

OTHER SERVICES

List of Acronyms

AOAC	Association of Official Agricultural Chemists	NIOSH	National Institute of Occupational Safety and Health
API	American Petroleum Institute	OSHA	Occupational Safety & Health Administration
ASTM	American Society for Testing Materials	PAHs	Polynuclear Aromatic Hydrocarbons
BS&W	Bottom Sediment and Water	PCM	Phase Contrast Microscopy
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes	PCP	Pentachlorophenol
E or EPA	US Environmental Protection Agency	PLM	Polarized Light Microscopy
GC	Gas Chromatograph	PM-10	Particulate Matter Less than 10 Microns in Diameter
GC-FID	Gas Chromatograph Flame Ionization Detector	PVC	Polyvinyl Chloride
GC-PID	Gas Chromatograph Photo - Ionization Detector	QC	Quality Control
GC/ECD	Gas Chromatograph/Electron Capture Detector	SKC	SKC Incorporated
GC/FID	Gas Chromatograph/Flame Ionization Detector	SW or SW846	Test Methods for Evaluating Solid Waste, Physical & Chemical Methods
GC/MS	Gas Chromatograph/Mass Spectrometer	TDS	Total Dissolved Solids
ICP	Inductively Coupled Plasma	TSP	Total Suspended Particles
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry	UOP	Universal Oil Products Co.
LPG	Liquefied Petroleum Gas	VOA	Volatile Organic Analysis
MA-VPH	Volatile Petroleum Hydrocarbons by Massachusetts Method	VPH	Volatile Petroleum Hydrocarbons
MCEF	Mixed Cellulose Ester Filter	XAD	Amerlite XAD™ (Rohm & Haas)
MSDS	Material Safety Data Sheets		

OTHER SERVICES

1. CRUDE OIL AND PETROLEUM PRODUCTS

PARAMETER	METHOD
Sample cleanup, preparation, and separation of emulsions prior to analysis	-
Complete Crude Oil Analysis: BS & W, Gravity(API & Specific), Hempel Distillation, Pour Point, Sulfur, Viscosity at 100°F and 120°F	-
Ash, Loss at 775°C	ASTM D482
Asphaltenes	UOP 46
Benzene in Gasoline	GC-PID
Bottom Sediment and Water (BS&W)	ASTM D1796
Cetane Number	ASTM D976
Chloride, Inorganic (water soluble)	E300.0 Mod
Chloride, Organic (1 ppm detection limit)	ASTM D4929B
Cloud Point	ASTM D2500
Engler distillation	ASTM D86
Fingerprint oils by chromatography (Carbon Scan identification of unknowns)	GC-FID
Flashpoint, Pensky Martens Closed Cup	SW 1010
Glycol (antifreeze) in oil or fuel	ASTM D2982
Gravity, API	ASTM D287
Gravity, specific	ASTM D1298
Halogens, total (200 ppm detection limit)	ASTM D808
Hempel Distillation, modified, cuts at 392°F and 500°F	ASTM D285
Metals in oil, digestion	SW 3050
Metals in oil, analysis of digestate, per metal	SW 6010/ SW 6020
Paraffin	UOP 46-64
Pour Point	ASTM D97
Simulated Distillation by GC/FID (carbon scan, product identification or fingerprinting)	GC-FID
Sulfur, total in diesel or heavier oils (not available for volatile fuels)	ASTM D1552
Vapor Pressure, Reid	ASTM D323
Viscosity, per temperature	ASTM D445
Water by Karl Fisher	ASTM D1744

2. OILFIELD WATER ANALYSIS

PARAMETER
Sample cleanup, preparation, and separation of emulsions prior to analysis
Routine Oilfield Water Analysis: Barium, Calcium, Iron, Magnesium, Potassium, Sodium, Strontium, pH, Specific Gravity, Sulfate, Total Dissolved Solids (calculated), Chloride, Carbonate, Bicarbonate, Resistivity

