

General Services Administration  
Federal Supply Service  
Authorized Federal Supply Schedule Price List  
For  
LABORATORY TESTING AND ANALYSIS SERVICES



Pricelist is current through Modification AO01, dated 01/23/07  
FSC CLASS 8734  
NAICS Code: 541380, 541690  
Contract Number: GS-07F-6087P  
Contract Period: 09/13/04 through 09/13/09



6220 Culebra Road  
San Antonio, Texas 78238

Contracts Office: 210-522-2231  
Fax: 210-522-3559  
Email: [contract@swri.org](mailto:contract@swri.org)  
Website: [www.swri.org](http://www.swri.org)

Business Size: Large

Products and Ordering Information in this Authorized Professional Engineering Schedule Price List is also available on the GSA *Advantage!*™ System. Agencies can browse GSA *Advantage!*™ by accessing GSA's Home Page via Internet at [www.fss.gsa.gov](http://www.fss.gsa.gov)

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## **CUSTOMER ORDERING INFORMATION**

### **SPECIAL ITEM NUMBERS AWARDED ON THIS SCHEDULE**

- ❖ 873-1 Mechanical Testing Evaluation and Analysis
- ❖ 873-2 Chemical testing and Analysis Services
- ❖ 873-3 Electric Testing and Analysis Services
- ❖ 873-4 Geotechnical and Thermal/Fire Testing and Analysis
- ❖ 873-99 Introduction of New Testing and Analysis Services

### **PRIMARY DISCIPLINES AWARDED ON THIS SCHEDULE:**

- ❖ Laboratory Testing and Analysis Services

### **CONTRACTOR'S ORDERING ADDRESS:**

Southwest Research Institute  
6220 Culebra Road  
San Antonio, Texas 78238-5166

### **CONTRACTORS REMITTANCE ADDRESS:**

Southwest Research Institute  
P.O. Box 841671  
Dallas, Texas 75284-1671

**For information concerning SwRI's technical capabilities, general inquiries, including instructions on how to use the schedule, and submissions of statements of work, contact:**

Jo Ann Boyd  
Phone: (210) 522-2169  
Fax: (210) 522-2021  
Email: [jboyd@swri.org](mailto:jboyd@swri.org)

**For SwRI contracting information or to send an order, contact**

Joyce A. McCoig  
Contracts Department  
Phone: (210) 522-3711  
Fax: (210) 522-3559  
Email: [joyce.mccoig@swri.org](mailto:joyce.mccoig@swri.org)

## TERMS AND CONDITIONS

### 1a. **Table of Awarded Special Item Numbers (SINs)**

- 873-1 Mechanical Testing Evaluation and Analysis
- 873-2 Chemical Testing and Analysis Services
- 873-3 Electric Testing and Analysis Services
- 873-4 Geotechnical and Thermal/Fire Testing and Analysis
- 873-99 Introduction of New Testing and Analysis Services

**1b.** If the Contractor is proposing hourly rates, a description of all corresponding commercial job titles, experience, functional responsibility and education for those types of employees or subcontractors who will perform services shall be provided. If hourly rates are not applicable, indicate "Not Applicable" for this item. See Pricing Section.

### 2. **Maximum Order: \$100,000**

This maximum order is a dollar amount at which it is suggested that the ordering agency request higher discounts from the contractor before issuing the order. The contractor may:

- 1) Offer a new lower price,
- 2) Offer the lowest price available under the contract, or
- 3) Decline the order within five (5) days. In accordance with the Maximum Order provisions contained in the Schedule, a delivery order may be placed against the Schedule contract even though it exceeds the maximum order.

### 3. **Minimum Order: \$ 100.00**

### 4. **Geographic Coverage:** 50 United States and Washington DC, Puerto Rico & U.S. Territories

### 5. **Point(s) of Production (city, county and State or foreign country):** United States of America

### 6. **Basic Discount:** Prices shown are net; Discounts have been deducted

### 7. **Quantity Discounts:** None

### 8. **Prompt Payment Terms:** Net 30

### 9a. **Government Purchase Cards are accepted up to the micro-purchase threshold**

### 9b. **Government purchase cards are not accepted above the micro-purchase threshold**

- 10. Foreign Items: None**
- 11a. Time of delivery after receipt of Order (ARO): As negotiated**
- 11b. Expedited Delivery:** As negotiated
- 11c. Overnight and 2-Day Delivery:** Customer may call for availability and rates for overnight and 2-day delivery.
- 11d. Urgent Requirement:** Customers are encouraged to contact the contractor for the purpose of requesting accelerated delivery
- 12. FOB Point:** Destination
- 13a. Ordering Address:** Same as contractor
- 13b. Ordering Procedures:** For supplies and services, the ordering procedures, information on Blanket Purchase Agreements (BPA's), and a sample BPA can be found at the GSA/FSS Schedule homepage ([fss.gsa.gov/schedules](http://fss.gsa.gov/schedules)).
- 14. Payment Address:** Same as contractor
- 15. Warranty Provision:** Standard Commercial Warranty
- 16. Export Packaging Charges:** N/A
- 17. Terms and Conditions of government purchase card acceptance (any threshold above the micro-purchase level):** N/A
- 18. Terms and Conditions of Rental, Maintenance, and Repair:** N/A
- 19. Terms and Conditions of Installation:** N/A
- 20. Terms and Conditions of Repair parts indicating date of parts price lists and any discounts from list prices:** N/A
- 21. List of Services and Distribution points:** N/A
- 22. List of Participating Dealers:** N/A
- 23. Preventative Maintenance:** N/A

- 24a. Special attributes such as environmental attributes (recycled content, energy efficiency, and/or reduced pollutants):** N/A
- 24b. If applicable, indicate that section 508 compliance information is available on electronic and information technology (EIT) supplies and services and show where full details can be found (contractor website or other location>) the EIT standards can be found at:** [www.section508.gov/](http://www.section508.gov/): N/A
- 25. Data Universal Number System (DUNS) Number:** 007936842
- 26. Notification regarding registration in Central Contractor Registration (CCR) Database:** Registration Valid until 08/28/2008

## Customer (Agency) Ordering Procedures

### Introduction

GSA has established special ordering procedures for services that require a Statement of Work. These special ordering procedures take precedence over the procedures in FAR 8.404 (b)(2) through (b)(3).

GSA has determined that the prices for services contained in the contractor's price list applicable to this Schedule are fair and reasonable. However, the ordering office using this contract is responsible for considering the level of effort and mix of labor proposed to perform a specific task being ordered and for making a determination that the total firm-fixed price or ceiling price is fair and reasonable.

### Suggested Procedure

When ordering services, ordering offices shall—

#### 1. Prepare a Request for Quote

- A. A performance-based statement of work that outlines, at a minimum, the work to be performed, location of work, period of performance, deliverable schedule, applicable standards, acceptance criteria, and any special requirements (i.e., security clearances, travel, special knowledge, etc.) should be prepared.
- B. A request should be prepared which includes the performance based statement of work and request the contractors to submit either a firm-fixed price or a ceiling price to provide the services outlined in the statement of work. A firm-fixed price order shall be requested, unless the ordering office makes a determination that it is not possible at the time of placing the order to estimate accurately the extent or duration of the work or to anticipate cost with any reasonable degree of confidence. When such a determination is made, a labor hour or time-and-materials proposal may be requested. The firm-fixed price shall be based on the prices in the schedule contract and shall consider the mix of labor categories and level of effort required to perform the services described in the statement of work. The firm-fixed price of the order should also include any travel costs or other direct charges related to performance of the services ordered, unless the order provides for reimbursement of travel costs at the rates provided in the Federal Travel or Joint Travel Regulations. A ceiling price must be established for labor-hour and time-and-materials orders.
- C. The request may ask the contractors, if necessary or appropriate, to submit a project plan for performing the task, and information on the contractor's experience and/or past performance performing similar tasks.
- D. The request shall notify the contractors what basis will be used for selecting the contractor to receive the order. The notice shall include the basis for determining whether the contractors are technically qualified and provide an explanation regarding the intended use of any experience and/or past performance information in determining technical qualification of responses.

## 2. Transmit the Request to Contractors:

- A. Based upon an initial evaluation of catalogs and price lists; the ordering office should identify the contractors that appear to offer the best value (considering the scope of services offered, pricing and other factors such as contractors' locations, as appropriate).
- B. The request should be provided to three (3) contractors if the proposed order is estimated to exceed the micro-purchase threshold, but not exceed the maximum order threshold. For proposed orders exceeding the maximum order threshold, the request should be provided to additional contractors that offer services that will meet the agency's needs. Ordering offices should strive to minimize the contractors' costs associated with responding to requests for quotes for specific orders. Requests should be tailored to the minimum level necessary for adequate evaluation and selection for order placement. Oral presentations should be considered, when possible.

## 3. Evaluate Responses and Select the Contractor to Receive the Order:

After responses have been evaluated against the factors identified in the request, the order should be placed with the schedule contractor that represents the best value and results in the lowest overall cost alternative (considering price, special qualifications, administrative costs, etc) to meet the Governments needs.

### Blanket Purchase Agreements (BPAs):

The establishment of Federal Supply Schedule Blanket Purchase Agreements (BPAs) for recurring services is permitted when the procedures outlined herein are followed. All BPAs for services must define the services that may be ordered under the BPA, along with delivery or performance time frames, billing procedures, etc. The potential volume of orders under BPAs, regardless of the size of individual orders, may offer the ordering office the opportunity to secure volume discounts. When establishing BPAs, ordering offices shall—

Inform contractors in the request (based on the agency's requirement) if a single BPA or multiple BPAs will be established, and indicate the basis that will be used for selecting the contractors to be awarded the BPAs.

- A. **SINGLE BPA:** Generally, a single BPA should be established when the ordering office can define the tasks to be ordered under the BPA and establish a firm-fixed price or ceiling price for individual tasks or services to be ordered. When this occurs, authorized users may place the order directly under the established BPA when the need for service arises. The schedule contractor that represents the best value should be awarded the BPA. (See FAR 8.404)
- B. **MULTIPLE BPAs:** When the ordering office determines multiple BPAs are needed to meet its requirements, the ordering office should determine which contractors can meet any technical qualifications before establishing the BPAs. When multiple BPAs are established, the authorized users must follow the procedures in (a)(2)(ii) above and then place the order with the Schedule contractor that represents the best value.

**4. Review BPAs Periodically:**

Such reviews shall be conducted at least annually. The purpose of the review is to determine whether the BPA still represents the best value (considering price, special qualifications, administrative costs, etc) and results in the lowest overall cost alternative to meet the agency's needs.

**5. Small Business:**

The Ordering Office should give preference to small business concerns when two or more contractors can provide the services at the same firm-fixed price or ceiling price.

**USA COMMITMENT TO PROMOTE  
SMALL BUSINESS PARTICIPATION  
PROCUREMENT PROGRAMS**

PREAMBLE

(Name of Company) provides commercial products and services to the Federal Government. We are committed to promoting participation of small, small disadvantaged and women-owned small businesses in our contracts. We pledge to provide opportunities to the small business community through reselling opportunities, mentor-protégé programs, joint ventures, teaming arrangements, and subcontracting.

COMMITMENT

To actively seek and partner with small businesses.

To identify, qualify, mentor and develop small, small disadvantaged and women-owned small businesses by purchasing from these businesses whenever practical.

To develop and promote company policy initiatives that demonstrate our support for awarding contracts and subcontracts to small business concerns.

To undertake significant efforts to determine the potential of small, small disadvantaged and women-owned small business to supply products and services to our company.

To insure procurement opportunities are designed to permit the maximum possible participation of small, small disadvantaged, and women-owned small businesses.

To attend business opportunity workshops, minority business enterprise seminars, trade fairs, procurement conferences, etc., to identify and increase small businesses with whom to partner.

To publicize in our marketing publications our interest in meeting small businesses that may be interested in subcontracting opportunities.

