

Wyoming Analytical Laboratories, Inc.

Fee Schedule

Summer 2008



This electronic price book is a general guideline to WAL prices. Please call for specific price quotes.

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GENERAL INFORMATION

The following terms and conditions will apply to all goods and services provided by **Wyoming Analytical Laboratories, Inc. (WAL)**:

1. Payment in full is due upon receipt of invoice, or as specified in prearranged, written terms.
2. Prices are subject to change without notice.
3. Prices quoted to the customer will remain in effect for 90 days unless otherwise stated in writing by WAL at the time of quotation.
4. Normally samples may be submitted to any of our locations. Standard turn-around-times (TAT) are 10 working days; faster TATs can usually be honored for a premium. If you require a quick TAT, check with the laboratory facility to verify that the current workload will allow for rush samples. If the lab can honor your request, premiums will be applied as follows:
 - Same day turnaround.....Add 300%
 - 1 working day.....Add 200%
 - 2- working days.....Add 100%
 - 3 working days.....Add 75%
 - 4 working days.....Add 50%
 - 5 working days.....Add 30%
 - 6 working days.....Add 15%
5. If a balance is outstanding for more than 60 days, or when the charged amount exceeds the established line of credit, WAL reserves the right to terminate the customer's credit and refuse to perform additional services on credit.
6. The analyses, opinions or interpretation of results by WAL, in response to customer request, reflect WAL's best judgment. WAL adheres to accepted industry standards and practices when performing laboratory analyses and endeavors to report complete and accurate results. WAL does not guarantee results, and its sole liability will be to redo the test and render a new report to the customer.
7. WAL will hold in confidence all information it receives from the customer and the results of all tests and other services provided to the customer.

Except as noted above, WAL makes no representation or warranty, express, implied or statutory, regarding its services or reports.

ENVIRONMENTAL ANALYSIS

WASTES -- RCRA (Resource Conservation Recovery Act)

Preparation: Digestion/Extraction/Filtration			
Procedure	Method	Price	
TCLP Extraction (Toxicity Characteristic Leaching Procedure)	EPA SW-846 1311	\$105.00	
SPLP Extraction (Synthetic Precipitation Leaching Procedure)	EPA SW-846 1312	\$105.00	
ZHE Extraction (Zero Headspace Extraction)	EPA SW-846 1311	\$160.00	
Filtration , when less than 0.5% solid	EPA SW-846 1311	\$42.00	
Acid Digestion – for <u>total</u> metals in wastes/oils/soils	EPA SW-846 3010A	\$44.00	
Bomb Digestion ; for As, Se, & Pb in wastes/oils/soils	EPA SW-846 5050	\$44.00	
Additional charges may be incurred for samples with multiple phases.			

Waste Oil, Soil, and Sludge Analysis			
Analyte	Method	Price	
Arsenic (As), Total	EPA SW-846 7060/7061	\$30.00	
Cadmium (Cd), Total	EPA SW-846 6010/6020	\$30.00	
Chromium (Cr), Total	EPA SW-846 6010/6020	\$30.00	
Lead (Pb), Total	EPA SW-846 6010/6020	\$30.00	
Mercury (Hg), Total	EPA SW-846 6010/6020	\$35.00	
Silver (Ag), Total	EPA SW-846 6010/6020	\$30.00	
Barium (Ba), Total	EPA SW-846 6010/6020	\$30.00	
Selenium (Se), Total	EPA SW-846 6010/6020	\$30.00	
Additional Metals	EPA SW-846 6010/6020	Inquire	
Semi-quantitative scan - ICP MS		\$160.00	
8 RCRA Metals, as Total Metals		\$165.00	
Flashpoint / Ignitability	EPA SW-846 1010	\$55.00	
Corrosivity, pH (aqueous sample)	EPA SW-846 9040	\$14.00	
Corrosivity, pH (solid sample)	EPA SW-846 9045B	\$16.00	
Reactivity as Cyanide	EPA 0335.3	\$40.00	
Reactivity as Sulfide	EPA 0376.2	\$40.00	
Reactivity as Cyanide and Sulfide	See above	\$70.00	
Cyanide (weak and dissociable)	SM 4500-CN I.	\$58.00	
Cyanide (total and amenable)	EPA SW-846 9012A	\$58.00	
Total Carbon (C)	ASTM D-5373 mod.	\$45.00	
Total Organic Carbon (TOC) (water)	EPA 415.1	\$45.00	
Total Organic Carbon (TOC) (solid)	EPA SW-846 5310B	\$58.00	
Oil & Grease	EPA 1664	\$75.00	
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 1664 (hexane extraction)	\$75.00	
Total Recoverable Petroleum Hydrocarbons (soil, sludges)	EPA 418.1 (Freon extraction)	\$165.00	
Total Recoverable Petroleum Hydrocarbons (water, liquids)	EPA 418.1 (Freon extraction)	\$160.00	
Lead in Paint (includes digestion)	EPA SW-846 7421	\$60.00	
Bulk Density	ASTM D-1555 modified	\$17.50	
Paint Filter Test	EPA SW-846 9095	\$14.00	
Heating Value, Btu/lb	ASTM D-5468, D5865	\$35.00	
Total Halogens	ASTM D-808	\$50.00	
Total Organic Halogens (TOX)	EPA SW-846 9020B	\$125.00	
Surfactants (colorimetric methylene blue) MBAS	SM5540C	\$40.00	
Chromium, hexavalent (Cr⁺⁶; Cr^{IV})		\$40.00	

Organics Analysis Section

40 CFR 261 Regulatory Items (Require Digestion)			
Analyte	Method		Price
Volatile Organic Analysis (VOA), full RCRA list	EPA SW-846 8260		\$200.00
VOA, Single Compound (from list)	EPA SW-846 8260		\$85.00
Each Additional Compound	EPA SW-846 8260		\$30.00
Semi-Volatile Organic Analysis	EPA SW-846 8270		\$420.00
Herbicides/Pesticides	EPA SW-846 8050/8080		Inquire
Sump Disposal – TCLP (benzene, 8 RCRA metals)			\$325.00
Sump Disposal – TCLP (benzene, 8 RCRA metals, semi VOA)			\$500.00
8 RCRA Metals (As, Se, Ba, Cd, Cr, Ag, Hg, Pb)	EPA SW-846 6010		\$165.00

GC/MS Procedures			
Analyte	Method	Water	Soil/Oil/ Sludge
Trihalomethanes (THM)	EPA SW-846 8260, 624	\$95.00	N/A
BTEX + MTBE (benzene, toluene, ethylbenzene, xylenes, + methyl tertiary-butyl ether)	EPA SW-846 8260, 624	\$150.00	\$175.00
Volatile Organic Analysis (VOA):			
VOA Short List, 54 Compounds	EPA SW-846 8260, 624	\$210.00	\$270.00
Long List, 66 Compounds (See Appendix 1-2)	EPA 8260, 624	\$230.00	\$295.00
Add 10 TICS (library search compounds)		\$30.00	\$30.00
Add Ketones (see Appendix 1-2)	EPA 8260, 624	\$30.00	\$33.00
VOA Compound (single compound from list)	EPA 8260, 624	\$85.00	N/A
Each Additional Compound	EPA 8260, 624	\$35.00	N/A
Purgeable Halocarbons	EPA 8260, 624	\$200.00	\$255.00
Semi-Volatile Organic Analysis			
Semi-Volatile Organic Analysis (SVOA) (includes extraction)			
Hazardous Substance List (HSL)	EPA 8270, 625	\$420.00	\$440.00
HSL + 20 TICS (tentatively identified compounds)	EPA 8270, 625	\$445.00	\$465.00
Polynuclear Aromatic Hydrocarbons (PAH)	EPA 8270, 625	\$212.00	\$275.00
Phenols	EPA 8270, 625	\$273.00	\$300.00
Identification and Quantification of Unknown Organic Compound		Inquire	Inquire
Custom GC/MS analysis can be created for specialized projects or samples. Please call for a quotation.			

