

GEOMARK** RESEARCH, LTD.**

**Capabilities
& Price Schedule
(All Services)**



GEO MARK PETROLEUM FLUID SERVICES LAB OIL AND BITUMEN ANALYSIS PRICE SCHEDULE

During the 1990's GeoMark has emerged as the preeminent geochemical laboratory providing crude oil, gas, PVT, and source rock analyses to the petroleum industry. Through our numerous studies and databases we have demonstrated the advantages of our regional crude oil approach to petroleum system evaluation.

We also offer a complete compliment of geochemical analyses on a tech service basis. The information below provides pricing for each of our three laboratories. Please feel free to contact us with any questions, or requests for customized services.

OIL & BITUMEN ANALYSES

GeoMark offers a full compliment of oil and oil extract (bitumen) analyses for exploration and exploitation uses. And we offer a 13,000 oil analysis database to assist in the comparison and interpretation of new samples. The price structure for our tech service package is presented below.

OIL ANALYSIS

| Type of Analysis | Total Unit Price |
|---------------------------------------|------------------|
| API Gravity | \$50.00 |
| % Sulfur | \$40.00 |
| Vanadium | \$35.00 |
| Nickel | \$35.00 |
| Liquid Chromatography | \$115.00 |
| C15+ Saturate Gas Chromatography | \$140.00 |
| Carbon Isotopes: Saturates | \$55.00 |
| Carbon Isotopes: Aromatics | \$55.00 |
| Molecular Sieve | \$35.00 |
| GCMS Quantitative Saturate Biomarkers | \$350.00 |
| GCMS Aromatic Hydrocarbons | \$385.00 |

BITUMEN ANALYSIS

| Type of Analysis | Total Unit Price |
|---------------------------------------|------------------|
| Bitumen Extraction | \$155.00 |
| Liquid Chromatography | \$115.00 |
| C15+ Saturate Gas Chromatography | \$140.00 |
| Carbon Isotopes: Saturates | \$55.00 |
| Carbon Isotopes: Aromatics | \$55.00 |
| Molecular Sieve | \$35.00 |
| GCMS Quantitative Saturate Biomarkers | \$350.00 |
| GCMS Aromatic Hydrocarbons | \$385.00 |

Source Rock Lab

218 Higgins Street
Humble, Texas 77338
Telephone: 832/644-1184
Fax: 832/644-1318

Headquarters

9748 Whithorn Drive
Houston, Texas 77095
Telephone: 281/856-9333
Fax: 281/856-2987

Petroleum Fluids Lab

115 Zonolite Street
Lafayette, Louisiana
Telephone: 337/261-4002
Fax: 337/267-5045

**GEO MARK SOURCE ROCK LAB
SOURCE ROCK ANALYSIS PRICE SCHEDULE**

SOURCE ROCK ANALYSES

GeoMark's Source Rock Laboratory offers a full complement of source rock analyses, including the rapid measurement of total organic carbon (TOC), Rock-Eval Pyrolysis parameters, and thermal maturity. The laboratory augments GeoMark's analytical capabilities, and makes GeoMark the only petroleum service laboratory offering a complete line of geochemical services. Companies wanting source rock, standard oil and gas, and/or PVT analyses can now send their samples to a single laboratory.

The main objective of our lab is to present high quality, but timely, data in a clear and systematic format that allows the user to easily assimilate the results. We try to avoid the repetitious duplication of plotting "nearly similar" ratios and concentrate on the significant parameters. We do encourage clients to request customized report formats and we will gladly modify our reporting procedures to match a company's desired format.

GeoMark also provides a database (RFDbase.com) service for the storage, review and manipulation of all petroleum fluid analyses, including Source Rock and Mud Gas Isotope Analyses. This "universal" database has a field level module which permits all field data to be viewed, captured, and manipulated at will. Additionally, all modules within the RFDbase structure are exportable to Excel or databases holding other types of data (rock properties, wire-line measurements, etc).