We signify our commitment to work in partnership with small, small disadvantaged and women-owned small businesses to promote and increase their participation in Federal Government contracts. To accelerate potential opportunities please contact **Southwest Research Institute, Paul Easley, (210) 522- 3077; fax (210) 522-2262; peasley@swri.org**



BPA NUMBER \_\_\_\_\_

**(CUSTOMER NAME)  
BLANKET PURCHASE AGREEMENT**

Pursuant to GSA Federal Supply Schedule Contract Number(s) \_\_\_\_\_, Blanket Purchase Agreements, the Contractor agrees to the following terms of a Blanket Purchase Agreement (BPA) EXCLUSIVELY WITH (Ordering Agency):

(1) The following contract items can be ordered under this BPA. All orders placed against this BPA are subject to the terms and conditions of the contract, except as noted below:

MODEL NUMBER/PART NUMBER	*SPECIAL
BPA DISCOUNT/PRICE	

_____	_____
_____	_____
_____	_____

(2) Delivery:

DESTINATION	DELIVERY SCHEDULES / DATES
-------------	----------------------------

_____	_____
_____	_____
_____	_____

(3) The Government estimates, but does not guarantee, that the volume of purchases through this agreement will be \_\_\_\_\_.

(4) This BPA does not obligate any funds.

(5) This BPA expires on \_\_\_\_\_ or at the end of the contract period, whichever is earlier.

(6) The following office(s) is hereby authorized to place orders under this BPA:

OFFICE	POINT OF CONTACT
--------	------------------

_____	_____
_____	_____
_____	_____

(7) Orders will be placed against this BPA via Electronic Data Interchange (EDI), FAX, or paper.

(8) Unless otherwise agreed to, all deliveries under this BPA must be accompanied by delivery tickets or sales slips that must contain the following information as a minimum:

- (a) Name of Contractor;
- (b) Contract Number;
- (c) BPA Number;
- (d) Model Number or National Stock Number (NSN);
- (e) Purchase Order Number;
- (f) Date of Purchase;
- (g) Quantity, Unit Price, and Extension of Each Item (unit prices and extensions need not be shown when incompatible with the use of automated systems; provided, that the invoice is itemized to show the information); and
- (h) Date of Shipment.

(9) The requirements of a proper invoice are specified in the Federal Supply Schedule contract. Invoices will be submitted to the address specified within the purchase order transmission issued against this BPA.

(10) The terms and conditions included in this BPA apply to all purchases made pursuant to it. In the event of an inconsistency between the provisions of this BPA and the Contractor's invoice, the provisions of this BPA will take precedence.

## **BASIC GUIDELINES FOR USING “CONTRACTOR TEAM ARRANGEMENTS”**

Federal Supply Schedule Contractors may use “Contractor Team Arrangements” (see FAR 9.6) to provide solutions when responding to a customer agency requirements.

These Team Arrangements can be included under a Blanket Purchase Agreement (BPA). BPAs are permitted under all Federal Supply Schedule contracts.

Orders under a Team Arrangement are subject to terms and conditions of the Federal Supply Schedule Contract.

Participation in a Team Arrangement is limited to Federal Supply Schedule Contractors.

Customers should refer to FAR 9.6 for specific details on Team Arrangements.

Here is a general outline on how it works:

- The customer identifies their requirements.
- Federal Supply Schedule Contractors may individually meet the customer's needs, or -
- Federal Supply Schedule Contractors may individually submit a Schedules “Team Solution” to meet the customer's requirement.

Customers make a best value selection.

## A Brief History of SwRI

Southwest Research Institute (SwRI), headquartered in San Antonio, Texas, is one of the oldest and largest independent, nonprofit, applied research and development (R&D) organizations in the United States. Founded in 1947, SwRI provides contract research and development services to industrial and government clients. The Institute is governed by a board of directors, which is advised by approximately 100 trustees.

SwRI consists of 11 technical divisions that offer multidisciplinary, problem-solving services in a variety of areas in engineering and the physical sciences. Nearly 2,000 projects were active at the Institute at the close of fiscal year 2006. These projects were funded almost equally between the government and commercial sectors. SwRI's total revenue for this fiscal year was \$455 million. During 2006, SwRI provided \$5.2 million to fund innovative research through its internally sponsored R&D program.

A partial listing of research areas includes antennas and propagation; automation, robotics, and intelligent systems; avionics and support systems; bioengineering; chemistry and chemical engineering; communications systems; corrosion and electrochemistry; Earth and planetary sciences; emissions research; engineering mechanics; fire technology; fluid systems and machinery dynamics; and fuels and lubricants. Additional areas include geochemistry and mining engineering; hydrology and geohydrology; space science and engineering; materials sciences and fracture mechanics; modeling and simulation; nondestructive evaluation; oil and gas exploration; pipeline technology; surface modification and coatings; training systems and simulators; and vehicle, engine, and powertrain design, research, and development.

SwRI initiates contracts with clients based on initial consultations and prepares a formal proposal outlining the scope of work. As part of a long-held tradition, intellectual property rights arising from sponsored research at the Institute are often assigned to the client. SwRI generally retains the rights to Institute-funded advancements.

SwRI's headquarters occupy almost two million square feet of office and laboratory space on more than 1,200 acres in San Antonio. The Institute has technical offices and laboratories in Ann Arbor, Michigan; Boulder, Colorado; Fort Hood, Texas; Ogden, Utah; Huntsville, Alabama; Oklahoma City, Oklahoma; Panama City, Florida; Rockville, Maryland; Warner-Robins, Georgia; Beijing, China; and other locations. SwRI provides environmental monitoring expertise at munitions demilitarization sites at the Umatilla Army Depot at Hermiston, Oregon, and the Pine Bluff Chemical Depot at Pine Bluff, Arkansas.

At the close of fiscal year 2006, the staff numbered 3,019. This number includes professionals who hold 241 degrees at the doctorate level and 477 at the master's level. In 2006, staff members published 518 papers in the technical literature; made 439 presentations at technical conferences, seminars, and symposia around the world; submitted 77 invention disclosures; filed 87 patent applications; and received 45 patent awards. The Institute supports professional development of its staff through onsite technical and training courses and tuition reimbursement.

Southwest Research Institute holds more than 700 patents, has earned 30 R&D 100 awards, and has been inducted in the U.S. Space Foundation's Space Technology Hall of Fame. The staff is committed to quality improvement -- numerous departments and divisions have earned ISO certifications and accreditations. The Ford Motor Company has designated the Institute a Tier 1 product development engineering services supplier and has awarded the Institute its Q1 award. In 1999, the Institute received its second Department of Defense James S. Cogswell Outstanding Industrial Security Achievement Award.

## Laboratory Testing and Analysis Services Descriptions

Southwest Research Institute provides all resources including personnel, management, supplies, services, materials, equipment, facilities and transportation necessary to support and conduct a wide range of Professional Engineering Services. SwRI will provide the requisite mechanical and/or electrical technical and associated support expertise for the services specified, but not limited to, in the following SIN descriptions:

### **873-1 Mechanical Testing Evaluation and Analysis Services**

Services for mechanical testing and analysis include, but are not limited to, material strength testing (compression, ductility, fracture, fatigue, shear, torsion, and metallography); calibration and testing of mechanical equipment; acoustic/vibration testing (noise, shock resistance); hydraulic/pneumatic testing; Metrology (time, length, mass, volume, pressure, etc.); non-destructive evaluation (x-ray, radiographic, ultrasonic, leak); environmental simulation/climatic testing; forensic, failure analysis, and expert testimony; building and welding inspection (site monitoring, field surveys, quality assurance, certification; and related training.

### **873-2 Chemical Testing and Analysis Services**

Services for chemical testing and analysis include, but are not limited to, wet chemistry and associated physical tests; viscosity/density testing; electrochemistry testing; chromatography (GC, LC, SFC, SFE, HPLC, GS/MS, LC/MS, GPC, GFC, IC, column, thin layer, paper); spectroscopy (AA, FT-IR, UV/VIS, XRD, NMR, ICP, MS, fluorescence, Raman); thermal analysis (DSC, DTA, TGA, TMA); surface analysis/microscopy (SAM, SEM, TEM, SIMS, ion); Optic/photometry testing (appearance, color, reflectance, gloss, transmittance, luminance); occupational/drug testing (monitoring or measure employees exposure to hazardous substance abuse screening); biological testing (biochemical, toxicological, pharmacological, bacteriological); environmental and hazardous waste analysis (priority pollutants, pesticides, herbicides, metals, PCB's, petroleum); water analysis; food testing (taste, odor, texture); and related training.

### **873-3 Electrical Testing and Analysis Services**

Services for electrical testing and analysis include, but are not limited to, qualification, inspection, safety, performance, certification, and compliance testing of manufactured goods to nationally and internationally recognized reliability standards and regulatory requirements and directives (UL, CSA, FCC, ANSI, MIL-STD, etc.); marking services; circuit testing of semiconductors and microprocessors; EMI/EMC testing; dielectric strength and dielectric constant; dissipation factor; electrical insulating materials testing; electrostatic discharge testing; arc resistance testing; hi-pot testing, electrical power system components testing (transformers, dielectric oil, relays, circuit breakers, switchboards, power plants, substations, etc.) screening and destructive analysis of electronic components; and related training.

### **873-4 Geo-technical and Thermal/Fire Testing and Analysis Services**

Services for geophysical and thermal/fire testing and analysis include, but are not limited to, construction material testing (concrete, roof, asphalt, etc.); geological material testing (soil, rock, etc); geophysical testing; geosynthetic testing, seismographic testing, oceanographic testing;

metrological testing; thermal/heat testing (temperature, fire, flammability, smoke/toxicity, conductivity); and related training.

## **873-99 Introduction to New Services**

**Introduction of New Testing and Analysis Services** - Laboratory testing and analysis services not covered above include, but are not limited to, specialized or customized tests, telecom/datacom line and equipment testing and analysis; and mobile laboratory services. An example of the types of New Services SwRI can offer are:

### **Localized Corrosion Testing**

Multi-electrode Array Sensors (MAS) have been successfully used to monitor localized corrosion taking place in simulated cooling water, humid air, and under hygroscopic salt deposits. The MAS provides a unique method to determine localized corrosion rate under atmospheric conditions, as well as in various environments such as seawater, fuel tanks, and lap joints. It can also be used to determine the susceptibility of a material for microbiologically influenced corrosion. The MAS sensor can be capable of determining the corrosivity of vehicle washdown fluids.

### **Condition-Based Coating Degradation Testing**

The coating degradation sensor is a unique tool used to measure the early stages of paint and coating degradation. It can be used to rate paint and coating quality rapidly.

### **Environmental Performance of Materials Testing**

Within the Environmental Performance of Materials section, SwRI® has the ability to design and fabricate flowing mixed gas systems in order to control the gaseous environment around mechanical test specimens. This allows the study of atmospheric variables (relative humidity, gaseous concentration, salt deposits, and temperature) on the mechanical behavior of materials.

The Environmental Performance of Materials section has capabilities to study the effect of radiation on the corrosion rate of various alloys.

Electrochemical techniques are used to directly measure the effect of radiation on the electronic surface properties of protective oxide films and how changes in these properties relate to corrosion.

### **Locomotive and Marine Diesel Emissions Testing**

Locomotive and marine diesel engine emissions testing are performed within the Engine, Emissions, and Vehicle Research Division of Southwest Research Institute. The SwRI Locomotive Technology Center (LTC) has extensive exhaust emission testing capabilities. The LTC provides a centralized location, direct access to a Class 1 railroad main line, two EPA-capable locomotive emissions test tracks, and a full-time professional staff experienced in locomotive exhaust emissions testing.

The SwRI LTC is located in San Antonio, Texas. This facility was established in cooperation with the Association of American Railroads (AAR) in 1992. SwRI has performed over 160 locomotive exhaust emission tests at this Center, in projects for EPA, CARB, the locomotive manufacturers, engine component suppliers, the AAR, and for individual railroads.

SwRI's Locomotive Technology Center is equipped with two test tracks, each capable of performing locomotive exhaust emissions testing as specified by EPA in 40 CFR, Part 92. With a full time staff of ten, SwRI routinely performs locomotive exhaust emission tests in support of EPA certification. Capabilities include an external load grid which will be necessary for testing switcher locomotives that are not capable of self-load operation. All of the emissions measurement equipment is compatible with SwRI's Department of Engine and Emissions Research (DEER), and as such, the LTC calls upon the 140-person DEER staff for instrumentation repair and calibration support. The LTC senior staff has over 60 man-years of experience in performing locomotive exhaust emissions tests. SwRI technical staff members permanently assigned to the LTC has many additional man-years of experience in locomotive exhaust emissions testing. In addition, both professional and technical staff has attended locomotive OEM training schools on locomotives and locomotive engines. LTC technical staff members are part of the SwRI Department of Engine and Emissions Research, and are qualified engine operators, gaseous emissions cart operators, and PM sampling specialists. All LTC staff participates in regularly scheduled safety and technical training programs within the DEER and SwRI.