GAS CHROMATOGRAPHY

GC Procedures for Frequently Requested Analytes				
Analyte	Method		Water	Soil/Oil/ Sludge
Benzene	EPA SW-846 8020		\$95.00	N/A
BTEX (benzene, toluene, ethylbenzene, xylenes) <i>(GC method not recognized by WyoDEQ)</i>	EPA SW-846 8020		\$95.00	\$105.00
BTEX & TVPH	8020 / 8015M		\$95.00	\$150.00
BTEX, MTBE, Naphthalene, TVPH	8020 / 8015M		\$120.00	\$120.00
TEPH DRO (C ₁₀ – C ₃₂) <i>(total extractable petroleum hydrocarbons)</i>	8015M		\$95.00	\$145.00
TPH GRO (C ₆ – C ₁₀)	8015M		\$80.00	\$105.00
TPH GRO + DRO (C ₆ – C ₃₂)	8015M		\$150.00	\$195.00

Other Common GC Analysis				
Parameter	Method		Water	Soil/Oil /Sludge
Methanol	8015 Mod		\$110.00	\$125.00
Ethanol	8015 Mod		\$110.00	\$125.00
Propanol	8015 Mod		\$110.00	\$125.00
Methanol, Ethanol, Propanol	8015 Mod		\$150.00	\$175.00
Glycols	8015 Mod		\$110.00	\$110.00
Amines, Amides	8015 Mod		\$85.00	\$95.00
Other Components:	8015 Mod		Inquire	Inquire
Hydrocarbon fingerprinting analysis	8015 Mod		\$150.00	\$150.00

Primary Oxygenates				
Compound	Method		Water	Soil/Oil /Sludge
t-Amyl alcohol (TAA)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
t-Amyl ethyl ether (TAE)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
t-Amyl methyl ether (TAME)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
t-Butyl alcohol (TBA)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
Diisopropyl ether (DIPE)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
Ethyl tert-butyl ether (ETBE)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00
Methyl tert-butyl ether (MTBE)	8215M* / 8260B**		☆ \$140.00	☆ \$160.00

*Gas Chromatography **GC Mass Spec

★ The price is the same for one sample or a full complement of compounds.

Air Samples (Tedlar bags will be furnished to the customer at a fee of \$20 per bag).			
Analyte	Method		Price
BTEX (benzene, toluene, ethyl benzene, and xylenes) by GC/MS	EPA T01		\$150.00
BTEX by GC FID / PID	EPA SW-846 8020		\$75.00
TVPH (total volatile petroleum hydrocarbons)	EPA SW-846 8015M		\$95.00
Volatile Organic Analysis	EPA SW-846 T01		\$240.00
Natural Gas Analysis	GC (FID & TCD)		\$120.00
CO, CO₂, N₂, O₂, CH₄	GC (FID & TCD)		\$100.00

**STATE OF WYOMING
DEPARTMENT OF ENVIRONMENTAL QUALITY
GUIDELINES**

Schedule of Fees

GUIDELINE	PARAMETER	PRICE per sample
Wyoming DEQ Well Monitoring Guideline #8 (1999)	Calcium, Chloride, Boron, Fluoride, Magnesium, Potassium, Sodium, Sulfate, Aluminum, Arsenic, Barium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Zinc, Total Dissolved Solids, Calculated Charge Balance.	\$275.00 (1-3 Samples) \$240.00 (4+ Samples)
Wyoming DEQ Baseline Well Monitoring	Total Dissolved Solids (TDS), Total Organic Carbons (TOC), Ammonia, Chloride, Iron, Hardness, Nitrates, Bicarb-Carb, Fluoride, calcium, Magnesium, potassium, sodium, Sulfate, copper, Manganese, Nickel, Zinc, Arsenic, Barium, Cadmium, Chromium, Cyanide, Lead, pH, Mercury, Selenium, Silver, Conductivity, Chemical Oxygen Demand (COD).	\$560.00 (1-3 Samples) \$510.00 (4+ Samples)
Wyoming DEQ Solid Waste, Chapter 11	<u>Quarterly:</u> Total Dissolved Solids (TDS), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), Ammonia as N, Nitrate as N, Bicarb-Carb, Chloride, Fluoride, Calcium, Magnesium, Potassium, Sodium, Copper, Iron, Cadmium, Chromium, Cyanide, Lead, Mercury, Selenium, Silver, Sulfate, pH, Conductivity, Calculated Charge Balance.	\$400.00 (1-3 Samples) \$355.00 (4+ Samples)
Wyoming DEQ Solid Waste, Chapter 11	<u>Semi-Annually:</u> Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Ammonia as N, Chloride, Iron, Hardness.	\$110.00 (1-3 Samples) \$90.00 (4+ Samples)
Wyoming Oil & Gas Commission Form 17 (See Page 7)	<u>Cations:</u> Sodium, Potassium, Lithium, Calcium, Magnesium, Iron. <u>Anions:</u> Sulfate, Chloride, Carbonate, Bicarbonate, Hydroxide, Hydrogen Sulfide.	\$160.00 (1-3 Samples) \$130.00 (4+ Samples)

WAL believes the above guidelines were accurate when this document was created, but advises all clients to verify that the lists are complete prior to sample submission.

SKINNER LIST FOR RCRA FACILITY INVESTIGATIONS

Inorganics

Antimony
 Arsenic
 Barium
 Beryllium
 Cadmium
 Chromium
 Cobalt
 Lead
 Mercury
 Nickel
 Selenium
 Silver
 Vanadium
 Zinc

Cyanide

Volatile Organics

Benzene
 Carbon Disulfide
 Chlorobenzene
 Ethylene Dibromide
 Methyl ethyl ketone
 Styrene
 Chloroform
 1,2-Dichloroethane
 1,1-Dichloroethane
 1,2-Dichlorobenzene
 1,3-Dichlorobenzene
 1,4-Dichlorobenzene
 Ethylbenzene
 Toluene
 1,1,1-Trichloroethane
 Trichloroethene
 Tetrachloroethylene
 Xylenes, total

 Methyl tertiary butyl ether

Semi-Volatile Organics

Acenaphthene
 Anthracene
 Benzo(a)anthracene
 Benzo(b)fluoranthene
 Benzo(k)fluoranthene
 Benzo(a)pyrene
 Bis(2-ethylhexyl)phthalate
 Chrysene
 o-Cresol
 m-Cresol
 p-Cresol
 Dibenz(a,h)anthracene
 Di-n-butyl phthalate
 Diethyl phthalate
 2,2-Dimethylphenol
 Dimethyl phthalate
 2,4-Dinitrophenol
 Fluoranthene
 Fluorene
 Indene(1,2,3-cd)pyrene
 Naphthalene
 4-Nitrophenol
 Phenanthrene
 Phenol
 Pyrene
 Pyridine
 Quinoline

Analysis	Prices
Inorganics: 13 Compounds + Cyanide	\$180.00 (1-2 Samples) \$140.00 (3 + Samples)
Volatiles: 18 Compounds	\$225.00 (1-2 Samples) \$180.00 (3 + Samples)
Semi-Volatiles: 28 Compounds	\$440.00 (1-2 Samples) \$340.00 (3 + Samples)
Partial Lists:	Inquire (1-2 Samples) Inquire (3 + Samples)

OIL FIELD WATER

WYOMING OIL & GAS COMMISSION – FORM 17

Analyte	Price
Sodium	\$22.00
Potassium	\$22.00
Lithium	\$22.00
Calcium	\$22.00
Magnesium	\$22.00
Iron	\$22.00
Field/Produced Water group (add \$30 admin. charge)* (Ca, Mg, K, Fe, Na, Ba, TDS, pH, conductivity, alkalinity, Cl, SO ₄)	\$165.00
High TDS or high organic content contamination charge	\$25.00
Total Dissolved Solids (TDS)	\$20.00
Sodium, Chloride (equivalent to Salinity)	\$30.00
Sulfate	\$25.00
Chloride	\$25.00
Alkalinity (carbonate, bicarbonate, hydroxide)	\$35.00
Carbonate	\$18.00
Bicarbonate	\$18.00
Hydroxide	\$18.00
Hydrogen Sulfide	\$50.00
Oil & Grease – EPA Method 1664 (hexane extraction)	\$90.00
Wyoming Leachate Extraction	\$90.00
TPH – EPA Method 418.1 (freon extraction) Soils/Sludge	\$160.00
TPH – EPA Method 418.1 (freon extraction) Water/Liquid	\$165.00
TPH – EPA Method 1664 (hexane extraction)	\$75.00
TPH (C₆-C₃₂) GRO + DRO – EPA SW-846 8015M Water	\$150.00

TPH: total petroleum hydrocarbons **GRO:** gasoline range organics **DRO:** diesel range organics

* Form 17 for well sites *\$195.00

(\$165 + \$30 admin charge includes: Well, Operator, Permit, and Location Facts. Cl, SO₄, Ca, Mg, K, Fe, Na, Ba, TDS (observed and calculated), conductivity, pH, carbonate/bicarbonate/hydroxide NaCl Equivalent, Observed Resistivity

Anions/Cations: (meq/L) Totals, Difference and %Balance

Plotted graph (Cations vs Anions)

WATER

Definitions of Metal Analytes

Total Metals: Metals concentrations determined in a sample following acid digestion (EPA SW-846 Method 3010, 3015, 3020, 3050, 3051 or 3052).