PRICE STRUCTURE

| SAMPLE HANDLING & PREPARATION | UNIT PRICE |
|------------------------------------------------------|-------------------|
| Sample washing & Drying | \$12.00 |
| Contaminated Sample Preparation (Hand pick Cuttings) | \$35.00 |
| Oil Base Mud Removal (Solvent Extraction) | \$30.00 |
| Basic Sample Prep (Grinding to 60 mesh) | \$5.00 |

| ROUTINE SOURCE ROCK ANALYSES | UNIT PRICE |
|-------------------------------------|-------------------|
| % Carbonate | \$15.00 |
| LECO Total Organic Carbon (TOC) | \$35.00 |
| Rock-Eval Pyrolysis | \$40.00 |

| THERMAL MATURITY ANALYSES | UNIT PRICE |
|-----------------------------------|-------------------|
| Sample Prep (Kerogen Isolation) | \$80.00 |
| Vitrinite Reflectance (%Ro) | \$220.00 |
| Py/GCMS of the Aromatic Compounds | \$850.00 |

| DETAILED SOURCE ROCK AND OIL ANALYSES | UNIT PRICE |
|---------------------------------------------------------|-------------------|
| Quantitative Extraction for Extract GC (Dionex) | \$85.00 |
| Extraction (Soxlet) for LC, Biomarkers, Carbon Isotopes | \$155.00 |
| Whole Extract GC (C15+) | \$140.00 |
| High Resolution GC (Light Hydrocarbon method) | \$250.00 |
| High Temperature GC | \$500.00 |
| Liquid Chromatography (SARA) | \$115.00 |
| Mole Sieve | \$35.00 |
| Sat GCMS | \$385.00 |
| Aro GCMS | \$330.00 |
| Sat + Aro Carbon Isotopes | \$110.00 |
| API Gravity | \$25.00 |

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**GEO MARK PETROLEUM FLUID SERVICES LAB
MUD GAS ISOTOPE ANALYSES (MGIA) PRICE SCHEDULE**

GeoMark offers Mud Gas Isotope Analyses (MGIA) on a rapid turn-around basis, but does not charge for rush services. This bridges the gap between typically slow onshore laboratory operations and very costly offshore operations. Routine turn-around is between 12 & 36 hours. This provides data to the client well in advance of most downhole sampling schedules.

PRICES

Costs for sample containers, supplies and analytical procedures are provided below. A comprehensive data report is prepared at no charge. Integrated interpretive reports will be provided upon request.

ANALYSES

GeoMark's standard composition program involves the gas chromatographic measurement of the concentrations of nitrogen, carbon dioxide, methane, ethane, propane, iso and normal butane, iso and normal pentane, and hexane (and higher components if present). The carbon isotope analysis uses GC/IRMS to determine the $\delta^{13}\text{C}$ composition of methane to butane with sufficient concentration.

Mud Gas analytical charges are given on a per sample basis. These prices are also applicable to cuttings gases and flash gases from PVT samples.

| GAS COMPOSITION & ISOTOPIC ANALYSES | TOTAL |
|-------------------------------------------------|--------------|
| GC Composition to C6+ (PVT Quality GC Analysis) | \$100.00 |
| GCIRMS Methane Carbon Isotope Composition | \$100.00 |
| GCIRMS C2+ & Higher Carbon Isotope Compositons | \$200.00 |

SAMPLING

Sampling containers and a sample manifold can be supplied if needed. Sampling containers (IsoTubes) cost \$30.00 each. The sampling manifold can be purchased or rented.

The cost for sample containers and the well site sampling manifold (provided free if GeoMark is conducting analyses) are given below.

| GAS ISOTOPE SUPPLIES | TOTAL |
|---------------------------------------------|--------------|
| IsoTube Gas Containers (price per each) | \$25.00 |
| IsoJar Cuttings Contalners (price per each) | \$10.00 |
| Gas Isotope Sampling Manifold | \$1,000.00 |

SAMPLE TRANSPORTATION

Sample tubes can be transported by ground and air as long as DOT and IATA shipping regulations and protocols are followed. GeoMark can supply clients with shipping instructions and sample containers if needed.