SwRI has extensive in "Locomotive and Marine Diesel Emissions Testing" and sufficiently meets the requirements of GSA SIN 873-99.

## APPENDIX A

# DIVISION OVERVIEW AND LABOR CATEGORY DESCRIPTIONS

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S O U T H W E S T R E S E A R C H I N S T I T U T E

# Chemistry & Chemical Engineering

The Chemistry and Chemical Engineering Division performs research and technical services for industrial and government clients using chemistry and chemical engineering technology. Some of the disciplines covered in the division are environmental engineering evaluations; chemical and process engineering; microencapsulation of substances to achieve a variety of targeted goals; polymer and material sciences; chemical demilitarization investigations; fire protection, certification, and testing services; and analytical services including analysis of any sample in any matrix, drug metabolism investigations, and method development component. SwRI's Chemistry and Chemical Engineering Division is ISO 9001:2000 registered.

- Microencapsulation, Nanomaterials and Process Engineering Department
  - Chemical Engineering
  - Depaint Test Center (Warner Robins, GA)
  - Chemical and Pharmaceutical Synthesis
  - Microencapsulation and Drug Delivery
  - Material Development
  
- Analytical and Environmental Chemistry Department
  - Bioanalytical Chemistry and Environmental Health
  - Quality Assurance
  - Organic
  - Inorganics/Radiochemistry
  
- Environmental and Demilitarization Technology Department
  - Environmental Engineering and Monitoring
  - Demilitarization Laboratory Support
  - Umatilla Chemical Agent Disposal Facility
  - Pine Bluff Chemical Agent Disposal Facility
  
- Fire Technology Department
  - Fire Resistance Testing
  - Material Flammability Testing
  - Engineering and Research Services
  - Listing, Labeling, and Follow-Up Inspection Services

## Chemistry &amp; Chemical Engineering Division

**Administrative Assistant**

**QUALIFICATIONS:** In general, the administrative assistant will have mastered all tasks required for lower-level administrative support functions. He or she must have demonstrated knowledge of internal processes of the Institute, especially those that relate to the department activities. He or she should have a thorough knowledge of correspondence protocol, modern office management practices and principles, computer software, Institute and division policies and procedures, and the ability to interpret them to individuals who inquire. He or she should have the ability to work independently in the absence of specific instructions on a number of tasks with a high degree of speed in the organizational skills. He or she should be able to reflect the supervisor's characteristic responses to management problems, maintain effective relations with clients and staff, exercise confidentiality and discretion, manage subordinate staff, and orchestrate the calendar of supervisors to meet management demands as required. He or she should satisfy typing, spelling, and error detection test requirements. Existing staff should have a high school education or equivalent with ten years experience in lower-level administrative support functions. Ten to twelve years of outside experience in related areas are required for new employees. Continuing education to maintain a high level of current knowledge and skill is necessary.

**RESPONSIBILITIES:** Administrative assistants are senior administrative support positions in most departments and usually report to the department director. Individuals at this level have widely varying tasks depending on the organization of the department or division. The tasks normally include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle nonroutine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**Administrative Coordinator**

**QUALIFICATIONS:** A thorough knowledge of the internal processes of the Institute and correspondence protocols as well as being completely skilled in providing secretarial software support to others. The Administrative Coordinator must have the ability to administer and supervise subordinate staff, organize meetings, make travel arrangements, deal effectively with clients and prepare original correspondence for approval. Very good communication and interpersonal skills are necessary at this level.

**RESPONSIBILITIES:** Responsibilities include preparation of management accounting data for project operations. This work includes tracking of project measurables, ensuring correct application of project time and material charges.

**Clerk 2**

**QUALIFICATIONS:** Knowledge of tasks and technical terminology associated with their work area and standard office procedures and equipment; have ability to maintain confidential

## Chemistry & Chemical Engineering Division

information; use common word processing, database, and spreadsheet software. A high school education or equivalent with one to two years of experience is required.

**RESPONSIBILITIES:** Typing correspondence, reports, and tabular data from handwritten drafts, dictation or electronic media, editing for spelling, punctuation, and grammar. Performs routine assigned activities such as monitoring and re-ordering inventory items to maintain desired levels, making travel arrangements, executing billing documents and monitoring multi-line telephone systems. Reproduces, binds, and processes reports as directed in written or verbal instructions. Records data as directed in particular programs and provides word processing or typing support to secretarial staff in the completion of correspondence or program deliverables.

### Clerk 3

**QUALIFICATIONS:** Knowledge of tasks and technical terminology associated with their work area and standard office procedures and equipment; have ability to maintain confidential information; use common word processing, database, and spreadsheet software. Capability to handle increasing specialized tasks independently with minimal supervision. Good oral and written communication skills. A high school education or equivalent with one to two years of experience is required.

**RESPONSIBILITIES:** Acts on own initiative within defined responsibility to carry out routine tasks and procedures particular to group activities. Compiles analyzes, and organizes data into format requested by client or as directed by program managers for efficient support. Maintains hard copy or electronic-based system of documents, files, and other materials used in the work area. Supervises and trains subordinates within delegated authority.

### Executive Assistant

**QUALIFICATIONS:** The Executive Assistant will have mastered all tasks required for less senior positions plus a minimum of 12 years of total relevant experience. They will have demonstrated a thorough knowledge of the internal processes relative to the officer's responsibility. Proper correspondence protocol in relation to officer's status, corporate policies and procedures, and the functions of groups within the cost center, Institute policies and procedures relative to the field and current knowledge of specialties, customers, and Institute personnel staff. Individuals must be able to work independently with minimal direction on complex assignments, respond in the officer's characteristic manner on day-to-day management problems, interact effectively with clients, exercise strict confidentiality and discretion, and assist the officer in management of his or her time.

**RESPONSIBILITIES:** Responsibilities include using judgment and knowledge of corporate officer in determining necessity of involvement in particular matter, settles issues independently within level of vested authority, or refers matters requiring action to others. Interacts with clients, Institute staff, within delegated limits, give information or initiate action on behalf of the officer. Reviews incoming correspondence for appropriate personal action, referral to other staff or preparation for action of corporate officer.

## Chemistry &amp; Chemical Engineering Division

## Secretary

**QUALIFICATIONS:** The ability to supervise and coordinate the activities of subordinate clerical staff and be fully effective as the senior administrative assistant person within their section or unit. They are responsible for training subordinate staff, advising management on various requirements of the section, and ensuring that administrative support skills keep up with current technology. Good communications and interpersonal skills are required. Validated tests are given to determine knowledge and skills.

**RESPONSIBILITIES:** Develops deliverables documentation working from rough drafts. Provides administrative support to project team. Tracks deliverable items to ensure timely delivery. Checks and reviews project time sheets for correctness. Checks all documentation for errors and completeness.

## Senior Coordinator

**QUALIFICATIONS:** Senior Coordinators have widely varying tasks to include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle nonroutine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**RESPONSIBILITIES:** The senior coordinator's position is responsible for anticipating supervisor's need for information and collecting, analyzing, and organizing the information as necessary. They also serve as an advisor to administrative support staff within subordinate departments and provide career guidance to junior AS staff. Uses judgment in determining supervisor level of involvement in matters related to the work group. Meet and deal with clients, staff, etc., and in the supervisor's absence, may, within delegated limits, give information or initiate action on behalf of the supervisor.

## Senior Secretary

**QUALIFICATIONS:** Seven years experience in an administrative support position. A high school degree or equivalent with a combination of 7 to 9 years of continuing education and related experience. Demonstrate specialized and well-developed clerical and administrative skills; handle routine tasks using personal judgment and discretion with minimal supervision as well as independent special assignments. Interacts directly with upper level management and external clients. Administratively supervise clerical staff in completion of assigned duties.

**RESPONSIBILITIES:** Prepares all project documentation for large projects. Handles notifications of contract modifications. Editorialize engineering reports and coordinates written correspondence with the client. Prepares and formats graphics, spreadsheets, and other complete media aspects of project documentation. Handles project related travel arrangements. Facilitates communications between clients and Institute technical staff. Mentors junior clerical staff on project related work.

## Chemistry &amp; Chemical Engineering Division

## Director

**QUALIFICATIONS:** Ability to successfully build a program and lead research personnel at all levels. Engineering or science degree appropriate for specific activity. Completion of supervisory training programs and university-level management courses or other similar training. Leads in successful promotion and execution of technical programs and planning for future program development and resource needs. Establishes methodologies to improve work practices for improved efficiency, promotion and conduct of business. Directly responsible for planning, organizing, and managing work of a research department. Leads research and development and testing activities.

**RESPONSIBILITIES:** Technical review of all deliverables, serves as management oversight for larger projects handling the technical and business functions of the project. Organize and integrate personnel, sometimes from several Divisions often including subcontractors. Is the liaison with the client on technical and business matters related to the projects. Exhibits outstanding management, communication, technical and interpersonal skills.

## Group Leader

**QUALIFICATIONS:** Group Leaders will have demonstrated excellent interpersonal skills including verbal and written communication abilities as well as success in building research programs or in the successful supervision of sizable laboratory, testing activities or projects. Individuals also have the capability and aptitude for leading others and administering to their needs. A Bachelor's degree in engineering or science and 5 years of technical experience is required.

**RESPONSIBILITIES:** Responsibilities include coordination of activities of project managers for projects within his or her responsibility, management of large or complex programs. Exercises technical leadership, promotes innovation in project performance and proposed investigation and acts for the Manager in his or her absence.

## Manager

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required.

Excellent verbal, written, and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs.

Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

## Chemistry &amp; Chemical Engineering Division

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical, and interpersonal skills.

## Supervisor

**QUALIFICATIONS:** Individual should have demonstrated technical competence in the activity he or she will supervise. Interpersonal skills and leadership ability appropriate to supervisory level should also be demonstrated. Individual should have completed the Institute supervisory management-training program during their tenure. A high school degree, or equivalent, with relevant technical experience is desired. An Associate's degree in the related field is desirable. Appropriate technical qualifications such as a journeyman rating in a craft specialization are also considered equivalent.

**RESPONSIBILITIES:** Assigns work to individuals under area of responsibility and evaluates work performance. Maintains discipline of the assigned personnel in accordance with delegated authority and/or applicable work rules. Assists subordinates in resolving work- and personnel-related problems. Assists in the selection of and employment of new staff members. Assists in training and provides coaching and guidance on individual development of subordinates. Maintains adequate records to support personnel actions. Maintains personnel performance and attendance records. Implements applicable Institute policies. On own initiative, or on request, analyzes section activities for possible improvement and recommends changes. Maintains productivity and output records, and reports to management according to established standards.

## Engineer

**QUALIFICATIONS:** The engineer must have completed a four-year college degree from an accredited university in an engineering discipline. Professional engineering registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations within the Chemistry Department as assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assist in the preparation, presentation, and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

## Chemistry &amp; Chemical Engineering Division

**Institute Scientist**

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assist in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

**Principal Engineer**

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition within the Chemistry Department. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design, development, installation, testing, and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and

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facilitates technical engineering related communications with the client where relevant. Acts as technical specialist for projects or project tasks.

## Principal Scientist

**QUALIFICATIONS:** Incumbent is a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research, proposal efforts, preparation, presentation, and follow-up of large proposals. In addition, the individual is a resource in program development efforts, a contributor to and director of presenting research and development efforts to clients and the professional community, and conducts advanced research leading to publication and peer review in periodicals. The principal level employee must have satisfied the senior research requirements and have five years of experience at the SE-3 level at the Institute or comparable experience with another organization. An advanced degree in a technical field is highly desirable. Individuals should also have led instruction in one of the technical or program/project management courses offered by the Institute and/or have taught a university-level technical course.

**RESPONSIBILITIES:** Accomplishes advanced scientific and engineering work within organizational activity and discipline, increasingly recognized as highly qualified in research specialty and possesses similar reputation with clients and the professional community. Takes the lead in expanding new technologies by contributing to department and division programs development activities and contributes motivating ideas to new programs. Supervise, advises and mentors less experienced technical staff.

## Research Engineer

**QUALIFICATIONS:** A research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work within the Chemistry Department involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure.

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Develops proficiency in writing and verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate on technical committees.