Total Recoverable Metals: Metals concentration in an unfiltered sample treated with hot dilute mineral acid. (Method 3005)

Suspended Metals: Metals concentration determined in sample portion retained by a 0.45-µm filter. (EPA Method 3005)

Dissolved Metals: Metals concentration determined in a sample filtered through a 0.45-µm filter. (EPA Method 3005)

Metal Digestion	EPA Method	Price
Acid Digestion for Total Metals		\$30.00
Total Recoverable		\$15.00
Filtration for Dissolved Metals or other Analytes		\$8.00
ICP / ICP-MS Metals		Price
Aluminum (Al)	6010/6020 200.7/200.8	\$14.00
Antimony (Sb)	6010/6020 200.7/200.8	\$14.00
Arsenic (As)	6010/6020 200.7/200.8	\$14.00
Barium (Ba)	6010/6020 200.7/200.8	\$14.00
Beryllium (Be)	6010/6020 200.7/200.8	\$14.00
Bismuth (Bi)	6010/6020 200.7/200.8	\$14.00
Boron (B)	6010/6020 200.7/200.8	\$14.00
Cadmium (Cd)	6010/6020 200.7/200.8	\$14.00
Calcium (Ca)	6010/6020 200.7/200.8	\$14.00
Chromium (Cr)	6010/6020 200.7/200.8	\$14.00
Cobalt (Co)	6010/6020 200.7/200.8	\$14.00
Copper (Cu)	6010/6020 200.7/200.8	\$14.00
Gallium (Ga)	6010/6020 200.7/200.8	Inquire
Gold (Ag)	6010/6020 200.7/200.8	\$14.00
Iron (Fe)	6010/6020 200.7/200.8	\$14.00
Lead (Pb)	6010/6020 200.7/200.8	\$14.00
Lithium (Li)	6010/6020 200.7/200.8	\$14.00
Magnesium (Mg)	6010/6020 200.7/200.8	\$14.00
Manganese (Mn)	6010/6020 200.7/200.8	\$14.00
Mercury (Hg)	6010/6020 200.7/200.8	\$15.00
Molybdenum (Mo)	6010/6020 200.7/200.8	\$14.00
Nickel (Ni)	6010/6020 200.7/200.8	\$14.00
Palladium (Pd)	6010/6020 200.7/200.8	\$14.00
Platinum (Pt)	6010/6020 200.7/200.8	\$14.00
Potassium (K)	6010/6020 200.7/200.8	\$14.00
Rubidium (Rb)	6010/6020 200.7/200.8	Inquire
Selenium (Se)	6010/6020 200.7/200.8	\$14.00
Silicon (Si)	6010/6020 200.7/200.8	\$15.00
Silver (Ag)	6010/6020 200.7/200.8	\$15.00
Sodium (Na)	6010/6020 200.7/200.8	\$14.00
Strontium (Sr)	6010/6020 200.7/200.8	\$14.00
Tellurium (Te)	6010/6020 200.7/200.8	Inquire
Thallium (Tl)	6010/6020 200.7/200.8	\$15.00
Tin (Sn)	6010/6020 200.7/200.8	\$14.00
Titanium (Ti)	6010/6020 200.7/200.8	\$14.00
Tungsten (W)	6010/6020 200.7/200.8	\$14.00
Uranium (U)	6010/6020 200.7/200.8	Inquire
Vanadium (Va)	6010/6020 200.7/200.8	\$14.00
Zinc (Zn)	6010/6020 200.7/200.8	\$14.00

ICP: Inductively Coupled Argon Plasma Spectrometry

Low Level Metals by:

ICP-MS: Inductively Coupled Plasma-Mass Spectrometry

HGICP: Hydride Generation followed by ICP

CVAA: Cold Vapor Atomic Absorption Spectrometry

	EPA Method	Price
Antimony (Sb)	6020 200.8	\$35.00
Arsenic (As)	6020 200.8	\$35.00
Lead (Pb)	6020 200.8	\$35.00
Selenium (Se)	6020 200.8	\$35.00
Mercury (Hg)	6020 200.8	\$48.00

Bacteriological Testing	Price
E Coli and Total Coliform, (pass / fail)	\$35.00
Fecal Coliform (colony count) (Rock Springs lab)	\$35.00
Total Coliform / E Coli (MPN: most probable number)	\$37.00
Heterotrophic Plate Count	\$40.00
BART: Biological Activity Reaction Test	
Sulfur reducing bacteria	\$30.00
Iron fixing bacteria	\$30.00
Heterotropic aerobic bacteria	\$30.00

Ion Chromatography	EPA Method	Price
Anion Scan (Br ⁻ , Cl ⁻ , F ⁻ , NO ₃ ⁻ , NO ₂ ⁻ , PO ₄ ⁻³ , SO ₄ ⁻)	300.0	\$55.00
Chloride single ion analysis	300.0	\$35.00
Fluoride single ion analysis	300.0	\$35.00
Nitrate single ion analysis	300.0	\$35.00
Sulfate single ion analysis	300.0	\$35.00
Other Analytes		Inquire

Metal Groupings	Minimum Charge	Price
Safe Drinking Water Act As, Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl		\$ 140.00
Priority Pollutant List Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn		\$150.00
Target Analyte Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Tl, Zn		\$220.00
Add CN		\$ 50.00
Precious Metals, Group 1*: Ag, Au, Pb, Pt		\$ 50.00
Precious Metals, Group 2* Ag, Au, Ir, Pd, Pt, Rh		\$ 65.00
*May require additional <i>aqua regia</i> digestion		\$ 20.00
Chromium, hexavalent (Cr⁺⁶; Cr^{IV})		\$40.00
Lead in Paint (2 or more samples, \$40 each)		\$50.00

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Other Analytes	Method	Price
Anions by ion chromatography (IC)	EPA 300	\$55.00
Alkalinity (carbonate, bicarbonate, hydroxide) as CaCO ₃	SM 2320B EPA 310.1	\$25.00
Bicarbonate, as CaCO ₃ (HCO ₃ ⁻)	SM 2320	\$16.00
Carbonate, as CaCO ₃ (CO ₃ ²⁻)		\$16.00
Hydroxide, as CaCO ₃ (OH)		\$16.00
Langelier Index		\$50.00
Temperature, °C (as measured in the lab)		\$ 5.00
Hardness - calculated	EPA 130.1	\$22.00
pH	SM 4500pH ⁺ EPA 150.2	\$12.00
Resistivity		\$12.00
Conductivity (specific conductance) μmhos/cm	SM 2510B EPA 120.1	\$12.00
Turbidity	SM 2310D EPA 180.1	\$30.00
Bromine (Br) IC	SM 4110 EPA 300.0	\$30.00
Chlorine (Cl) by titration IC	SM 4500B	\$20.00
Residual Chlorine (as measured in the lab)	SM 4500	\$16.00
Total Chlorine (as measured in the lab)		\$16.00
Free Chlorine (as measured in the lab)		\$16.00
Fluorine (F)	SM 4110B EPA 300.0	\$30.00
Cyanide (minimum of 3 samples) spectrophotometric	SM 4500-CNE	\$50.00
Nitrogen		
Ammonia, as N mg/L	SM 4500-NH ₃ B	\$35.00
Kjeldahl Nitrogen, as N	SM 4500-N _{org}	\$60.00
Nitrate, as N IC	SM 4110B EPA 300.0	\$35.00
Nitrite, as N IC	SM 4110B EPA 300.0	\$35.00
Nitrate + Nitrite, as N IC	SM 4110B EPA 300.0	\$35.00
Organic Nitrogen	(Kjeldahl - Ammonia)	\$90.00
Total Nitrogen	(Kjeldahl +Nitrate +Nitrite)	\$90.00
Phosphorous, ortho phosphate	SM 4110B EPA 300.0	\$35.00
Phosphorous, total	SM4500-P	\$30.00
Oil and Grease (Freon extraction)**	EPA 418.1	Inquire
Oil and Grease (hexane extraction)	EPA 1664	\$75.00
TPH* (Freon extraction) soil / sludge	EPA 418.1	\$165.00
TPH* (Freon extraction) water / liquid	EPA 418.1	\$165.00
Phenols	EPA SW-846 9065 EPA420.1	\$65.00
Solids		
Total Suspended Solids (TSS) (105°C)	SM2540D EPA 160.1	\$14.00
Total Dissolved Solids (TDS) (108°C)	SM2540C EPA 160.2	\$14.00
Total Solids (TS) (105°C)	SM2540B EPA 160.3	\$14.00
Total Volatile Solids (TVS) (550°C)	SM2540F EPA 160.4	\$15.00
Specific Gravity (by hydrometer)		\$10.00
Sulfate as SO ₄ , mg/L, gravimetric	SM4500-SO ₄ -C ^D	\$20.00
Sulfide	SM4500-S _G	\$45.00
Surfactants (colorimetric methylene blue) MBAS	SM5540C	\$40.00
Total Organic Carbon (TOC)	SM5310B EPA SW-846 9060	\$45.00
Total Organic Halogens (TOX)		Inquire
Biological Oxygen Demand (BOD)	SM5210B EPA410.3	\$50.00
Chemical Oxygen Demand (COD)	SM5220C	\$50.00
Dissolved Oxygen (DO)	SM4500-OG	\$28.00
Glycol Detection (presence / absence)		\$40.00