OTHER SERVICES

3. NATURAL GAS AND LIQUEFIED PETROLEUM GAS (LPG) ANALYSIS

PARAMETER	METHOD
Natural Gas Analysis: Methane through Hexanes plus, Nitrogen, Carbon Dioxide, Hydrogen Sulfide, BTU, Specific Gravity, Pseudo-critical temperature and pressure, Compressibility Factor, Molecular Weight (Oxygen available upon request).	GPA 2261-95
Natural Gas Analysis plus Carbon Monoxide	GPA 2286-95
Extended Natural Gas, C1 thru C10+ including Nitrogen, CO2 and Oxygen	GPA 2286-95
Extended Natural Gas, C1 thru C10+ with BTEX including Nitrogen, CO2 and Oxygen	GPA 2286-95
LPG Analysis: Ethane through Hexanes plus, Volume Ratio, Molecular Weight, Specific Gravity, Vapor Pressure, BTU.	ASTM D2163-87.
Extended Natural Gas or Extended LPG analysis to include Heptanes thru Decanes Plus	GPA 2286-95
Methane, Ethane, Propane in air at ppm concentrations.	GC-FID

4. FEEDS

PARAMETER	METHOD
Moisture	Loss at 40°C
Nitrate	MSU Feed Laboratory Method-CuSO ₄ Extraction
Protein	AOAC 7.033
Sulfur	ASTM D1552

5. SPECIAL SERVICES

SERVICE
Scale Analysis: Identification of unknown materials i.e. scale, deposits, or other inorganic substances, semi-quantitative analysis (does not include quantitative analysis for organic chemicals)
Sample filtering/preservation in the lab, per sample bottle or fraction
Clerical services, per hour
Sampling or courier services, per hour
Staff chemist, per hour
Senior chemist, per hour
Overtime, evening, weekend, holidays – add
Mileage, per mile
3 rd Party/Electronic Invoicing Submissions

OTHER SERVICES

6. INDUSTRIAL HYGIENE LABORATORY SERVICES

PARTICULATES	METHOD
Particulates, Total*	NIOSH 0500
Particulates, Respirable*	NIOSH 0600
Silica, Crystalline Respirable - X-ray Diffraction*	NIOSH 7500

METALS			METHOD
Metals by ICP/ICP-MS - Digestion of 37 mm mixed cellulose ester filter (MCEF)			NIOSH 7300
Metals by ICP/ICP-MS – Digestion of wipe samples			NIOSH 9100/ SW 3050
Metals by ICP/ICP-MS – Analysis of digestate, per metal			SW 6010/SW 6020
Metals available by ICP Scan			NIOSH 7300
Aluminum	Cobalt	Manganese	Sodium
Beryllium	Copper	Molybdenum	Thallium
Cadmium	Iron	Nickel	Titanium
Calcium	Lead	Phosphorus	Vanadium
Chromium	Magnesium	Silver	Zinc
Lead in paint			SW 3050/ SW 6010/SW 6020
NOTES: Other metals available on request – see <i>Waters</i> sections			