### Research Scientist

**QUALIFICATIONS:** The research scientist must have completed a four-year college degree from an accredited university in a scientific discipline, and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** The research scientist positions are important to the technical staff in their contribution to the accomplishment of specific tasks in research, development, and test projects. The research scientist is distinguished from entry level by having obtained significant experience-based competence in research and development activities, including technical contributions to projects, analyses of research and development objectives for proposals and projects, and effective contributions to proposals, as well as the ability to establish performance objectives for themselves and others and manage a project phase. Emphasis at this level is on the development of skills as a fully competent project team member, the development of individual technical specializations, and the development of abilities to innovatively support technical objectives. The research scientist performs work involving conventional investigations within a science specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific theories, concepts, and techniques and for which precedents have been established. He or she conducts process and analytical studies and models scientific phenomenon and problems.

### Scientist

**QUALIFICATIONS:** The scientist must have completed a four-year college degree from an accredited university in an scientific discipline. Professional scientific registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assist in the preparation, presentation, and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in

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the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

### Senior Research Engineer

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work within the Chemistry Department to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

### Senior Research Scientist

**QUALIFICATIONS:** Five years scientific experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

### Staff Scientist

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external

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community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required.

### Senior Specialist

**QUALIFICATIONS:** Five to seven years in a Specialist Support position. A four-year degree in a relevant field and five years of directly applicable experience is necessary. Completion of promotion/project management courses or advanced degree in field of specialization desirable. Specialized senior-level skills in specific area. Supervise effectively, coordinate and manage special projects and have superior communication and interpersonal skills. Provide expert independent advice to senior management. Supervises and trains subordinate staff.

**RESPONSIBILITIES:** Responsible for control of classified document inventory for individual projects. Must have a security clearance from the specific project sponsors at the highest level of classified material held by the project. Maintains a log of incoming and outgoing documents. Documents may arrive via courier; via the US mail system or the secure facsimile system. Maintains a log of SwRI generated classified material. Assures the proper wrapping and marking as well as transmission means is used when sending out classified material.

### Specialist

**QUALIFICATIONS:** A Specialist must have knowledge of: advanced systems, applications of new technology in their field of specialization, project management, performance and reports, and application of modern PC-based software for use in their activity. Must have the ability to supervise subordinate staff, conduct technical sessions, communicate with clients concerning project activities, write and present materials effectively, act independently to solve problems, and promote project work to clients. Individuals should have a Bachelor's degree from an accredited university with two to seven years experience in their field of specialization or equivalent knowledge and expertise obtained through on-the-job experience. Professional certification in a field such as that obtained by a Certified Public Accountant may be necessary.

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**RESPONSIBILITIES:** The specialist provides significant contributions for the accomplishments of specific tasks within both project and support assignments. Project assignments normally involve design, development, testing, or administration and delivery of discrete systems processes or products comprised of components or technology that are well established. The configuration of the final deliverable may be unique to meet client's specifications and have sophisticated technical components but usually does not involve original engineering or scientific design. Specialists employed in support assignments provide services in such areas as project and division administration, safety, security, publications, accounting, personnel, and contracts. Persons providing services at the specialist level have specialized skills and knowledge in their specific area of activity and often provide expert consultant services to management and division staff. The specialist independently conducts conventional investigations in field of specialization; composes or contributes to technical correspondence reports and peer review papers; develops and promotes (or assists with such activities) proposal efforts for new or follow-on projects; analyzes, designs, develops, and delivers programs for clients; and applies recent PC software technology to satisfy complex program assignments; work may require advanced knowledge of applications of certain software.

### Student Assistant

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and is currently enrolled or intending to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

### Student Engineer

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

### Student Scientist

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

### Student Technician

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and is currently enrolled or intending to remain enrolled in school.

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**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Engineering Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Within the Chemistry Department, takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Laboratory Assistant

**QUALIFICATIONS:** Ability to learn to perform the particular job; knowledge of general technical area and materials and equipment such as hand tools and cleaning fluids; ability to use PC. Ability to follow instructions; work interpersonally as a member of a group; practice regular attendance during a normal eight-hour work day and forty-hour work week as required; perform routine duties as directed; lift heavy objects; perform under adverse conditions; work shifts and overtime as required; drive Institute vehicle. High school or equivalent education is required and zero to one year of related experience. Validated tests are given to determine level of knowledge and skill in particular field.

**RESPONSIBILITIES:** Incumbents in this position are entry-level, nonexempt technical support personnel providing support to the scientific and engineering and more senior technical support staff. Most positions required on-the-job training to learn specific job requirements. This position begins the career progression for staff who are initially expected to accomplish relatively simple and routine laboratory and outdoor tasks under close supervision.

## QA Technician

**QUALIFICATIONS:** Incumbent should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to generate reports and to store and retrieve data; inventory maintenance, and

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ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. For new employees, a high school or equivalent education and a combination of one to five years continuing education, or trade school and/or related experience is required. An Associate's Degree may be required. Validated tests are given to demonstrate level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Primary duty is quality assurance. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance on equipment, vehicles, etc. following established schedules and procedures. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

## Research Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Within the Chemistry Department, takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Senior Engineering Technologist

**QUALIFICATIONS:** Incumbents must have knowledge of current technology associated with field of specialization, ability to mentor subordinate staff, and ability to write and present technical publications to groups of peers. 20 years of prior experience or demonstrated equivalent experience, knowledge, and ability. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of

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design requirements and the evaluation of systems for the Chemistry Department. Conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget. Designs and develops new procedures to address particular needs of clients or industry as a whole. Prepares reports following program guidelines using PC-based applications and directs activities of clerical or subordinate staff in completion of large program reporting requirements.

### Senior Research Technologist

**QUALIFICATIONS:** Incumbents must have the knowledge to manage programs successfully, knowledge of current technology associated with the field of specialization, ability to mentor subordinate staff, ability to write and present technical publications to groups of peers, and ability to market programs. Incumbent should have 20 years of prior experience in TS-1 through TS-5 positions or have demonstrated equivalent experience, knowledge, and ability. A newly hired staff member should have a high school or equivalent education, a combination of 20 years of continuing education and/or related experience, or a Bachelor's degree in technology from an accredited university with five to 10 years of experience in the field of specialization.

**RESPONSIBILITIES:** Within the Chemistry Department, conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within proposed budget. Designs and develops new laboratory procedures to address particular needs of clients or industry as a whole. Mentors and supervises subordinate staff in the location of technical activities. Advises scientific and engineering staff in field of specialization.

### Senior Technician

**QUALIFICATIONS:** Incumbent should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedures peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical support, design, and fabrication of engineering and scientific testing apparatus; test data manipulation; and maintenance and repair of specialized equipment. They should also have the ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. An Associate's degree is preferred at this level. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test setup or procedures.

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**Staff Technician**

**QUALIFICATIONS:** Ten years experience in a technical support position. High school or equivalent education and a combination of 10-15 years of continuing education or trade school and/or related experience. An Associate's degree is highly desired. Possess in-depth skills and expertise in a specialty field and provides key support to scientific and engineering and project personnel. Performs independent tasks with minimum supervision. Supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, management and supervisors.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. Designs and builds special test fixturing. Works independently to obtain data or construct special test apparatus based on instructions from engineering staff. May write standard test reports or input sections to larger reports.

**Technician**

**QUALIFICATIONS:** Incumbent should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to generate reports and to store and retrieve data; inventory maintenance, and ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. For new employees, a high school or equivalent education and a combination of one to five years continuing education, or trade school and/or related experience is required. An Associate's Degree may be required. Validated tests are given to demonstrate level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Sets up experimental apparatus following written or verbal instructions or graphic representations of desired testing environment; prepares samples, specimens, and test materials following defined procedures. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance on equipment, vehicles, etc. following established schedules and procedures. Fabricates equipment and testing apparatus components following blueprints, engineering schematics, equipment manuals, handwritten or drawn notes, and performs simple design tasks as directed by supervisor. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

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# Engine, Emissions & Vehicle Research

The Engine, Emissions and Vehicle Research Division conducts design, development, and test programs on a wide range of components, engines, transmissions, and vehicles. This is supported by research and modeling of fuel mixing, combustion, tribology, filtration, structural analysis, NVH, and fluid flow analysis. The division organizes multi-client cooperative industry research programs in many areas to help manufacturers achieve lower exhaust emissions and to increase fuel economy. The division also develops specialized instruments, control systems, test apparatus, and data acquisition systems to aid in achieving engine and vehicle performance and emissions goals.

The Engine, Emissions and Vehicle Research Division and Fuels and Lubricants Division are certified to ISO 9001:2000 "Quality Management Systems - Requirements" and ISO 14001:1996 "Environmental Management Systems." The Engine and Emissions Research Department is accredited to ISO/IEC 17025:1999 "General Requirements for the Competence of Testing and Calibration Laboratories." The division has also achieved Ford Tier 1 status for providing engineering services and has received the Ford Q1 Quality Award.

- Engine and Emissions Research Department
  - Research
    - Diesel Engines
    - Aftertreatment R&D
    - Advanced Combustion and Emissions
    - Powertrain Controls
    - Heavy-Duty Technology Assessment
  - Development
    - Certification, Audit and Compliance
    - Light-Duty and Unregulated Emissions
    - Engine Design
    - Gas and Large Engine Development
    -
- Department of Vehicle Systems Research
  - Advanced Vehicle Technology
  - Contamination Research
  - Drive train Engineering
  - Filtration and Fine Particle Technology
  - Hydraulic and Fuel Systems Development

## Chemistry &amp; Chemical Engineering Division

**Administrative Coordinator**

**QUALIFICATIONS:** A thorough knowledge of the internal processes of the Institute and correspondence protocols as well as being completely skilled in providing secretarial software support to others. The Administrative Coordinator must have the ability to administer and supervise subordinate staff, organize meetings, make travel arrangements, deal effectively with clients and prepare original correspondence for approval. Very good communication and interpersonal skills are necessary at this level.

**RESPONSIBILITIES:** Responsibilities include preparation of management accounting data for project operations. This work includes tracking of project measurables, ensuring correct application of project time and material charges.

**Clerk 2**

**QUALIFICATIONS:** Knowledge of tasks and technical terminology associated with their work area and standard office procedures and equipment; have ability to maintain confidential information; use common word processing, database, and spreadsheet software. A high school education or equivalent with one to two years of experience is required.

**RESPONSIBILITIES:** Typing correspondence, reports, and tabular data from handwritten drafts, dictation or electronic media, editing for spelling, punctuation, and grammar. Performs routine assigned activities such as monitoring and re-ordering inventory items to maintain desired levels, making travel arrangements, executing billing documents and monitoring multi-line telephone systems. Reproduces, binds, and processes reports as directed in written or verbal instructions. Records data as directed in particular programs and provides word processing or typing support to secretarial staff in the completion of correspondence or program deliverables.

**Clerk 3**

**QUALIFICATIONS:** Knowledge of tasks and technical terminology associated with their work area and standard office procedures and equipment; have ability to maintain confidential information; use common word processing, database, and spreadsheet software. Capability to handle increasing specialized tasks independently with minimal supervision. Good oral and written communication skills. A high school education or equivalent with one to two years of experience is required.

**RESPONSIBILITIES:** Acts on own initiative within defined responsibility to carry out routine tasks and procedures particular to group activities. Compiles analyzes, and organizes data into format requested by client or as directed by program managers for efficient support. Maintains hard copy or electronic-based system of documents, files, and other materials used in the work area. Supervises and trains subordinates within delegated authority.

## Chemistry &amp; Chemical Engineering Division

**Executive Assistant**

**QUALIFICATIONS:** The Executive Assistant will have mastered all tasks required for less senior positions plus a minimum of 12 years of total relevant experience. They will have demonstrated a thorough knowledge of the internal processes relative to the officer's responsibility. Proper correspondence protocol in relation to officer's status, corporate policies and procedures, and the functions of groups within the cost center, Institute policies and procedures relative to the field and current knowledge of specialties, customers, and Institute personnel staff. Individuals must be able to work independently with minimal direction on complex assignments, respond in the officer's characteristic manner on day-to-day management problems, interact effectively with clients, exercise strict confidentiality and discretion, and assist the officer in management of his or her time.

**RESPONSIBILITIES:** Responsibilities include using judgment and knowledge of corporate officer in determining necessity of involvement in particular matter, settles issues independently within level of vested authority, or refers matters requiring action to others. Interacts with clients, Institute staff, within delegated limits, give information or initiate action on behalf of the officer. Reviews incoming correspondence for appropriate personal action, referral to other staff or preparation for action of corporate officer.