*Total Petroleum Hydrocarbons

**EPA has discontinued this method. It is only valid for Wyoming Oil and Gas Conservation Commission or other agency using the Exploration/Production Exemption.

POTABILITY WATER TESTING

Group 1 Analyses
Human Consumption

Calcium	Hardness
Magnesium	pH
Sodium	Iron
Potassium	Bicarbonate
Sulfate	Carbonate
Nitrate as N	Chloride
TDS	Conductivity
Fluoride	

Group 2
Agriculture

Calcium
Magnesium
Sodium
Sulfate
Nitrate
TDS
Hardness
pH

Group 3
Livestock

Calcium
Magnesium
Sodium
Sulfate
Nitrate as N
TDS
Hardness

ANALYSIS	PRICE
Group 1 (for human consumption)	\$115.00
Group 2 (for agriculture)	\$96.00
Group 3 (for livestock)	\$76.00
Lead	\$18.00
Copper	\$18.00
Total coliform/E.coli (Pass/Fail -- Laramie lab)	\$35.00
Total coliform/E.Coli (MPN, most probable number – Rock Springs, Golden)	\$37.00
Failure – 2 nd run sampling fee for E. Coli	\$30.00
*Total Organic Carbon (TOC)	\$45.00

**TOC is a good general indicator of organic contaminants in drinking water*

Note: *Samples requiring chemical testing must be received in the laboratory before 2:00 pm Monday through Thursday in order for these prices to be effective.*

Samples received on an unscheduled day will be charged as follows:

ANALYSIS	PRICE
Coliform received on Friday (results on Saturday)	\$65.00
Other	Call

PLEASE NOTE: OUR MINIMUM BILLING CHARGE IS \$50.00

Certain analyses must be initiated within 24 hours of sampling because of limited holding times for the analytes involved (bacteria and nitrate, for example). Samples must, therefore, be received in the lab within 24 hours of sampling to ensure the most accurate results.

COAL & FUELS

Sample Preparation – Coal	ASTM Method	Price
One-Stage sample preparation (minimum charge)		\$ 10.00
Two-Stage Sample Preparation (minimum charge)	D-2013	\$ 13.00
Ashing (–60 mesh material)		\$ 10.00
Laboratory Preparation (crushing, pulverizing, blending, making composites, etc.)		\$45.00 per hour

Coal Analysis –	ASTM Method	Price
Proximate Analysis: moisture, ash, volatile matter, fixed carbon	D-5142	\$ 45.00
Moisture & Ash (by thermogravimetric analyzer)	D-5142	\$ 37.00
Moisture instrumental (TGA)	D-5142	\$ 21.00
Ash instrumental (TGA)	D-5142	\$ 21.00
Proximate Analysis: moisture, ash, volatile matter, fixed carbon; <i>manual ("legacy") methods</i>	D-3172	\$ 65.00
Moisture manual	D-3173	\$ 25.00
Ash, 750° C manual	D-3174	\$ 25.00
Volatile Matter manual	D-3175	\$25.00
Proximate, Ultimate, Btu (heating value)	D-5142/D-5373	\$158.00
Proximate, Ultimate (does <u>not</u> include Btu)	D-5142/D-5373	\$126.00
“Full Prox” (proximate, Btu & sulfur)	D-5142, D-5685, D4239	\$ 81.00
“Short Prox” Analysis: moisture, ash, Btu, sulfur	D-5142, D-5685, D4239	\$ 56.00
Ultimate Analysis: includes moisture, ash, carbon, hydrogen, sulfur, nitrogen, and oxygen (by difference)		\$113.00
Carbon (C)	D-5373	\$ 31.00
Hydrogen (H)	D-5373	\$ 31.00
Nitrogen (N)	D-5373	\$ 31.00
Carbon, Hydrogen, Nitrogen (CHN)	D-5373	\$63.00
Mineral Carbon (carbonate C; inorganic C)	D-1756	\$44.00
Total, Combustible & Carbonate Carbon	D-6316	\$75.00
Heating Value (calorific value, Btu/lb)	D-5685	\$35.00
Heating Value & Total Sulfur	D-5685 / D-4239	\$40.00
Extra charge for heating value when ash content exceeds 25%		\$10.00
Free Swelling Index (FSI)	D-720	\$31.00
Sodium in ash (includes high temperature fusion and digestion)	D-3682	\$28.00
Sulfur, total	D-4239	\$26.00
Sulfur (total), by Eschka	D-3177A	\$110.00
Water or acid soluble alkalies	In-house method	\$74.00
Oxidation by alkali extraction	D-5263	\$60.00
Hardgrove Grindability Index (HGI) with moisture value	D-409	\$77.00
Loss on Ignition (LOI) 750° C	D-3174	\$39.00
Equilibrium Moisture (EqM)	D-1412	\$77.00
Specific Gravity; density	D-167	\$24.00
Forms of Sulfur (pyritic, sulfate, organic, total)	D-2492	\$77.00
Vitrinite Reflectance	D-2798	\$150.00

Coal Ash Analysis	ASTM Method	Price
Ash Fusion Temperatures:		
Reducing atmosphere (4-pt. ash fusion)	D-1857	\$ 50.00
Oxidizing atmosphere	D-1857	\$ 45.00
Oxidizing & reducing atmospheres (same sample)	D-1857	\$ 85.00
Ash Analysis (elemental analysis of ash; reported as oxides)		
SiO ₂ , TiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, K ₂ O, Na ₂ O, SO ₃ , P ₂ O ₅ , MnO ₂ , SrO, BaO; Calculated T ₂₅₀ , base/acid ratio, silica value	D-4326 (XRF) D-3682 (AA) D-6349 (ICP)	\$185.00
Ash Viscosity Index (T ₂₅₀) requires ash analysis	calculated	no additional cost

Miscellaneous Analyses	Method	Price
Sieve Analysis: ASTM D4749		
Dry samples weighing < 50 pounds	D-4749	\$ 30.00 + \$ 6.50/screen
Wet samples weighing < 50 pounds	D-4749	\$ 50.00 + \$ 7.50/screen
Dry samples weighing > 50 pounds	D-4749	\$ 95.00 + \$15.00/screen
Wet samples weighing > 50 pounds	D-4749	\$120.00 + \$20.00/screen
Washability (500 grams or less) various gravities available	D-4371	\$100.00
Washability (large scale samples)	D-4371	Inquire
Laboratory hourly rate		\$ 50.00
Sample collection		Inquire
Bias tests, laboratory audits, consultations, etc. ...		Inquire

Trace Elements in Coal	Method	Price
(All elements require digestion at \$15.00 per sample)		
As, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Sb, V, Zn, per element		\$ 15.00
Other elements available	XRF	Inquire
Bromide (Br)	XRF	\$ 20.00
Chloride (Total)	XRF	\$ 20.00
Fluoride (F)	D-3761	\$ 20.00
Mercury (Hg)	Cold vapor\ICP	\$ 30.00
TRI (Toxic Release Inventory) Trace Metals: Al, Sb, As, Ba, Cd, Cr, Co, CU, Pb, Mn, Mo, Ni, Se, Ag, Tl, Th, V, Zn, Be, Hg, Cl, F	ICP or ICP/MS	\$300.00

Coal samples received for analysis will be discarded after 30 days, unless other instructions are received.
 A shipping fee will be charged for return of samples.
 When submitting samples for analysis, please include a list of samples with identifications and state the specific analyses to be performed.

