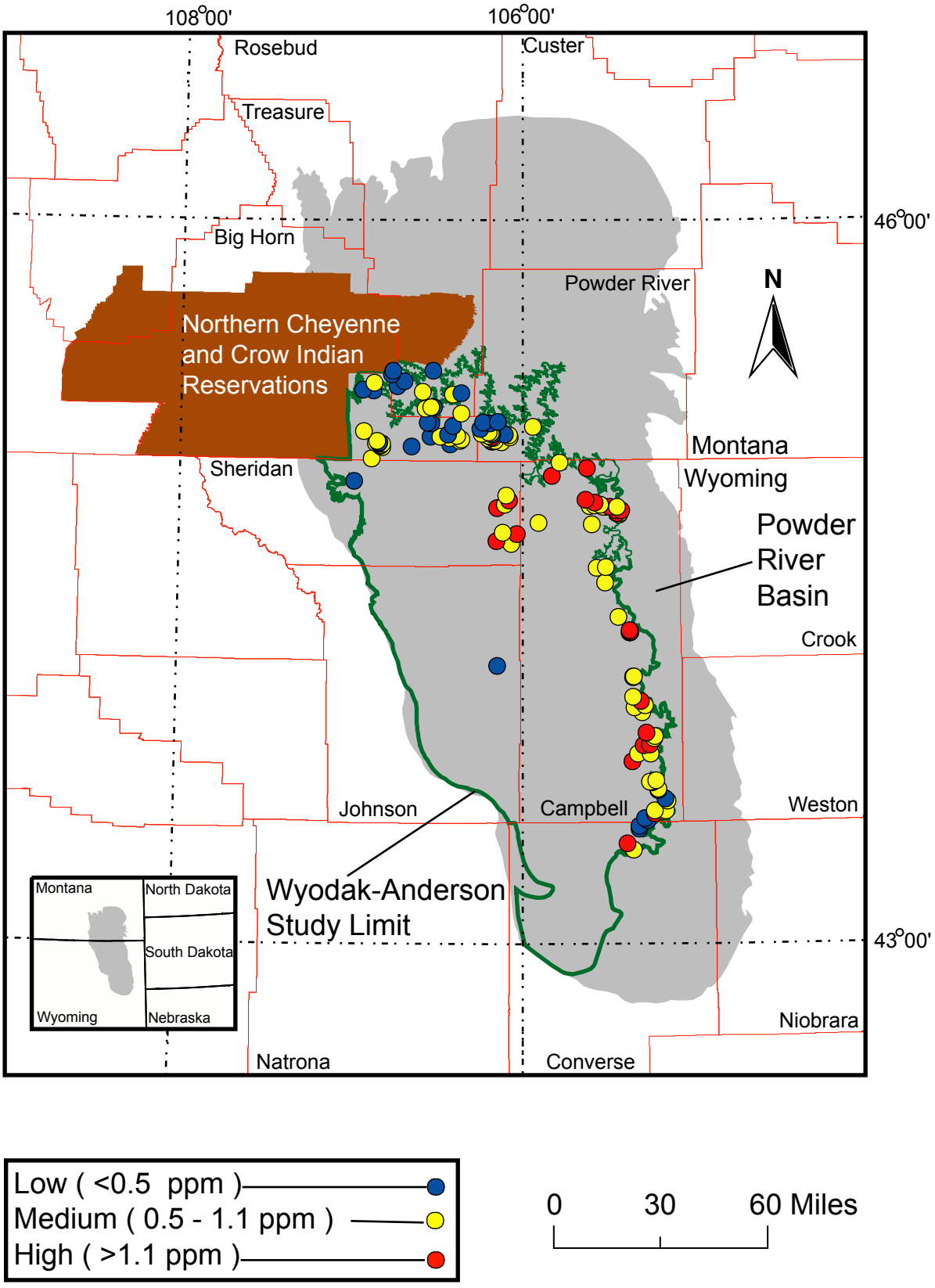

Figure PQ-17. Selenium concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

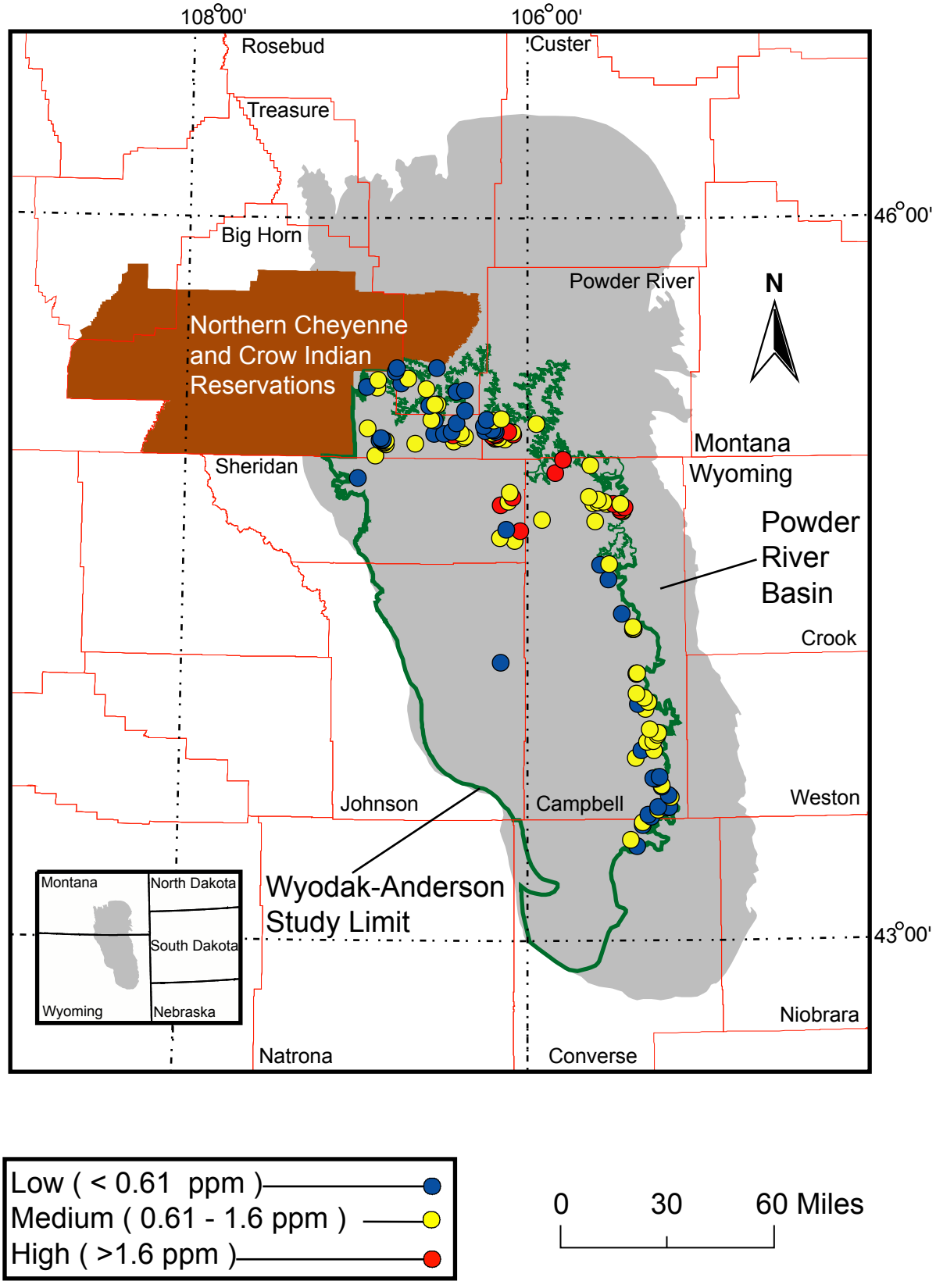

Figure PQ-18. Uranium concentration in the Wyodak-Anderson coal zone, Powder River Basin, Wyoming and Montana.

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in the toolbar to return.

Table PQ-1. Summary data for coal in the Wyodak-Anderson coal zone in the Powder River Basin, Wyoming and Montana. Calculated from the unpublished U.S. Geological Survey coal quality database (USCHEM), February, 1992; Bragg and others (1994); and proprietary source(s)

Variable	Number of samples	Range		Mean
		Minimum	Maximum	
Moisture [1]	300	14.50	42.30	27.66
Ash [1]	279	2.86	25.06	6.44
Total sulfur [1]	279	0.06	2.40	0.48
Calorific value [2]	277	3,740	9,950	8,220
lb SO_2 [3]	277	0.14	7.88	1.24
MMMFBtu [4]	277	4,580	10,560	8,820
Antimony [5]	144	0.01L	17	0.49
Arsenic [5]	158	0.20L	19	2.6
Beryllium [5]	151	0.078L	3.3	0.54
Cadmium [5]	151	0.007L	3.0	0.21
Chromium [5]	161	0.59L	50	6.1
Cobalt [5]	160	0.38L	27	1.9
Lead [5]	162	0.50L	17	3.0
Manganese [5]	161	0.18	210	26
Mercury [5]	162	0.006L	27	0.13
Nickel [5]	161	0.71L	35	4.6
Selenium [5]	151	0.08L	16	1.1
Uranium [5]	157	0.11L	12	1.3

[1] Values are in percent and on an as-received basis.
[2] Value is in British thermal units (Btu).
[3] Value is in pounds per million Btu and on an as-received basis.
[4] Value is in British thermal units on a moist, mineral-matter-free basis.
[5] Values are in parts per million (ppm) on a whole-coal and remnant moisture basis; “L” denotes less than value shown.