**Secretary**

**QUALIFICATIONS:** The ability to supervise and coordinate the activities of subordinate clerical staff and be fully effective as the senior administrative assistant person within their section or unit. They are responsible for training subordinate staff, advising management on various requirements of the section, and ensuring that administrative support skills keep up with current technology. Good communications and interpersonal skills are required. Validated tests are given to determine knowledge and skills.

**RESPONSIBILITIES:** Develops deliverables documentation working from rough drafts. Provides administrative support to project team. Tracks deliverable items to ensure timely delivery. Checks and reviews project time sheets for correctness. Checks all documentation for errors and completeness.

**Senior Secretary**

**QUALIFICATIONS:** Seven years experience in an administrative support position. A high school degree or equivalent with a combination of 7 to 9 years of continuing education and related experience. Demonstrate specialized and well-developed clerical and administrative skills; handle routine tasks using personal judgment and discretion with minimal supervision as well as independent special assignments. Interacts directly with upper level management and external clients. Administratively supervise clerical staff in completion of assigned duties.

**RESPONSIBILITIES:** Prepares all project documentation for large projects. Handles notifications of contract modifications. Editorialize engineering reports and coordinates written correspondence with the client. Prepares and formats graphics, spreadsheets, and other

## Chemistry &amp; Chemical Engineering Division

complete media aspects of project documentation. Handles project related travel arrangements. Facilitates communications between clients and Institute technical staff. Mentors junior clerical staff on project related work.

## Assistant Director

**QUALIFICATIONS:** Assistant Directors have excellent verbal, written and interpersonal communication skills as well as proven success in leading others and administering their technical and professional needs. A Bachelor's degree in engineering or science appropriate for the department's activities and relevant management training course work or experience is required.

**RESPONSIBILITIES:** Responsibilities include technical review of deliverables, management oversight for larger projects handling the technical and business functions of the project. Organize and integrate personnel, sometimes from several Divisions, including subcontractors.

## Director

**QUALIFICATIONS:** Ability to successfully build a program and lead research personnel at all levels. Engineering or science degree appropriate for specific activity. Completion of supervisory training programs and university-level management courses or other similar training. Leads in successful promotion and execution of technical programs and planning for future program development and resource needs. Establishes methodologies to improve work practices for improved efficiency, promotion and conduct of business. Directly responsible for planning, organizing, and managing work of a research department. Leads research and development and testing activities.

**RESPONSIBILITIES:** Performs technical review of all project deliverables, serves as management oversight for larger projects handling the technical and business functions of the project. Organize and integrate personnel, sometimes from several Divisions often including subcontractors. Is the liaison with the client on technical and business matters related to the projects. Exhibits outstanding management, communication, technical and interpersonal skills.

## Group Leader

**QUALIFICATIONS:** Group Leaders will have demonstrated excellent interpersonal skills including verbal and written communication abilities as well as success in building research programs or in the successful supervision of sizable laboratory, testing activities or projects. Individuals also have the capability and aptitude for leading others and administering to their needs. A Bachelor's degree in engineering or science and 5 years of technical experience is required.

**RESPONSIBILITIES:** Responsibilities include coordination of activities of project managers for projects within his or her responsibility, management of large or complex programs. Exercises technical leadership, promotes innovation in project performance and proposed investigation and acts for the Manager in his or her absence.

## Chemistry &amp; Chemical Engineering Division

## Manager

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required. Excellent verbal, written, and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs. Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical, and interpersonal skills.

## Program Manager

**QUALIFICATIONS:** Will have demonstrated the capability to successfully promote and lead projects of significant scope and complexity involving several divisions and clients and multi-disciplinary teams. A Bachelor's degree in a technical field is required. Outstanding organizational, management, communications, technical, and interpersonal skills are essential.

**RESPONSIBILITIES:** Provides ideas for large project promotion in area of specialty based on interaction with clients or potential clients and leads in the promotion of these projects in coordination with Institute and division management and senior staff. Manages large multi-disciplinary and multi-divisional projects. Promotes development of multi-client programs. Commands a thorough knowledge of the Institute and industrial and U.S. government contracting procedures, rules, and regulations.

## Supervisor

**QUALIFICATIONS:** Individual should have demonstrated technical competence in the activity he or she will supervise. Interpersonal skills and leadership ability appropriate to supervisory level should also be demonstrated. Individual should have completed the Institute supervisory management-training program during their tenure. A high school degree, or equivalent, with relevant technical experience is desired. An Associate's degree in the related field is desirable. Appropriate technical qualifications such as a journeyman rating in a craft specialization are also considered equivalent.

**RESPONSIBILITIES:** Assigns work to individuals under area of responsibility and evaluates work performance. Maintains discipline of the assigned personnel in accordance with delegated authority and/or applicable work rules. Assists subordinates in resolving work- and personnel-related problems. Assists in the selection of and employment of new staff members. Assists in training and provides coaching and guidance on individual development of subordinates. Maintains adequate records to support personnel actions. Maintains personnel performance and attendance records. Implements applicable Institute policies. On own initiative, or on request,

## Chemistry &amp; Chemical Engineering Division

analyzes section activities for possible improvement and recommends changes. Maintains productivity and output records, and reports to management according to established standards.

## Engineer

**QUALIFICATIONS:** The engineer must have completed a four-year college degree from an accredited university in an engineering discipline. Professional engineering registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assists in the preparation, presentation, and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

## Institute Engineer

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of

## Chemistry & Chemical Engineering Division

high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assists in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

### Principal Engineer

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design, development, installation, testing, and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and facilitates technical engineering related communications with the client where relevant. Acts as technical specialist for projects or project tasks.

### Research Analyst

**QUALIFICATIONS:** Research Analyst must have completed a four-year college degree in a scientific, technical or engineering discipline and have two years technical experience or its equivalent. A Master's Degree plus one year of experience, or a Doctorate with no experience is considered equivalent. Demonstrated a meaningful level of technical accomplishments. Completion of SwRI promotion and project management courses desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within a science or engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity.

## Chemistry &amp; Chemical Engineering Division

## Research Assistant

**QUALIFICATIONS:** Qualifications include in-depth knowledge of scientific, technical, and other principles, practices, and procedures that are common to their field of specialty. Able to assist in the development of new or advanced testing systems; have the ability to supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, and management and supervisors. A high school or equivalent education and 10 to 15 years of related experience. An Associate's degree is highly desirable.

**RESPONSIBILITIES:** Works on limited segments, components, or parts of development projects. Interacts with senior staff and clients in discussion of current tests or future activities. Provides input to technical reports, proposals, and procedures. Consults with scientists, engineers, and other senior-level staff in technical field of specialization.

## Research Engineer

**QUALIFICATIONS:** A research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure. Develops proficiency in writing and verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate on technical committees.

## Chemistry &amp; Chemical Engineering Division

**Research Scientist**

**QUALIFICATIONS:** The research scientist must have completed a four-year college degree from an accredited university in a scientific discipline, and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** The research scientist positions are important to the technical staff in their contribution to the accomplishment of specific tasks in research, development, and test projects. The research scientist is distinguished from entry level by having obtained significant experience-based competence in research and development activities, including technical contributions to projects, analyses of research and development objectives for proposals and projects, and effective contributions to proposals, as well as the ability to establish performance objectives for themselves and others and manage a project phase. Emphasis at this level is on the development of skills as a fully competent project team member, the development of individual technical specializations, and the development of abilities to innovatively support technical objectives. The research scientist performs work involving conventional investigations within a science specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific theories, concepts, and techniques and for which precedents have been established. He or she conducts process and analytical studies and models scientific phenomenon and problems.

**Senior Research Engineer**

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

**Senior Research Scientist**

**QUALIFICATIONS:** Five years scientific experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a

## Chemistry & Chemical Engineering Division

technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

### Staff Scientist

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required. Regularly collaborates with others in the external professional community.

### Senior Technical Specialist

**QUALIFICATIONS:** Incumbents must have knowledge of current technology associated with field of specialization, ability to mentor subordinate staff, and ability to write and present technical publications to groups of peers. 20 years of prior experience or demonstrated equivalent experience, knowledge, and ability. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

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**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems. Conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget. Designs and develops new procedures to address particular needs of clients or industry as a whole. Prepares reports following program guidelines using PC-based applications and directs activities of clerical or subordinate staff in completion of large program reporting requirements.

## Engine Operator

**QUALIFICATIONS:** Engine Operators have knowledge of tasks associated with the operation of internal combustion engines, specialized test and measurement equipment, application of mathematical functions, use of a PC to generate reports and to store and retrieve data. They have knowledge of supply inventory, routine engine maintenance, reading and following written work instructions. A high school or equivalent education and some mechanical training or experience is required.

**RESPONSIBILITIES:** Responsibilities include operation of all types of production and prototype internal combustion engines, including gasoline, diesel, and alternative fueled engines. They perform engine maintenance such as oil and filter changes, record test data using a PC or logbook. They maintain a safe and clean work environment.

## Engineering Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Chemistry &amp; Chemical Engineering Division

## Research Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Senior Technician

**QUALIFICATIONS:** Incumbents should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedure peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical support, design, and fabrication of specialized equipment. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test set-up or procedures. Selects testing set-up and operates test equipment to record data by hand or ensures automated retrieval of data output. Performs routine analysis to check applicability, accuracy, and reasonableness of data. They should also have the ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff.

## Staff Drafter

**QUALIFICATIONS:** Qualifications include in-depth knowledge of scientific, technical, and other principles, practices, and procedures that are common to their field of specialty. Able to assist in the development of new or advanced testing systems; have the ability to supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, and

## Chemistry & Chemical Engineering Division

management and supervisors. A high school or equivalent education and 10 to 15 years of related experience. An Associate's degree is highly desirable.

**RESPONSIBILITIES:** Works on limited segments, components, or parts of development projects. Interacts with senior staff and clients in discussion of current tests or future activities. Provides input to technical reports, proposals, and procedures. Consults with scientists, engineers, and other senior-level staff in technical field of specialization. Innovates new techniques, procedures, and designs for particular tests or systems within area of specialization.

### Staff Technician

**QUALIFICATIONS:** Individuals should have in-depth knowledge of scientific, technical, and other principals, practices, and procedures that are common to their field of specialty. They should remain aware of changes in technology and the application thereof; be able to assist in the development of new or advanced testing systems; communicate effectively verbally and in writing with clients, peers, and management and supervisors. A high school or equivalent education and a combination of 10-15 years of continuing education or trade school and/or related experience. Possess in-depth skills and expertise in a specialty field and provides key support to scientific and engineering and project personnel. Performs independent tasks with minimum supervision. Supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, management and supervisors.

**RESPONSIBILITIES:** Works on limited segments, components, or parts of development projects. Interacts with senior staff and clients in discussion of current tests or future activities. Provides input to technical reports, proposals, and procedures. Consults with scientists, engineers, and other senior-level staff in technical field of specialization. Innovates new techniques, procedures, and designs for particular tests or systems within area of specialization. Controls the quality of fabrication and design work of subordinate staff within field of specialization.

### Technician

**QUALIFICATIONS:** Incumbent should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to generate reports and to store and retrieve data; inventory maintenance, and ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. For new employees, a high school or equivalent education and a combination of one to five years continuing education, or trade school and/or related experience is required. An Associate's Degree may be required for some positions at this level.

**RESPONSIBILITIES:** Sets up experimental apparatus following written or verbal instructions or graphic representations of desired testing environment; prepares samples, specimens, and test materials following defined procedures. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured

## Chemistry &amp; Chemical Engineering Division

by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance on equipment, vehicles, etc. following established schedules and procedures. Fabricates equipment and testing apparatus components following blueprints, engineering schematics, equipment manuals, handwritten or drawn notes, and performs simple design tasks as directed by supervisor. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

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# Aerospace Electronics & Information Technology

The Aerospace Electronics and Information Technology Division is an electronics and computer engineering-oriented organization serving the needs of industry and government agencies through aerospace technology transfer. The division combines extensive hardware and software design activities with a comprehensive systems engineering program. In addition, a broad range of services is available to help clients produce, operate, and manage systems through effective training, supply, transportation, distribution, testing, maintenance, repair, and other logistics support functions.