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GEOMARK PETROLEUM FLUID SERVICES LAB PVT PRICE SCHEDULE

| SAMPLE HANDLING, RESTORATION AND RECOMBINATIONS | UNIT PRICE |
|-----------------------------------------------------------------|------------|
| Opening pressure at ambient temperature | \$75 |
| Sample restoration (agitation / heating for 4 hours) | \$150 |
| Sample restoration (agitation / heating for 24 hours) | \$225 |
| Sample restoration (agitation / heating for 5 days) | \$500 |
| Single Phase Sample transfer @ Tres/Tsep | \$400 |
| Solvent rinse of sample chamber | \$350 |
| Heated Blowdown of gas and oil samples at reservoir temperature | \$450 |
| Cold Blowdown and disposal of pressurized samples | \$300 |
| Preparation of synthetic separator gas for recombination | \$500 |
| Physical recombination of separator samples to given GOR | \$1,500 |
| Physical recombination of separator samples to given Psat | \$2,000 |

| SAMPLE EVALUATIONS AND COMPOSITIONAL ANALYSES | UNIT PRICE |
|----------------------------------------------------------------------------------------|------------|
| Single stage flash of sample for 3rd party geochem fluid prep (atmospheric conditions) | \$300 |
| Single stage flash of fluid sample (includes Density, GOR, FVF, API) | \$600 |
| C15+ Gas Analysis | \$200 |
| C30+ Liquid Analysis | \$450 |
| OBM Analyses for EOS Tuning (C30+ analysis, CCE, viscosities) | \$2,000 |
| OBM Contamination estimate and calculation of mud free API Gravity and GOR | \$200 |

| PVT ANALYSES | UNIT PRICE |
|---------------------------------------------------------------------------------------------|------------|
| Oil Constant Composition Expansion (CCE) with liquid volume measurements | \$1,500 |
| Gas Condensate Constant Composition Expansion (CCE) with liquid volume measurements | \$2,200 |
| Differential Liberation (DL): 6 to 8 pressure steps with gas and residual oil compositions | \$3,500 |
| Constant Volume Depletion (CVD): 8 to 12 steps with gas and residual liquid compositions | \$6,500 |
| Single-stage Separator Test with gas and residual oil composition (1stage + Stock Tank) | \$1,500 |
| Additional Separator Test stages with gas compositions | \$750 |
| Single-Phase fluid viscosity @ specified temperature & pressure (per measurement using EMV) | \$450 |
| Live Fluid viscosity profile (above and below Psat using EMV) | \$1,850 |

| STOCK TANK OIL AND CONDENSATE ANALYSES | UNIT PRICE |
|-----------------------------------------------------------------------------------------|----------------|
| API Gravity | \$50 |
| Water Content (Karl Fisher) | \$75 |
| Wax Content (UOP 46-64) | \$200 |
| Asphaltene Content (ASTM D-3279) | \$200 |
| SARA Analysis (Saturates, Aromatics, Resins, Asphaltenes) | \$950 |
| Cloud Point (Cross Polar Microscopy) | \$650 |
| Pour Point (ASTM D-97) | \$75 |
| Reid Vapor Pressure (ASTM D-323) | \$125 |
| Sulfur Content (X-Ray Fluorescence) | \$100 |
| Nickel and Vanadium Content | \$150 |
| Molecular Weight (Freezing Point Depression) | \$125 |
| Total Acid Number | \$125 |
| STO Viscosities @ 3 Temperatures | \$500 |
| STO Discount Package (all measurements in Stock Tank Oil and Condensate Section) | \$2,000 |

| WATER ANALYSES | UNIT PRICE |
|--------------------------------------------------------------------------|------------|
| Individual ions | \$90 |
| Standard water analysis including Anions, Cations, Resistivity, pH, etc. | \$450 |

| FLOW ASSURANCE ANALYSES - RESERVOIR FLUIDS | UNIT PRICE |
|---------------------------------------------------------------------------------------------|------------|
| Live Fluid Wax Appearance Temperatures by NIR at specified Pressure | \$2,500 |
| Live Fluid Asphaltene Onset Pressure by NIR at specified Temperature | \$2,500 |
| HT / HP filtration for quantification of asphaltenes | \$1,500 |
| Fluid compatibility test (test for asphaltene precipitation from titration) at P & T by NIR | \$3,000 |
| Hydrate Formation Locus (4 points) with fresh water | \$4,000 |

| EQUATION OF STATE MODELING SERVICES | UNIT PRICE |
|-------------------------------------------------------------------------------|------------|
| Prediction of decontaminated fluid properties from contaminated measured data | \$1,500 |
| Calculation of Gas Condensate surface yields from CVD data | \$750 |

Surcharges for H2S, Heavy Oils, etc. by Quotation

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