PETROLEUM AND PETROLEUM PRODUCTS

Determination	Method	Price
Acid number (potentiometric)	D-664	\$55.00
Acid number (color titration)	D-974	\$55.00
Ash content	D-482	\$22.00
Ash, sulfated	D-874	\$60.00
Asphaltenes (insoluble)	D-893	\$150.00
Carbon (C)	D-5291	\$32.00
Carbon, hydrogen, nitrogen (C, H, N)	D-5291	\$65.00
Carbon residue (Conradson)	D-189	\$65.00
Chlorine, total	D-808	\$42.00
Chlorine, organic	D-4929	\$125.00
Cloud point	D-2500	\$18.00
Cetane index (Calculated) requires distillation and API gravity	D-976	\$100.00
Color (ASTM)	D-1500	\$15.00
Distillation	D-86	\$90.00
For each 1% moisture over 10% moisture add		\$ 9.00
Flash point, Pensky-Martens closed-cup	D-93	\$55.00
Flash point, Tag closed cup	D-56	\$55.00
Flash and fire points, Tag open cup	D-1310	\$55.00
Flash and fire points, Cleveland open cup	D-92	\$55.00
Freeze point	D-1015	\$35.00
Heating value (Btu)	D-4809	\$45.00
Hydrogen (H)	D-5291	\$32.00
Glycol in oils	D-2982	\$110.00
Halogens, total	D-808	\$47.00
Mercaptans	D-3227	\$35.00
Nitrogen (N)	D-5291	\$32.00
Pour point	D-97	\$45.00
Sediment and water (centrifuge)	D-96	\$45.00
Simulated distillation GC method (42° C – 320° C)	D-3710	\$200.00
Simulated distillation GC method (50° C – 540° C)	D-2887	\$210.00
Simulated distillation GC method (65° C – 1000° C)	D-6352	\$250.00
Softening point (ring & ball)	D-36	\$42.00
Specific gravity, API gravity	D-287	\$20.00
Specific gravity, hydrometer	D-1298	\$20.00
Sulfur, total	D-1552	\$35.00
Sulfur in gasoline by XRF	D-2622	\$38.00
Sulfur in diesel by XRF	D-2622	\$38.00
Sulfur in diesel, <i>ultra low detection limits</i> by XRF	D-2622	\$50.00
Water in oil (distillation)	D-95	\$55.00
Determination	Method	Price
Viscosity, kinematic, 60° F	D-445	\$58.00
Viscosity, kinematic, 100° F	D-445	\$58.00
Viscosity, kinematic, 140° F	D-445	\$58.00
Viscosity, kinematic, 210° F	D-445	\$90.00
Viscosity, Saybolt (same fee schedule as kinematic above)	D-2161	\$90.00
Other Determinations		Inquire
Basic fuel oil analysis includes moisture, ash, carbon, hydrogen, sulfur, nitrogen, and oxygen (by difference). specific gravity		\$151.00

Biomass: Wood, Pulp, Paper, Etc.

Sample Preparation - Biomass	Price
Biomass sample preparation fee (minimum charge)	\$20.00
Ashing fee	\$ 10.00
Crushing, pulverizing, blending, splitting, etc.	\$45.00/hour

Analysis	Price
Short proximate analysis: moisture, ash, Btu, sulfur	\$ 65.00
Proximate analysis: moisture, ash, volatile matter, fixed carbon	\$ 55.00
Ultimate analysis: moisture, ash, carbon, hydrogen, sulfur, nitrogen, oxygen	\$140.00
Proximate, ultimate, Btu,	\$165.00
Proximate, Btu, total sulfur	\$80.00
Btu (heating value), only	\$50.00
Moisture	\$25.00
Ash	\$25.00
Moisture and Ash	\$48.00
Sulfur (S)	\$30.00
Chlorine (Cl)	\$35.00
Fluorine (F)	\$35.00
Mercury (Hg)	\$35.00
Bromide (Br)	\$35.00
Ash Analysis: SiO ₂ , TiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, K ₂ O, Na ₂ O, SO ₃ , P ₂ O ₅ , MnO ₂ , SrO, BaO; calculated values for T ₂₅₀ , base/acid ratio, silica value).	\$185.00
Ash Fusion Temperatures:	
Reducing atmosphere (4-point ash fusion)	\$65.00
Oxidizing atmosphere	\$55.00
Reducing and oxidizing atmosphere (same sample)	\$95.00
Miscellaneous	
Bulk density (g/cc)	\$40.00
Sieve analysis: 5 screens	\$55.00
Sieve analysis: greater than 50 lbs, or wet samples	Inquire
RCRA analysis: 8 metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se)	\$168.00
TCLP extraction	\$105.00

Cogeneration fuel analysis is done by modified ASTM and /or EPA Methods.

Cement and Limestone

Cement, Concrete, Aggregate	Method	Price
Cement – Elemental Analysis: SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O, P ₂ O ₅ , Mn ₂ O ₃ , SrO, BaO, SO ₃ , loss on ignition, insoluble residue	ASTM C-114 (XRF)	\$200.00
Insoluble residue	ASTM C-114	\$ 33.00
Chloride, total	ASTM C-1152	\$ 38.00
Chloride, water soluble	ASTM C-1218	\$38.00
Cement content of concrete	ASTM C-1084	\$550.00
Free calcium oxide (CaO)	ASTM C-114	\$73.00
Lightweight concrete-aggregate ("Float/Sink")	ASTM C-123	\$100.00
Staining materials in lightweight concrete-aggregate	ASTM C-641	\$83.00

Other Pozzolans – ASTM D-4326		Price
Sample preparation		\$45.00
Elemental analysis: SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O, P ₂ O ₅ , Mn ₂ O ₃ , SrO, BaO, SO ₃ , <i>LOI and moisture</i>	ASTM D-4326	\$200.00
Individual elements from above list- per element (\$40.00), + sample preparation fee (\$45.00)		\$ 85.00
Other Elements – by request		Inquire

28-Day – Available Alkali		Price
Determination of sodium and potassium in solution	ASTM C-311	\$ 55.00

Limestone (and Gypsum)		Price
LOI (1000° C), moisture (120° C), elemental analysis (MnO ₂ , SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaCO ₃ , MgO, SO ₃ , K ₂ O, P ₂ O ₅ , SrO, BaO)	ASTM C-25	\$200.00
Acid Insolubles	ASTM C-25	\$45.00

		Price
Available lime index	ASTM C-25	\$ 75.00

Cement and fly ash samples are analyzed at the Denver Division in Golden, Colorado. It would, therefore, be expedient to submit these types of samples directly to that location. (WAL / Denver Division, 14335 W. 44th Ave., Golden, Colorado 80403). WAL will, of course, accept samples at any of our locations and direct them to the appropriate facility as necessary.

SOILS AND OVERBURDEN

Preparation	Price
Splitting & blending fee	16.00
Acid digestion fee , (required for total metals)	59.00
Bomb digestion fee (required for total lead, arsenic or selenium)	38.00
DTPA extraction for metals	14.00

Determination	Price
pH (saturated paste)	\$ 14.00
Conductivity	8.00
Saturation percentage	8.00
Particle size analysis	
Clay, silt, sand, very fine sand	38.00
Clay, silt, sand	32.00
Texture (requires particle size analysis)	4.00
Soluble cations (calcium, magnesium, sodium, potassium)	27.00
Soluble anions	58.00
Sodium absorption ratio (SAR) (requires soluble cations) >>>> just calculations<<<<	8.00
Exchangeable cations (requires soluble cations and anions)	58.00
Exchangeable sodium % (ESP) (requires SAR)	30.00
Acid-base potential (ABP = NP – AP)	54.00
Acid potential (AP = S _T – S _{SO4})	43.00
Neutralization potential (as % CaCO ₃)	11.00
Nitrate nitrogen	30.00
Organic matter	22.00
Organic carbon	49.00
Carbonates	16.00
Coarse fragment , weight %	10.00
Arsenic (As)	38.00
Boron (B)	22.00
Copper (Cu)	27.00
Chromium, hexavalent (Cr ⁺⁶ ; Cr ^{IV})	40.00
Lead (Pb)	38.00
Molybdenum (Mo)	11.00
Selenium (Se)	38.00
Sulfur, total (S _T)	27.00
Sulfate sulfur (S _{SO4})	16.00
Total organic carbon (TOC) EPA Method 415.1, SW-846 9070	46.00
Total recoverable petroleum hydrocarbons (TRPH) Method 418.1* (Freon extraction)	175.00
Total recoverable petroleum hydrocarbons GRO/DRO	150.00
BTEX EPA SW-846 Method 8260	95.00
Methanol	125.00
Glycols	110.00
Semi-qualitative XRF scan , 10 most abundant elements	150.00

+ \$27 = \$35

+ \$35 = \$65

*EPA no longer allows this method unless it is "grandfathered" under an existing permit or the work falls under E & P exemption for Wyoming Gas & Oil Conservation Commission.