- Avionics and Support Systems Department
  - Integrated Diagnostics
  - Aircraft Systems Integration
  - Aerospace Engineering
  
- Electronics Integration and Information Technology Department
  - Engineering Services
  - Automatic Test Equipment
  - Large-Scale Database Development
  - Reliability and Maintainability Improvements
  - Software Development
  - Program Development and Operations
  
- System Design and Engineering Department
  - Aerospace Systems Engineering
  
- Aerospace Engineering Department
  - Unmanned Systems and Sensors
  - Avionics and Control Systems

## Aerospace Electronics and Information Technology Division

**Administrative Assistant**

**QUALIFICATIONS:** In general, the administrative assistant will have mastered all tasks required for lower-level administrative support functions. He or she must have demonstrated knowledge of internal processes of the Institute, especially those that relate to the department activities. He or she should have a thorough knowledge of correspondence protocol, modern office management practices and principles, computer software, Institute and division policies and procedures, and the ability to interpret them to individuals who inquire. He or she should have the ability to work independently in the absence of specific instructions on a number of tasks with a high degree of speed in the organizational skills. He or she should be able to reflect the supervisor's characteristic responses to management problems, maintain effective relations with clients and staff, exercise confidentiality and discretion, manage subordinate staff, and orchestrate the calendar of supervisors to meet management demands as required. He or she should satisfy typing, spelling, and error detection test requirements. Existing staff should have a high school education or equivalent with ten years experience in lower-level administrative support functions. Ten to twelve years of outside experience in related areas are required for new employees. Continuing education to maintain a high level of current knowledge and skill is necessary.

**RESPONSIBILITIES:** Administrative assistants are senior administrative support positions in most departments and usually report to the department director. Individuals at this level have widely varying tasks depending on the organization of the department or division. The tasks normally include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle nonroutine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**Manager**

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required.

Excellent verbal, written, and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs.

Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical, and interpersonal skills.

## Aerospace Electronics and Information Technology Division

## Analyst

**QUALIFICATIONS:** Analyst must have completed a four-year college degree from an accredited university in a technical discipline. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine technical investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interacts with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assists in the preparation, presentation and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contracts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

## Principal Analyst

**QUALIFICATIONS:** Five years analyst experience or comparable work experience. An advanced degree in a technical field desirable. Led program/project management courses or taught a university-level technical course. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Provides high-level analytical efforts to support requirement in development and design, provides guidance to junior staff in selection of hardware and system design including requirements definition, planning designs, development, installation, testing, and scheduling. Provides input into configuration management and documentation for design related work. Leads project teams in the analysis aspects of the technical work. Coordinates and facilitates technical software related communications with the client where relevant.

## Principal Engineer

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional

## Aerospace Electronics and Information Technology Division

experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition within the Chemistry Department. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design, development, installation, testing, and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and facilitates technical engineering related communications with the client where relevant. Acts as technical specialist for projects or project tasks.

## Research Analyst

**QUALIFICATIONS:** Research Analyst must have completed a four-year college degree in a scientific, technical or engineering discipline and have two years technical experience or its equivalent. A Master's Degree plus one year of experience, or a Doctorate with no experience is considered equivalent. Demonstrated a meaningful level of technical accomplishments. Completion of SwRI promotion and project management courses desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within a science or engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity.

## Research Engineer

**QUALIFICATIONS:** A research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work within the Chemistry Department involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software.

## Aerospace Electronics and Information Technology Division

Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure. Develops proficiency in writing and verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate on technical committees.

## Senior Research Analyst

**QUALIFICATIONS:** Senior Research Analysts must have satisfied all of the research engineer requirements and have at least five years of research engineer level experience at the Institute, or comparable work experience including successful project management, successful proposal preparation, and marketing activities. Completion of the SwRI promotion and project management courses and an advanced degree in a technical field are highly desirable.

**RESPONSIBILITIES:** Provides analytical efforts to support requirements in development and design. Provides guidance to junior staff in selection of hardware and system design including requirements definition, planning designs, development, installation, testing and scheduling. Performs configuration management and documentation for design related work. Leads project teams in the analysis aspects of the technical work. Coordinates and facilitates technical software related communications with the client.

## Senior Research Engineer

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work within the Chemistry Department to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

## Aerospace Electronics and Information Technology Division

## Student Assistant

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Student Engineer

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Engineering Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Within the Chemistry Department, takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Senior Engineering Technologist

**QUALIFICATIONS:** Incumbents must have knowledge of current technology associated with field of specialization, ability to mentor subordinate staff, and ability to write and present technical publications to groups of peers. 20 years of prior experience or demonstrated equivalent experience, knowledge, and ability. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

## Aerospace Electronics and Information Technology Division

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems for the Chemistry Department. Conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget. Designs and develops new procedures to address particular needs of clients or industry as a whole. Prepares reports following program guidelines using PC-based applications and directs activities of clerical or subordinate staff in completion of large program reporting requirements.

## Senior Technician

**QUALIFICATIONS:** Incumbent should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedures peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical support, design, and fabrication of engineering and scientific testing apparatus; test data manipulation; and maintenance and repair of specialized equipment. They should also have the ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. An Associate's degree is preferred at this level. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test setup or procedures.

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# Automation & Data Systems

The Automation and Data Systems Division provides engineering services in the definition, development, and maintenance of complex systems and equipment for government and industry. The staff of 100 electrical, industrial, and mechanical engineers, computer scientists, and support staff form multidisciplinary teams to provide technological solutions for commercial and military problems. The state of the art in design aids, laboratory instrumentation, and test equipment are provided in extensive facilities to aid the engineering services provided to clients.

- Manufacturing Systems Department
  - Automation Engineering
  - Computer-Aided Design and Drafting
  
- Communications Engineering Department
  - Communications Systems
  - RF Engineering
  - Electromagnetic Compatibility Research (EMCR)
  
- Software Engineering Department
  - Embedded Systems Software
  - Intelligent Transportation Systems
  - Medical Information Technology
  - Modeling and Simulation
  
- Bioengineering Department
  - Interventional Systems
  - Diagnostic Systems
  
- Industrial Engineering
  - Special Programs
  - Texas Manufacturing Assistance Center (TMAC)

## Chemistry &amp; Chemical Engineering Division

**Administrative Assistant**

**QUALIFICATIONS:** In general, the administrative assistant will have mastered all tasks required for lower-level administrative support functions. He or she must have demonstrated knowledge of internal processes of the Institute, especially those that relate to the department activities. He or she should have a thorough knowledge of correspondence protocol, modern office management practices and principles, computer software, Institute and division policies and procedures, and the ability to interpret them to individuals who inquire. He or she should have the ability to work independently in the absence of specific instructions on a number of tasks with a high degree of speed in the organizational skills. He or she should be able to reflect the supervisor's characteristic responses to management problems, maintain effective relations with clients and staff, exercise confidentiality and discretion, manage subordinate staff, and orchestrate the calendar of supervisors to meet management demands as required. He or she should satisfy typing, spelling, and error detection test requirements. Existing staff should have a high school education or equivalent with ten years experience in lower-level administrative support functions. Ten to twelve years of outside experience in related areas are required for new employees. Continuing education to maintain a high level of current knowledge and skill is necessary.

**RESPONSIBILITIES:** Administrative assistants are senior administrative support positions in most departments and usually report to the department director. Individuals at this level have widely varying tasks depending on the organization of the department or division. The tasks normally include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle non-routine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**Director**

**QUALIFICATIONS:** Ability to successfully build a program and lead research personnel at all levels. Engineering or science degree appropriate for specific activity. Completion of supervisory training programs and university-level management courses or other similar training. Leads in successful promotion and execution of technical programs and planning for future program development and resource needs. Establishes methodologies to improve work practices for improved efficiency, promotion and conduct of business. Directly responsible for planning, organizing, and managing work of a research department. Leads research and development and testing activities.

**RESPONSIBILITIES:** Technical review of all deliverables, serves as management oversight for larger projects handling the technical and business functions of the project. Organize and integrate personnel, sometimes from several Divisions often including subcontractors. Is the liaison with the client on technical and business matters related to the projects. Exhibits outstanding management, communication, technical and interpersonal skills.

## Chemistry &amp; Chemical Engineering Division

## Manager

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required.

Excellent verbal, written, and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs.

Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical, and interpersonal skills.

## Program Manager

**QUALIFICATIONS:** Will have demonstrated the capability to successfully promote and lead projects of significant scope and complexity involving several divisions and clients and multi-disciplinary teams. A Bachelor's degree in a technical field is required. Outstanding organizational, management, communications, technical, and interpersonal skills are essential.

**RESPONSIBILITIES:** Provides ideas for large project promotion in area of specialty based on interaction with clients or potential clients and leads in the promotion of these projects in coordination with Institute and division management and senior staff. Manages large multi-disciplinary and multi-divisional projects. Promotes development of multi-client programs. Commands a thorough knowledge of the Institute and industrial and U.S. government contracting procedures, rules, and regulations.

## Analyst

**QUALIFICATIONS:** Analyst must have completed a four-year college degree from an accredited university in a technical discipline. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine technical investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interacts with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assists in the

## Chemistry &amp; Chemical Engineering Division

preparation, presentation and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contracts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

## Engineer

**QUALIFICATIONS:** The engineer must have completed a four-year college degree from an accredited university in a scientific, technical, or engineering discipline. Professional engineering registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**GENERAL DESCRIPTION:** The SE-1 position is entry-level for technical personnel who must have the ability and expertise to understand complex technical instructions from senior staff in developing information systems. Requires the ability to read and understand technical documentation and data, and transfer data to hardware/software design.

**REPRESENTATIVE FUNCTIONS:** An individual at the SE-1 level performs the following functions:

- Assists research staff in performing studies, engineering and evaluation of technical systems in his/her area of expertise.
- Has entry level knowledge and expertise in design technology.
- Develops and prepares technical documentation and reports for delivery to client.
- Performs technical evaluation of products.
- Develops reports and technical summaries for review by senior staff or clients.

## Institute Engineer

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in

## Chemistry &amp; Chemical Engineering Division

the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assists in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

## Principal Analyst

**QUALIFICATIONS:** Five years analyst experience or comparable work experience. An advanced degree in a technical field desirable. Led program/project management courses or taught a university-level technical course. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Provides high-level analytical efforts to support requirement in development and design, provides guidance to junior staff in selection of hardware and system design including requirements definition, planning designs, development, installation, testing, and scheduling. Provides input into configuration management and documentation for design related work. Leads project teams in the analysis aspects of the technical work. Coordinates and facilitates technical software related communications with the client where relevant.

## Principal Engineer

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable. Extraordinary experience and accompanying knowledge and capability in technology, project promotion, and management. Specialization in technical creativity, functional expertise and contributions of technical and business goals. Accomplishes advanced scientific and engineering work within organization activity and discipline; recognized as highly qualified in a research specialty and possess similar reputation with clients and the professional community. Supervises, advises, and mentors less experienced technical staff.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition within the Chemistry Department. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design,

## Chemistry &amp; Chemical Engineering Division

development, installation, testing, and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and facilitates technical engineering related communications with the client where relevant. Acts as technical specialist for projects or project tasks.

## Research Analyst

**QUALIFICATIONS:** Research Analyst must have completed a four-year college degree in a scientific, technical or engineering discipline and have two years technical experience or its equivalent. A Master's Degree plus one year of experience, or a Doctorate with no experience is considered equivalent. Demonstrated a meaningful level of technical accomplishments. Completion of SwRI promotion and project management courses desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within a science or engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity.

## Research Engineer

**QUALIFICATIONS:** A research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work within the Chemistry Department involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure. Develops proficiency in writing and verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals

## Chemistry &amp; Chemical Engineering Division

regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate on technical committees.

## Senior Research Analyst

**QUALIFICATIONS:** Senior Research Analysts must have satisfied all of the research engineer requirements and have at least five years of research engineer level experience at the Institute, or comparable work experience including successful project management, successful proposal preparation, and marketing activities. Completion of the SwRI promotion and project management courses and an advanced degree in a technical field are highly desirable.

**RESPONSIBILITIES:** Provides analytical efforts to support requirements in development and design. Provides guidance to junior staff in selection of hardware and system design including requirements definition, planning designs, development, installation, testing and scheduling. Performs configuration management and documentation for design related work. Leads project teams in the analysis aspects of the technical work. Coordinates and facilitates technical software related communications with the client.