TM

OTHER SERVICES

6. INDUSTRIAL HYGIENE LABORATORY SERVICES continued

Asbestos, Bulk Identification – Polarized Light Microscopy 1-3 Layers	E600/M4- 82-020 or RTI 600/R-93/E116	
Asbestos, In Soil – Polarized Light Microscopy	Point Count	
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) - Charcoal tube or passive diffusion monitor.	NIOSH 1501 SW 8015B	
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) – Tedlar Bag	SW 8021B / GC	
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) – Tedlar Bag	SW 8260B GC/MS	
Formaldehyde – 3M passive diffusion monitor	NIOSH 3500M Colorimetric	
Gasoline Range Organics (GRO) – Charcoal Tube or Tedlar Bag	SW 8015B / GC	
Methane in air, ppm concentrations – Tedlar Bag	SW 8015M	
Organic Vapor Scan – Single compound	SW 8260B Mod.	
Organic Vapor Scan – Short list	SW 8260B Mod.	
Organic Vapor Scan – Long list	SW 8260B Mod.	
Compounds Available For Analysis by Organic Vapor Scan (by sorbent tube, passive diffusion monitor ¹ or tedlar bag ¹)		
Acetone	1,2-Dichlorobenzene	Naphthalene
Benzene	1,3-Dichlorobenzene	n-Propylbenzene
Bromobenzene	1,4-Dichlorobenzene	Styrene
Bromochloromethane	1,2-Dichloroethane	1,1,1-2-Tetrachloroethane
Bromodichloromethane	cis-1,2-Dichloroethene	1,1,2,2-Tetrachloroethane
Bromoform	1,2-Dichloropropane	Tetrachloroethene
n-Butylbenzene	1,3-Dichloropropane	Toluene
sec-Butylbenzene	2,2-Dichloropropane	1,2,3-Trichlorobenzene
tert-Butylbenzene	1,1-Dichloropropene	1,2,4-Trichlorobenzene
Carbon Tetrachloride	cis-1,3-Dichloropropene	1,1,1-Trichloroethane
Chlorobenzene	trans-1,3-Dichloropropene	1,1,2-Trichloroethane
Chloroform	Ethylbenzene	Trichloroethene
2-Chlorotoluene	Hexachlorobutadiene	1,2,3-Trichloropropane
4-Chlorotoluene	2-Hexanone	1,3,5-Trimethylbenzene
Chlorodibromomethane	Isopropylbenzene	1,2,4-Trimethylbenzene
1,2-Dibromo-3-chloropropane	p-Isopropyltoluene	m+p-Xylenes
1,2-Dibromoethane	Methyl ethyl ketone	o-Xylene
Dibromomethane	Methyl isobutyl ketone	-
Pentachlorophenol (PCP) – Sorbent Tube ¹	OSHA 39M	
Polynuclear Aromatic Hydrocarbons (PAHs) - (GS/MS substituted for GC/FID specified in method) – Sorbent Tube ¹	NIOSH 5515M GC/MS	
Radon in indoor air, Charcoal canister	Gamma Spec.	
Volatile Petroleum Hydrocarbons (VPH) – Tedlar Bag ¹	MA-VPH GC/FID	

OTHER SERVICES

7. AIR SAMPLING EQUIPMENT RENTAL

EQUIPMENT
Pump - Low or High Flow (0.2 to 3.5 LPM) Pumps are pre- and post-calibrated. Personal and area sampling accessories and battery chargers are included.
Cyclone Sampler (SKC) or Calibration Sleeve - respirable particulates monitoring
Sensidyne Gas Sampling Pump with Flow Finish Indicator
Sensidyne Colorimetric Indicator Tubes, Box of 10

8. AMBIENT AIR QUALITY LABORATORY SERVICES

SERVICE
Conditioning and pre-weighing of a quartz filter (PM-10) - includes filter
Conditioning and pre-weighing of glass fiber filter (TSP) – includes filter
Conditioning and post - weighing, concentration calculation of PM-10 or TSP filters
Metals analysis on quartz or glass fiber filter – digestion
Metals by ICP/ICP-MS – analysis of digestate, per metal

9. MEDIA SUPPLIES

Sample collection media such as charcoal tubes, pre-weighed filter cassettes for particulates and cassettes for metals analysis are provided at no cost. There will be a nominal charge for specialized sorbent tubes and passive diffusion monitor badges. Because of QC, there will be a surcharge for media not supplied by our laboratory if it requires desorption efficiency determinations.
3M 3500 Passive Diffusion Monitor
3M 3721 Formaldehyde Passive Diffusion Monitor
PAH sampling media (XAD-2 Sorbent Tube, Teflon Filter)
PCP sampling media (XAD-7 Sorbent Tube, 3 tubes/set)
Tedlar bags
Transducer charts, per box
Field data sheets and envelopes for particulate monitoring, each

10. OTHER SERVICES AVAILABLE

MSDS Sheet Preparation	Radiation Safety Officer
Safety Consulting and Training	Indoor Air Quality Assessments
Microscopic Exam, Miscellaneous	-----