ELEMENTAL ANALYSIS

By X-Ray Fluorescence Spectrometry (XRF)

X-Ray Fluorescence Spectrometry (XRF) allows direct analysis of solid samples. The method gives a highly accurate analysis of major and minor components, and is also capable of determining trace elements down to 5 to 10 ppm. XRF is also a very effective way to do a complete elemental scan of an unknown sample; it is able to scan all elements heavier than sodium.

Coal / Petroleum Products	Method	Price
Sample preparation		\$ 15.00
Chlorine (Cl)		\$ 35.00
Bromine (Br)		\$ 35.00
Iodine (I)		\$ 35.00
Sulfur (S)		\$ 35.00
Other Elements		Inquire
Analysis of Coal Ash and Fly Ash	Method	Price
Preparation of ash		\$ 35.00
Elemental analysis: (reported as the oxides) SiO ₃ , TiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, K ₂ O, Na ₂ O, P ₂ O ₅ , MnO ₂ , SrO, BaO, SO ₃ ; calculated base/acid ratio, alkalies as Na ₂ O, silica ratio, and T ₂₅₀ .	ASTM D-4326	\$185.00
Petroleum Coke		Price
Sample Preparation		\$ 35.00
Silicon (Si), calcium (Ca), iron (Fe), nickel (Ni), vanadium (V), sulfur (S) includes preparation fee		\$130.00
Individual elements from above list (\$35.00) + sample preparation fee (\$35.00)		\$ 70.00
Other elements by request		Inquire
Petroleum Products		Price
Sample preparation		\$ 35.00
Vanadium (V), nickel (Ni), iron (Fe), per element		\$ 20.00
Sulfur (S)		\$ 35.00
Sulfur in diesel by XRF	D-2622	\$40.00
Sulfur in diesel, ultra low detection limits by XRF	D-2622	\$50.00
Other elements by request		Inquire
Rock, Soil and Clay		Price
Elemental analysis (reported as the oxides) SiO ₃ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, Na ₂ O, K ₂ O, TiO ₂ , MnO ₂ , P ₂ O ₅ , SrO, BaO; SO ₃ , (also includes loss on ignition and moisture)		\$200.00
Single elements from list + \$35.00 preparation fee		\$35.00
Qualitative Scan		Price
Semi-qualitative XRF scan , 10 most abundant elements		\$125.00
Quantification of elements found		\$150.00
Silica and Alkali Reactivity		Price
ASTM C-289		\$110.00
ASTM C-289 preparation price for coarse material		\$55.00
ASTM C-289 preparation price for fine material		\$30.00

Glow Discharge Mass Spectrometry (GDMS)

Inorganic Conducting Matrices

Most inorganic samples are amenable to GDMS for the commonly occurring 80 elements. Detection limits are approximately 2 to 40 ppb and the quantifiable concentrations are normally from 0.04 to 1000ppm. Concentrations over 1000 ppm are reported as weight percent. GDMS Analysis for both trace and majors can approach +/- 20% (with standards) of the element present. Pricing for GDMS Analysis is based on detection limit levels, since lower detection limits (*i.e.*, ppb range) require considerably longer instrument times.

Sample preparation of conducting powders for GDMS assumes the customer supplies conducting sample at -200 mesh. Sample preparation of conducting powder is included in the following price structure. Cutting of solid samples that are not powders is included.

GDMS Analysis of Inorganic Conducting Materials		Price
Nominal Detection Limit 100 to 40 ppb (0.1 to 0.04 ppm)		
Single sample		\$550.00
2 to 5 samples		\$510.00
6+ samples		\$450.00
Nominal Detection Limit 30 to 10 ppb (0.03 to 0.01 ppm)		
Single sample		\$660.00
2 to 5 samples		\$600.00
6+ samples		\$550.00
Nominal Detection Limit 300 to 100 ppt (0.3 to 0.1 ppb)		
Single sample		\$1100.00
2 to 5 samples		\$ 850.00
6+ samples		\$ 800.00
Organic material: as above + preparation fee, per sample		\$ 100.00

Semi-Conductors

Glow Discharge Mass Spectrometry can be accomplished in semi-conductors if a single pin (3 mm x 20 mm) or flat surface of approximately 31 mm in diameter and 1 mm thick is submitted. Most raw materials (such as gallium, silicon, aluminum, tungsten, tellurium and molybdenum) and finished semi-conductors (such as cadmium, tellurium, gallium, arsenic and silicon) can be analyzed for trace elements directly by GDMS. Pricing structure is based on detection limits, and includes up to 75 elements for the GDMS in semi-conductors, since lower limits (*i.e.*, ppb range) require considerably longer instrument times.

GDMS Analysis of Semi-Conductors		Price
Nominal Detection Limit 100 to 40 ppb (0.1 to 0.04 ppm)		
Single sample		\$550.00
2 to 5 samples		\$510.00
6+ samples		\$450.00
Nominal Detection Limit 30 to 10 ppb (0.03 to 0.01 ppm)		
Single sample		\$660.00
2 to 5 samples		\$600.00
6+ samples		\$550.00
Nominal Detection Limit 10 to 1 ppb (0.01 to 0.001 ppm)		
Single sample		\$1100.00
2 to 5 samples		\$ 1000.00
6+ samples		\$ 900.00

Isotope Dilution

Isotope Dilution is available for multi-isotope elements in amenable matrices: precision of the isotopic ratios approach 0.1%. **The basic price is given below; however, the pricing structure is dependent upon the elements requested and the specific matrix involved.**

GDMS Analysis by Isotope Dilution		Price
Set-up charge		\$1000.00
Each element		\$ 300.00

Super Alloys

A variety of super alloys can be analyzed by Glow Discharge Mass Spectrometry. A pin of approximately 3 mm in diameter and 20 mm long is required. **A charge of \$50.00 per sample will be added for cutting super alloys.**

GDMS Analysis of Super Alloys		Price
Single sample		\$400.00
2 to 5 samples, per sample		\$380.00
6 + samples, per sample		\$ 350.00

Depth Profiling

The GDMS is capable of depth profiling of conductors such as metal foils, metal surfaces, and semi-conductors (including doped) for elemental content vs. depth in the material being analyzed. Sputter rates are on the order of 0.1 to 10 microns per minute, which enables very rapid depth profiling. Pricing structure is dependent upon instrument time and number of elements profiled. Individual tests will be quoted upon request.

Sample Turn-Around-Time

Turn-around-time is approximately 2 weeks from receipt of sample, depending upon sample load and the time the instrument is in use. Expedited service is available to provide GDMS Analysis in 5 working days for a 50% surcharge, or 3 working days for a 75% surcharge. For those in a real hurry, a 200% surcharge will produce GDMS Analysis results within 24 hours.

APPENDIX

Sample Submission

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SAMPLE PRESERVATION / CONTAINER GUIDE	PAGE 27

ENVIRONMENTAL — Chain-of-Custody / Service Request

Wyoming Analytical Laboratories, Inc.

Page ____ of ____

1660 Harrison Street
Laramie, WY 82070
(307) 742-7995
Fax: (307) 721-8956

625 Center Street
Rock Springs, WY 82901
(307) 362-3176
Fax: (307) 362-3581

14335 West 44th Avenue
Golden, CO 80403
(303) 278-2446
Fax: (303) 278-2439

Project:								Billing Information				
Send Report to:								Name:				
Address:								Company Name:				
City:		State:		Zip:				Address:				
Phone:								City:		State:		Zip:
Fax:								Phone:		Fax:		
E-mail:								E-mail Results: Yes / No				
PO Number:								Fax Results: Yes / No				
Sample Identification	Matrix*	VOA	BTEX	Semi-VOA	TRPH				Total number of containers _____	Date / Time	Special Instructions	

*Matrix: S - soil, G - gas, A - air, Sl - sludge, X -
Other, (please specify) _____

Sample Transfer Record (1)

Relinquished by: _____
Signature: _____
Date: _____

Sample Transfer Record (2)

Relinquished by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Please make photocopies of this form to accompany environmental samples submitted to WAL for analysis.