## Senior Research Engineer

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work within the Chemistry Department to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

## Senior Research Scientist

**QUALIFICATIONS:** Five years scientific experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as

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project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

## Systems Analyst

**QUALIFICATIONS:** Research Analyst must have completed a four-year college degree in a scientific, technical or engineering discipline and have two years technical experience or its equivalent. A Master's Degree plus one year of experience, or a Doctorate with no experience is considered equivalent. Demonstrated a meaningful level of technical accomplishments. Completion of SwRI promotion and project management courses desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within a science or engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity.

## Senior Technical Specialist

**QUALIFICATIONS:** Incumbents must have knowledge of current technology associated with field of specialization, ability to mentor subordinate staff, and ability to write and present technical publications to groups of peers. 20 years of prior experience or demonstrated equivalent experience, knowledge, and ability. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems. Conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget. Designs and develops new procedures to address particular needs of clients or industry as a whole. Prepares reports following program guidelines using PC-based applications and directs activities of clerical or subordinate staff in completion of large program reporting requirements.

## Student Assistant

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and is currently enrolled or intending to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Chemistry &amp; Chemical Engineering Division

## Student Engineer

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Designer

**QUALIFICATIONS:** Designers must have knowledge of advanced systems, applications of new technology in the field of their specialization, project management, performance and reports, and application of PCs for use in program work. Must have the ability to supervise subordinate staff, conduct technical sessions, effectively communicate with clients concerning project activity, write and present materials effectively, and act independently to solve problems. Individual promoted from TS-4 should have performed satisfactorily in TS-1 through TS-4 functions for 15 years or have demonstrated equivalent experience, knowledge, and ability. A newly hired staff member should have a high school or equivalent education, a combination of 15 to 20 years of continuing education, or trade school and/or related experience, or a Bachelor's degree from an accredited university with zero to five years of experience in the field of specialization.

**RESPONSIBILITIES:** Independently conducts conventional investigations in field of specialization. Develops and promotes proposal efforts for new or follow-up projects. Designs specialized testing apparatus or test equipment to satisfy parameters established by an Institute client. Prepares testing specifications and inspection standards. Provides appropriate liaison with clients on project work or as a phase manager with reporting responsibilities to a project.

## Engineering Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Within the Chemistry Department, takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish

## Chemistry &amp; Chemical Engineering Division

primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Senior Designer

**QUALIFICATIONS:** The senior designer must have the knowledge to manage programs successfully, knowledge of current technology associated with the field of specialization, ability to mentor subordinate staff, ability to write and present technical publications to groups of peers, and ability to market programs. He or she should have 20 years of prior experience in technical support positions or have demonstrated equivalent experience, knowledge, and ability. A newly hired staff member should have a high school or equivalent education, a combination of 20 years of continuing education and/or related experience, or a Bachelor's degree in technology from an accredited university with five to 10 years of experience in the field of specialization.

**RESPONSIBILITIES:** The senior designer conducts scientific and engineering research and development in field of specialization; develops and writes proposals and coordinates proposal team efforts in response to client requests to perform work; manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget; designs and develops new laboratory procedures to address particular needs of clients or industry as a whole; prepares reports following program guidelines using PC-based applications and/or directs activities of clerical or subordinate staff in completion of large program reporting requirements; and writes and presents technical papers to peers in field of specialization.

## Senior Engineering Technologist

**QUALIFICATIONS:** Incumbents must have knowledge of current technology associated with field of specialization, ability to mentor subordinate staff, and ability to write and present technical publications to groups of peers. 20 years of prior experience or demonstrated equivalent experience, knowledge, and ability. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems for the Chemistry Department. Conducts scientific and engineering research and development in field of specialization. Manages project work tasks and fiscal monitoring to assure the timely completion of work within projected budget. Designs and develops new procedures to address particular needs of clients or industry as a whole. Prepares reports following program guidelines using PC-based applications and directs activities of clerical or subordinate staff in completion of large program reporting requirements.

## Senior Technician

**QUALIFICATIONS:** Incumbent should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedures peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical

## Chemistry & Chemical Engineering Division

support, design, and fabrication of engineering and scientific testing apparatus; test data manipulation; and maintenance and repair of specialized equipment. They should also have the ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. An Associate's degree is preferred at this level. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test setup or procedures.

### Staff Drafter

**QUALIFICATIONS:** Qualifications include in-depth knowledge of scientific, technical, and other principles, practices, and procedures that are common to their field of specialty. Able to assist in the development of new or advanced testing systems; have the ability to supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, and management and supervisors. A high school or equivalent education and 10 to 15 years of related experience. An Associate's degree is highly desirable.

**RESPONSIBILITIES:** Works on limited segments, components, or parts of development projects. Interacts with senior staff and clients in discussion of current tests or future activities. Provides input to technical reports, proposals, and procedures. Consults with scientists, engineers, and other senior-level staff in technical field of specialization. Innovates new techniques, procedures, and designs for particular tests or systems within area of specialization.

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# Applied Physics

The Applied Physics Division conducts research and development in disciplines such as advanced electronic and microelectronic devices and systems, unique power supplies and sources, special-purpose voice and data communications equipment, and mechanical systems. Staff members have extensive experience in sensor and sensor system development, optic and electro-optic system development, and infrared signature modeling and analysis. The division also houses experts in geophysical modeling and data processing techniques and in nondestructive evaluation tools such as cylindrically guided waves, ultrasonic and eddy current technology, and magnetostrictive sensor technology.

- Electronics Systems and Robotics Department
  - Hardware Design and Construction
  - Powerline Systems Data Collection, Analysis, and Modeling
  - Hardware and Component Analysis
  - Laser and Electro-Optics Applications
  - Engineering and Logistics Support
  - Small Robotic Vehicle Evaluation and Applications
  - Earth Characterization and Geophysical Measurements
  - Antenna Design and Fabrication
  - Electromagnetic Modeling
- Electromechanical and Optical Systems Department
  - Packaging and Rapid Prototyping
  - Special Mechanical Systems
  - Microelectromechanical Systems
- Engineering Applications and Systems Development Department
  - Advanced Systems Engineering
  - Audio Systems
  - Software Development
- Sensor Systems and Nondestructive Evaluation (NDE) Technology Department
  - Nondestructive Evaluation Engineering Applications
  - Sensors and Sensor Systems
  - Process Monitoring Technologies

## Chemistry &amp; Chemical Engineering Division

**Administrative Assistant**

**QUALIFICATIONS:** In general, the administrative assistant will have mastered all tasks required for lower-level administrative support functions. He or she must have demonstrated knowledge of internal processes of the Institute, especially those that relate to the department activities. He or she should have a thorough knowledge of correspondence protocol, modern office management practices and principles, computer software, Institute and division policies and procedures, and the ability to interpret them to individuals who inquire. He or she should have the ability to work independently in the absence of specific instructions on a number of tasks with a high degree of speed in the organizational skills. He or she should be able to reflect the supervisor's characteristic responses to management problems, maintain effective relations with clients and staff, exercise confidentiality and discretion, manage subordinate staff, and orchestrate the calendar of supervisors to meet management demands as required. He or she should satisfy typing, spelling, and error detection test requirements. Existing staff should have a high school education or equivalent with ten years experience in lower-level administrative support functions. Ten to twelve years of outside experience in related areas are required for new employees. Continuing education to maintain a high level of current knowledge and skill is necessary.

**RESPONSIBILITIES:** Administrative assistants are senior administrative support positions in most departments and usually report to the department director. Individuals at this level have widely varying tasks depending on the organization of the department or division. The tasks normally include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle nonroutine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**Secretary**

**QUALIFICATIONS:** The ability to supervise and coordinate the activities of subordinate clerical staff and be fully effective as the senior administrative assistant person within their section or unit. They are responsible for training subordinate staff, advising management on various requirements of the section, and ensuring that administrative support skills keep up with current technology. Good communications and interpersonal skills are required. Validated tests are given to determine knowledge and skills.

**RESPONSIBILITIES:** Develops deliverables documentation working from rough drafts. Provides administrative support to project team. Tracks deliverable items to ensure timely delivery. Checks and reviews project time sheets for correctness. Checks all documentation for errors and completeness.

**Senior Secretary**

**QUALIFICATIONS:** Seven years experience in an administrative support position. A high school degree or equivalent with a combination of 7 to 9 years of continuing education and

## Chemistry & Chemical Engineering Division

related experience. Demonstrate specialized and well-developed clerical and administrative skills; handle routine tasks using personal judgment and discretion with minimal supervision as well as independent special assignments. Interacts directly with upper level management and external clients. Administratively supervise clerical staff in completion of assigned duties.

**RESPONSIBILITIES:** Prepares all project documentation for large projects. Handles notifications of contract modifications. Editorialize engineering reports and coordinates written correspondence with the client. Prepares and formats graphics, spreadsheets, and other complete media aspects of project documentation. Handles project related travel arrangements. Facilitates communications between clients and Institute technical staff. Mentors junior clerical staff on project related work.

## Manager

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required.

Excellent verbal, written, and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs.

Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical, and interpersonal skills.

## Engineer

**QUALIFICATIONS:** The engineer must have completed a four-year college degree from an accredited university in an engineering discipline. Professional engineering registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or a manager. Prepares written reports of work for presentation to clients. Assists in the preparation, presentation, and follow-up of research proposals. Provides work instruction to

## Chemistry &amp; Chemical Engineering Division

technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

## Institute Scientist

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assists in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

## Principal Engineer

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design, development, installation, testing,

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and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and facilitates technical engineering related communications with the client where relevant. Acts as technical specialist for projects or project tasks.

## Principal Scientist

**QUALIFICATIONS:** Incumbent is a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research, proposal efforts, preparation, presentation, and follow-up of large proposals. In addition, the individual is a resource in program development efforts, a contributor to and director of presenting research and development efforts to clients and the professional community, and conducts advanced research leading to publication and peer review in periodicals. The principal level employee must have satisfied the senior research requirements and have five years of experience at the SE-3 level at the Institute or comparable experience with another organization. An advanced degree in a technical field is highly desirable. Individuals should also have led instruction in one of the technical or program/project management courses offered by the Institute and/or have taught a university-level technical course.

**RESPONSIBILITIES:** Accomplishes advanced scientific and engineering work within organizational activity and discipline, increasingly recognized as highly qualified in research specialty and possesses similar reputation with clients and the professional community. Takes the lead in expanding new technologies by contributing to department and division programs development activities and contributes motivating ideas to new programs. Supervise, advises and mentors less experienced technical staff.

## Research Engineer

**QUALIFICATIONS:** Research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major

## Chemistry &amp; Chemical Engineering Division

projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure. Develops proficiency in writing and verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate no technical committees.

## Research Scientist

**QUALIFICATIONS:** The research scientist must have completed a four-year college degree from an accredited university in a scientific discipline, and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** The research scientist positions are important to the technical staff in their contribution to the accomplishment of specific tasks in research, development, and test projects. The research scientist is distinguished from entry level by having obtained significant experience-based competence in research and development activities, including technical contributions to projects, analyses of research and development objectives for proposals and projects, and effective contributions to proposals, as well as the ability to establish performance objectives for themselves and others and manage a project phase. Emphasis at this level is on the development of skills as a fully competent project team member, the development of individual technical specializations, and the development of abilities to innovatively support technical objectives. The research scientist performs work involving conventional investigations within a science specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific theories, concepts, and techniques and for which precedents have been established. He or she conducts process and analytical studies and models scientific phenomenon and problems.

## Scientist

**QUALIFICATIONS:** The scientist must have completed a four-year college degree from an accredited university in an scientific discipline. Professional scientific registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, procedures, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys ad experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced

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researcher or a manager. Prepares written reports of work for presentation to clients. Assists in the preparation, presentation, and follow-up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the Institute in order to help develop collaborative research efforts and maintain professional awareness. Establishes and maintains professional society contacts.

### Senior Research Engineer

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements, and evaluation of system. Manages small to medium size projects. Mentors junior staff and leads small technical teams in finding solutions to client posed technical problems.

### Senior Research Scientist

**QUALIFICATIONS:** Five years scientific experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

### Staff Engineer

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external

## Chemistry & Chemical Engineering Division

community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required.

## Engineering Technologist

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a Bachelor's degree with zero to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently supervising junior technical staff in accomplishing the laboratory aspects of a project including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

## Laboratory Assistant

**QUALIFICATIONS:** A temporary employee employed in an internship and/or coop relationship and who is currently or intending to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Chemistry &amp; Chemical Engineering Division

## Senior Engineering Technologist

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems. Manages small to medium size projects. Mentors junior staff and leads small technical teams in finding solutions to client posed technical problems.