WATER — Chain-of-Custody / Service Request

Wyoming Analytical Laboratories, Inc.

1660 Harrison Street
Laramie, WY 82070
(307) 742-7995
Fax: (307) 721-8956

625 Center Street
Rock Springs, WY 82901
(307) 362-3176
Fax: (307) 362-3581

Project:							Billing Information			
Send Report to:							Name:			
Address:							Company Name:			
City:		State:		Zip:			Address:			
Phone:							City:		State:	Zip:
Fax:							Phone:		Fax:	
E-mail:							E-mail Results: Yes / No			
PO Number:							Fax Results: Yes / No			
Sample Identification	Metals	As, Sb, Pb, Se	Low Levels	Alk, Bicarb/Carb	Cl, F, Br, P, TOT	BOD, COD, TOC	Total number of Containers _____	Date/Time	Special Instructions	

Matrix: Water – **W**; **X** – other, (please specify) _____

Sample Transfer Record (1)

Sample Transfer Record (2)

Relinquished by: _____
Signature: _____
Date: _____

Relinquished by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Please make photocopies of this form to accompany water samples submitted to WAL for analysis.

POTABILITY — CHAIN-of-CUSTODY

Wyoming Analytical Laboratories, Inc.

1660 Harrison Street
Laramie, WY 82070
(307) 742-7995
Fax: (307) 721-8956

625 Center Street
Rock Springs, WY 82901
(307) 362-3176
Fax: (307) 362-3581

Note: Results will be furnished to the person or business name that appears on this chain of custody.
Copies will not be issued to a third party without written authorization.

Company Name (If applicable) _____
 Name _____
 Address _____
 City _____ State _____ Zip Code _____
 Phone _____ Fax Number _____
 E-mail _____

New Property? Yes _____ No _____ New Well? Yes _____ No _____

Sample Identification: _____

Date Sample Taken: _____ Time Sample Taken: _____

Analysis: (when submitted Monday through Thursday before 2pm*)

Group 1	@	\$115.00	(Human Consumption)	= \$	_____
Group 2	@	\$96.00	(Agriculture)	= \$	_____
Group 3	@	\$76.00	(Livestock)	= \$	_____
Coliform Bacteria*	@	\$37.00	(MPN - Rock Springs)	= \$	_____
Coliform Bacteria*	@	\$35.00	(pass or fail Laramie)	= \$	_____
1 st & 2 nd Draw Lead/Copper	@	\$65.00		= \$	_____
Lead	@	\$20.00		= \$	_____
Copper	@	\$20.00		= \$	_____
Other_____	@	inquire		= \$	_____
Other_____	@	inquire		= \$	_____
			Amount Due	= \$	_____
			Amount Paid	= \$	_____

Signature: _____

Date: _____

An additional fee will be charged for samples brought in on an unscheduled day.

STANDARD TURNAROUND TIME IS 5 WORKING DAYS

Non-Standard turnaround times: *Coliform samples cannot be analyzed on the same-day basis.*

- 1 working day, add 100% 2 working days, add 50%
- 3 working days, add 30% 4 working days, add 15%

*Coliform samples require a sterilized container. Kits with instructions are available at no charge.

Note: Acceptance of any sample requiring a turnaround time other than the standard is at the discretion of Wyoming Analytical Laboratories, Inc. and is based on the work load of samples currently in-house.

Please feel free to make photocopies of this chain of custody to accompany drinking water samples submitted to WAL for analysis.

Coal / Biomass / Cogeneration — Chain-of-Custody / Service Request

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14335 West 44th Avenue
Golden, CO 80403
(303) 278-2446
Fax: (303) 278-2439

Project:								Billing Information	
Send Report to:								Name:	
Address:								Company Name:	
City:		State:		Zip:				Address:	
Phone:								City: State: Zip:	
Fax:								Phone: Fax:	
E-mail:								E-mail Results: Yes / No	
PO Number:								Fax Results: Yes / No	
Sample Identification	Proximate	Ultimate	Heating Value	Sulfur	Short Prox	Ash Fusibility		Total number of Samples _____	Special Instructions
								Date/Time	

Matrix: C-Coal; X-other, (please specify) _____

Sample Transfer Record (1)

Sample Transfer Record (2)

Relinquished by: _____
Signature: _____
Date: _____

Relinquished by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Received by: _____
Signature: _____
Date: _____

Please make photocopies of this form to accompany coal samples submitted to WAL for analysis.

CONTAINERS, PRESERVATIVES & HOLDING TIMES

Analyte	Method	Container	Preservative	Holding Time
<u>Metals, dissolved</u>				
Metals	SW-846 / 600 series	1 - 250mL poly	Field filter	180/28 days
8 RCRA, 13 priority pollutants	SW-846 / 600 series	1 - 500mL poly	Field filter	180/28 days
23 HSL	SW-846 / 600 series	1 -1L poly	Filed filter	180/28 days
Hexavalent chromium	SM3500 CR-D	1 - 500mL poly	4°C	24 hours
<u>Metals, total, total recoverable</u>				
Metals	SW-846 / 600 series	1-250mL poly	2mL 1:1 HNO ₃	180/28 days
8 RCRA, 13 priority pollutants	SW-846 / 600 series	1-500mL poly	2mL 1:1 HNO ₃	180/28 days
23 HSL	SW-846 / 600 series	1-1L poly	5mL 1:1 HNO ₃	180/28 days
<u>Water</u>				
Alkalinity / CO ₂ / HCO ₃ or acidity	310.1 or 305.1	1 - 125mL poly	4°C	14 days
Ammonia	SM 4500-NH3F	1 - 500mL poly	4°C, 2mL 1:1 H ₂ SO ₄	28 days
Anions - NO ₂ , NO ₃ , PO, SO ₄ , Br, Cl	300 (IC method)	1 - 125mL poly	4°C	2/28 days
BOD	405.1	1 - 1L poly	4°C	48 hours
BTEX / MTBE / purgeable aromatics	8020 / 624	2 - 40mL vials	4°C, 0.5mL 1:1 HCl	14 days
Carbamates	632	1 - 1L amber	4°C	7 days
COD	410.4	1 - 125mL amber	4°C, 2mL 1:1 H ₂ SO ₄	28 days
Coliform – fecal & total (drinking water)	Colilert	1 - 110mL, sterile	4°C -Na ₂ S ₂ O ₃	24 hours
Color	110.2	1 - 125mL amber	4°C	48 hours
Cyanide – total, WAD, amenable	335.1 / 2 / 9010	1 - 1L poly	4°C, 10mL 10N NaOH	14 days
Dissolved oxygen	360.1	BOD Bottle	4°C	24 hours
Flashpoint	1010 / ASTM D-93	1 - 250mL amber	4°C	28 days
Fluoride	340.2	1 - 125mL poly	4°C	28 days
Formaldehyde	8315	1 - 1L amber	4°C	3 days
Glycol / alcohol	8015	1 - 20mL vial	4°C	14 days
Herbicides	8150	1 - 80oz amber	4°C	7 days
Ignitability	1010	1 - 250mL glass	4°C	28 days
Langelier Index	SM 2330B	1 - 1L poly	4°C	ASAP
Nitrate/nitrite		1 - 125mL poly	4°C, H ₂ SO ₄	28 days
Odor	140.1	1 - 1L amber	4°C	48 hours
Oil & grease	1664	1 - 1L amber	4°C, 5mL 1:1 H ₂ SO ₄	28 days
Pesticides / PCBs	8080/608 or 8140	1 - 80oz amber	4°C	7 days
PCB screen	8080 mod.	1 - 125mL amber	4°C	7 days
pH – corrosivity	150.1	1 - 125mL poly	4°C	ASAP
Phenols, total	420.1	1 - 1L amber	4°C, 5mL 1:1 H ₂ SO ₄	28 days
Phenols	8040	1 - 80oz amber	4°C	7 days
Purgeable halocarbons	8260 / 624	2 - 40mL vials	4°C	14 days
Reactivity – CN, sulfide	SW846	1 - 250mL poly	4°C, 2mL 10N Zn acetate	7 days
Residual chlorine	330.5	1 - 250mL amber	4°C	24 hours
Semi-volatiles (BNA/PNA)	8270 / 625	1 - 80oz amber	4°C	5 days
Specific conductance	120.1 / 9050	1 - 125mL poly	4°C	28 days
Sulfide	376.1 / 9030	1 - 500mL poly	4°C, 5mL 10N Zn acetate	7 days
Sulfite	377.1	1 - 500mL poly	4°C, 0.5g Zn acetate, 5mL EDTA	7 days
Surfactants (MBAS)	425.1	1 -1L poly	4°C	48 hours
TCLP BNA, pest, herb, metals	1311 / SW-846	1 - 80oz amber	4°C	14 days
TCLP metals	1311/ 6010,7470	1 - 1L poly	4°C	180/28 days
TCLP VOA	1311 / 8260	1 - 250mL amber	4°C	14 days
TEPH (diesel) fuel ID / DRO	8015 mod	1 - 1L amber	4°C	7 days
TVPH (gasoline)	8015 mod	2 - 40mL vials	4°C, 0.5mL 1:1 HCl	14 days
Total organic carbon-(TOC)	9060 / 415.1	1 - 125mL amber	4°C, 2mL 1:1 H ₂ SO ₄	28 days
Total organic halogens-(TOX)	9020	1 - 500mL amber	4°C, 3mL 1:1 H ₂ SO ₄	28 days
Total halogens – (TX) in oil	9020 mod	1 - 20mL vial	4°C	none
TRPH	418.1	1 - 1L amber	4°C, 5mL 1:1 HCl	28 days
TS / TDS / TSS	160.1 / .2	1 - 500mL poly	4°C	7 days
Turbidity	180.1	1 - 125mL poly	4°C	48 hours
Volatile organic analytes (VOA)	8260 / 624	2 - 40mL vials	4°C, 0.5mL 1:1 HCl	14 days
Drinking Water				
VOC / Trihalomethanes	524.2	4-40mL vials	4°C 20mg ascorbic acid, add	14 days
SOC	525.1	1-1L amber	4°C 55mg Na ₂ SO ₃ +HCl	7 days
Nitrogen / phosphorus pesticides	507	1-1L amber	4°C 80mg Na ₂ S ₂ O ₃	7 days
Pesticides / PCBs	508	1-1L amber	4°C 80mg Na ₂ S ₂ O ₃	7 days
Herbicides	515	1-1L amber	4°C 80mg Na ₂ S ₂ O ₃	14 days
EDB / DBCP	504	2-40mL vials	4°C 3mg Na ₂ S ₂ O ₃	28 days
Carbamates	531.1	1-125mL amber	4°C 10mg Na ₂ S ₂ O ₃ +MCAA	28 days
Diquat	549	1-500mL polyamber	4°C 50mg Na ₂ S ₂ O ₃	7 days
Endothal	548	1-125mL amber	4°C	7 days
Glyphosate	547 mod	1-125mL amber	4°C 12mg Na ₂ S ₂ O ₃	14 days
Lead and copper rule	239.2 / 200.7	1-1L poly	5mL 1:1 HNO ₃ (unpreserved if a private residence)	180 days

Analyte	Method	Container	Preservative	Holding Time
Soil				
Anions - Br, Cl, NO ₂ , NO ₃ , PO ₄ , SO ₄	300.0	1-2oz.wm	4°C	28 days
BTEX / MTBE / purgeable aromatics	8020	2-2oz wm	4°C	14 days
Corrosivity / pH	150.1	1-2oz wm	4°C	14 days
Cyanide	335.2	1-2oz wm	4°C	28 days
Extractable organic halogens (EOX)	9020 mod	1-2oz wm	4°C	28 days
Herbicides	8150	1-4oz wm	4°C	14 days
Ignitability / flashpoint	1010 / ASTM D93	1-8oz wm	4°C	28 days
Oil and grease	413.1	1-4oz wm	4°C	28 days
Paint filter test	9095	1-4oz wm	4°C	28 days
Pesticides / PCBs	8080 or 8140	1-4oz wm	4°C	14 days
Phenols (total)	420.1	1-4oz wm	4°C	14 days
Reactivity	SW846	1-2oz wm	4°C	28 days
Semi-volatiles (BNA, PNA)	8270	1-4oz wm	4°C	14 days
TCLP volatiles	1311 / 8260	1-4oz wm	4°C	14 days
TCLP BNA, pest, herb	1311/ 8270,8080,8150	1-6oz wm	4°C	14 days
TCLP metals	1311 / 6010,7470	1-4oz wm	4°C	180 days
TEPH (diesel) / fuel ID / DRO	8015 mod	1-2oz wm	4°C	14 days
Total metals	6010 / 7471	1-2oz wm	4°C	80/28 days
TRPH	418.1	1-4oz wm	4°C	28 days
TVPH (gasoline)	8015 mod	1-2oz wm	4°C	14 days
VOA or purgeable halocarbons	8260 or 8010	1-2oz wm	4°C	14 days

(wm = wide-mouthed, glass jar)

Radiochemistry

Analyte	Method	Container	Preservative	Holding Time
Gross Alpha, Beta	EPA 900.0	1 - 1L poly	5mL 1:1 HNO ₂	180 days
Ra-226	SM 7500 RaB mod	1 - 1L poly	5mL 1:1 HNO ₂	180 days
Ra-228	EPA Ra 05	1 - 1L poly	5mL 1:1 HNO ₃	180 days
Uranium	ASTM D2907	1 - 1L poly	5mL 1:1 HNO ₃	180 days
Radon	EPA 600 / 2-87 / 082	2 - 40mL vials	4°C	48 hours

USEFUL CONVERSIONS AND DEFINITIONS

Water related conversions:

1 ppm (liquid) = 1 mg/L = 1000 µg/L = 1000 ppb (liquid)

1 ppm (solid) = 1 mg/kg = 1000 µg/kg = 1000 ppb (solid)

1% = 10,000 ppm

1 gallon water = 231 cubic inches = 8.333 pounds

Water Hardness is given by the following formula:

Hardness, as mg/L CaCO₃ = 2.497 x Ca, mg/L + 4.115 x Mg, mg/L

1 mg/L CaCO₃ = 0.058 grains/Gallon (US)

Definitions

Metals, analyte types

Dissolved analyte – The concentration of analyte in an aqueous sample that will pass through a 0.45 µm membrane filter assembly prior to sample acidification.

Suspended analyte – Those elements which are retained by a 0.45 µm membrane filter.

Total – The concentration determined on an unfiltered sample following vigorous digestion

Total recoverable analyte – The concentration of analytes determined either by "direct analysis" of an unfiltered, acid-preserved drinking water sample with turbidity of <1 NTU, or by analysis of the solution extract of a solid sample or an unfiltered aqueous sample following digestion by refluxing with hot dilute mineral acid(s) as specified in the method.

Potentially dissolved analyte – The concentration of analyte in an acidified aqueous sample that will pass through a 0.45 µm membrane filter after acidification for 8 – 9 hours.

(This definition is only used by State of Colorado.)

TCLP – Toxicity Characterization Leaching Procedure (EPA SW-846 Method 1311) – this is a leach procedure that is designed to give the mobile fraction of the metals in the sample and not the content of the metals in the sample. It is often incorrectly used to refer to the 8 RCRA metals that are most commonly extracted with this procedure.

Data quality objective (DQO) – Client-defined quality parameters, such as project-specific detection levels, RPD.

Field reagent blank (FRB) – An aliquot of reagent water or other blank matrix that is placed in a sample container in the laboratory and treated as a sample in all respects, including shipment to the sampling site, exposure to the sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.

Laboratory control sample (LCS): A volume of reagent water spiked with known concentrations of analytes and carried through the preparation and analysis procedure as a sample. It is used to monitor loss/recovery values.

Laboratory duplicates (LD1 and LD2) – Two aliquots of the same sample taken in the laboratory and analyzed separately with identical procedures. Analyses of LD1 and LD2 indicate precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

Laboratory fortified sample matrix (LFM) – An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

Laboratory reagent blank (LRB) – An aliquot of reagent water or other blank matrices that are treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, and internal standards that are used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, reagents, or apparatus

Method blank: A volume of reagent water processed through each sample preparation procedure.

Method detection limit (MDL) – The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample in a given matrix containing the analyte which has been processed through the preparative procedure.

Quality control sample (QCS) – A solution of method analytes of known concentrations which is used to fortify an aliquot of LRB or sample matrix. The QCS is obtained from a source external to the laboratory and different from the source of calibration standards. It is used to check either laboratory or instrument performance.

Sample holding time – The storage time allowed between sample collection and sample analysis when the designated preservation and storage techniques are employed.

Sensitivity – The slope of the analytical curve, *i.e.* functional relationship between emission intensity and concentration.

Water sample – a sample taken from one of the following sources: drinking, surface, ground, storm runoff, industrial or domestic wastewater