## Senior Technician

**QUALIFICATIONS:** Incumbent should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedures peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical support, design, and fabrication of engineering and scientific testing apparatus; test data manipulation; and maintenance and repair of specialized equipment. They should also have the ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. An Associate's degree is preferred at this level. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test setup or procedures.

## Staff Scientist

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

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**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required.

### Staff Technician

**QUALIFICATIONS:** Ten years experience in a technical support position. High school or equivalent education and a combination of 10-15 years of continuing education or trade school and/or related experience. An Associate's degree is highly desired. Possess in-depth skills and expertise in a specialty field and provides key support to scientific and engineering and project personnel. Performs independent tasks with minimum supervision. Supervise and train subordinate staff, communicate effectively verbally and in writing with clients, peers, management and supervisors.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. Designs and builds special test fixturing. Works independently to obtain data or construct special test apparatus based on instructions from engineering staff. May write standard test reports or input sections to larger reports.

### Technician

**QUALIFICATIONS:** Incumbent should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to generate reports and to store and retrieve data; inventory maintenance, and ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. For new employees, a high school or equivalent education and a combination of one to five years continuing education, or trade school and/or related experience is required. An Associate's Degree may be required. Validated tests are given to demonstrate level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Sets up experimental apparatus following written or verbal instructions or graphic representations of desired testing environment; prepares samples, specimens, and test materials following defined procedures. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance

## Chemistry &amp; Chemical Engineering Division

on equipment, vehicles, etc. following established schedules and procedures. Fabricates equipment and testing apparatus components following blueprints, engineering schematics, equipment manuals, handwritten or drawn notes, and performs simple design tasks as directed by supervisor. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

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# Mechanical & Materials Engineering

The Mechanical and Materials Engineering Division is internationally recognized in its core programs of: Engineering Dynamics, Structures, Materials, and Fluids Systems. Our mission is to improve the safety, reliability, efficiency, and life of new or existing mechanical components or systems for the economic benefit of our clients.

- Engineering Dynamics Department
  - Computational Mechanics
  - Survivability Mechanics
  
- Structural Engineering Department
  - Aerospace Structures
  - Structural Integrity and Reliability
  - Test and Evaluation
  - Structural Systems
  
- Materials Engineering Department
  - Materials Integrity
  - Materials Development
  - Materials Characterization
  
- Mechanical and Fluids Engineering
  - Structural Dynamics, Acoustics, Environmental Testing, and Reverse Engineering
  - Fluid Machinery and Design Services
  - Flow Measurement
  - Multiphase Flow, Space Propellant Dynamics, and Safety Equipment Testing
  - Plant Engineering Services and Gas Machinery Research

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**Administrative Assistant**

**QUALIFICATIONS:** In general, the administrative assistant will have mastered all tasks required for lower-level administrative support functions. He or she must have demonstrated knowledge of internal processes of the Institute, especially those that relate to the department activities. He or she should have a thorough knowledge of correspondence protocol, modern office management practices and principles, computer software, Institute and division policies and procedures, and the ability to interpret them to individuals who inquire. He or she should have the ability to work independently in the absence of specific instructions on a number of tasks with a high degree of speed in the organizational skills. He or she should be able to reflect the supervisor's characteristic responses to management problems, maintain effective relations with clients and staff, exercise confidentiality and discretion, manage subordinate staff, and orchestrate the calendar of supervisors to meet management demands as required. He or she should satisfy typing, spelling, and error detection test requirements. Existing staff should have a high school education or equivalent with ten years experience in lower-level administrative support functions. Ten to twelve years of outside experience in related areas are required for new employees. Continuing education to maintain a high level of current knowledge and skill is necessary.

**RESPONSIBILITIES:** Administrative assistants are senior administrative support positions in most departments and usually report to the department director. Individuals at this level have widely varying tasks depending on the organization of the department or division. The tasks normally include providing advanced secretarial support to senior management, supervising junior clerical staff, and administering various division or department support activities. Responsibility may also include direct support for a group of engineers, secretaries, or analysts. They handle non-routine and routine tasks with little or no supervision with a thorough knowledge of the department and division activities, Institute policies and procedures, and personnel.

**Secretary**

**QUALIFICATIONS:** The ability to supervise and coordinate the activities of subordinate clerical staff and be fully effective as the senior administrative assistant person within their section or unit. They are responsible for training subordinate staff, advising management on various requirements of the section, and ensuring that administrative support skills keep up with current technology. Good communications and interpersonal skills are required. Validated tests are given to determine knowledge and skills.

**RESPONSIBILITIES:** Develops deliverables documentation working from rough drafts. Provides administrative support to project team. Tracks deliverable items to ensure timely delivery. Checks and reviews project time sheets for correctness. Checks all documentation for errors and completeness.

**Senior Secretary**

**QUALIFICATIONS:** Seven years experience in an administrative support position. A high school degree or equivalent with a combination of 7 to 9 years of continuing education and

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related experience. Demonstrate specialized and well-developed clerical and administrative skills; handle routine tasks using personal judgment and discretion with minimal supervision as well as independent special assignments. Interacts directly with upper level management and external clients. Administratively supervise clerical staff in completion of assigned duties.

**RESPONSIBILITIES:** Prepares all project documentation for large projects. Handles notifications of contract modifications. Editorialize engineering reports and coordinates written correspondence with the client. Prepares and formats graphics, spreadsheets, and other complete media aspects of project documentation. Handles project related travel arrangements. Facilitates communications between clients and Institute technical staff. Mentors junior clerical staff on project related work.

## Director

**QUALIFICATIONS:** Ability to successfully build a program and lead research personnel at all levels. Engineering or science degree appropriate for specific activity. Completion of supervisory training programs and university-level management courses or other similar training. Leads in successful promotion and execution of technical programs and planning for future program development and resource needs. Establishes methodologies to improve work practices for improved efficiency, promotion, and conduct of business. Directly responsible for planning, organizing, and managing work of a research department. Leads research and development and testing activities.

**RESPONSIBILITIES:** Technical review of all deliverables, serves as management oversight for larger projects handling the technical and business functions of the project. Organize and integrate personnel, sometimes from several Divisions often including subcontractors. Is the liaison with the client on technical and business matters related to the projects. Exhibits outstanding management, communication, technical and interpersonal skills.

## Manager

**QUALIFICATIONS:** A Bachelor's degree in engineering or science appropriate for the department's activities and completion of relevant management training courses or prior experience is normally required. Excellent verbal, written and interpersonal communication skills as well as proven success in building technical programs. Demonstrates capabilities for leading others and administering to their employees' technical and professional needs. Provides management expertise to assigned staff members in technical efforts, assign project team members, and schedule and direct work efforts. Exhibit outstanding management, communication, technical and interpersonal skills.

**RESPONSIBILITIES:** Provides management expertise to assigned staff members in technical efforts, assigns project team members, and schedules and directs work efforts. Exhibits outstanding management, communications, technical and interpersonal skills.

## Mechanical &amp; Materials Engineering Division

**Engineer**

**QUALIFICATIONS:** The engineer must have completed a four-year college degree from an accredited university in an engineering discipline. Professional engineering registration is considered equivalent. In this initial assignment, the individual must exercise judgment, diligence, and attention to detail and demonstrate an aptitude for carrying out responsible technical assignments.

**RESPONSIBILITIES:** Performs routine engineering or scientific investigations assigned by more experienced researchers or management, normally as part of a project team, requiring an application of standard theories, techniques, and concepts in carrying out a sequence of related tasks. Contributes ideas for improving project work processes. Provides suggestions for promoting new projects and solicits opportunities to contribute to proposals and interact with clients. Searches literature, conducts surveys and experiments, collects, analyzes, interprets, and reports results. Develops preliminary findings for review by a more experienced researcher or manager. Prepares written reports of work for presentation to clients. Assists in the preparation, presentation, and follow up of research proposals. Provides work instruction to technical support staff. Demonstrates proficiency in writing and verbal presentation skills and in the mastery of computer software and hardware common to the technical field or specialization. Obtains necessary certifications. Becomes an effective and productive team member knowledgeable of the project team approach to contract research business. Develops professional contacts both within and outside the institute in order to help develop collaborative research efforts and maintain professional awareness. Establish and maintains professional society contacts.

**Institute Engineer**

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assists in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR

## Mechanical & Materials Engineering Division

Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

### Institute Scientist

**QUALIFICATIONS:** The individual at this level must have achieved true eminence in his or her field through technical accomplishments as reported in peer review publications, invited papers, patents, appointment to national committees, election to professional society positions, and an outstanding record of achievements at the Institute, including obtaining external funded programs for clients. Scientific or engineering creativeness and competence are not sufficient without recognition of professional contemporaries. A Doctoral degree in field of expertise is desirable. Individuals should also have led the development and training of junior staff in their areas of expertise.

**RESPONSIBILITIES:** Applies advanced scientific and engineering principles theories and concepts in development of original research programs and the solution of complex research problems where little or no precedence exists. Innovation is required and may extend the boundaries of existing knowledge. Works with senior Institute and division staff to plan for future technology needs and program development and to lead the development of new programs in the areas of expertise. Oversees the preparation, presentation, and follow-up of major proposals. Generates program ideas based on innovative approaches and knowledge of clients' needs. Takes the lead in developing new technical initiatives at the Institute. Is normally responsible for project development, for self-support, and for finding support for a number of high-level researchers. Contributes to institute projects on whatever basis necessary for effective utilization of expertise. Regularly publishes in peer-review periodicals and pursues authorship of other scholarly work. Assists in managing the Institute's internal research and development program by evaluating IR&D proposal and project results and attending R&D ACR Committee and other similar activities. Provides expert consultation services in areas of expertise to division and Institute management. Serves as a mentor to less experienced technical staff.

### Principal Engineer

**QUALIFICATIONS:** Principal Engineers are a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research. An advanced degree in a technical field is desirable.

**RESPONSIBILITIES:** Conducts test programs, develops test procedures and hardware for measurements and develops control techniques and data acquisition. Presents and publishes technical papers. Provides high-level engineering efforts to support requirements in development and design, provides guidance to junior staff in selection of hardware and system design, including requirements definition, planning, design, development, installation, testing, and scheduling. Provides input into configuration management and documentation for engineer related projects. Manages small and large projects. Leads project teams in the engineering aspects of the technical work. Coordinates and facilitates technical engineering related

## Mechanical & Materials Engineering Division

communications with the client where relevant. Acts as technical specialist for projects or project tasks.

### Principal Scientist

**QUALIFICATIONS:** Incumbent is a critical division resource in several dimensions, proceeding from 12 or more years of research and development project and promotional experience, including development of advanced concepts for internal research, proposal efforts, preparation, presentation, and follow-up of large proposals. In addition, the individual is a resource in program development efforts, a contributor to and director of presenting research and development efforts to clients and the professional community, and conducts advanced research leading to publication and peer review in periodicals. The principal level employee must have satisfied the senior research requirements and have five years of experience at the SE-3 level at the Institute or comparable experience with another organization. An advanced degree in a technical field is highly desirable. Individuals should also have led instruction in one of the technical or program/project management courses offered by the Institute and/or have taught a university-level technical course.

**RESPONSIBILITIES:** Accomplishes advanced scientific and engineering work within organizational activity and discipline, increasingly recognized as highly qualified in research specialty and possesses similar reputation with clients and the professional community. Takes the lead in expanding new technologies by contributing to department and division programs development activities and contributes motivating ideas to new programs. Supervise, advises and mentors less experienced technical staff.

### Research Engineer

**QUALIFICATIONS:** Research engineer must have satisfied the requirements of the entry-level engineer position and have two years of technical experience or its equivalent. A Master's degree plus one year of experience, or a Doctorate with no experience is considered equivalent. The individual should demonstrate a meaningful level of technical accomplishments. Completion of the SwRI promotion and project management courses is desirable.

**RESPONSIBILITIES:** Performs work involving conventional investigations within an engineering specialty; designs experiments, surveys, structures, software, and equipment applying standard scientific and engineering theories, concepts, and techniques and for which precedents have been established. Tests materials and engineering and scientific designs for conformance to specifications. Conducts process and analytical studies and models scientific phenomenon and problems using available engineering software. Identifies ideas for new projects, participates in their promotion, and contributes to improving project and promotional work processes. Establishes working relationships with clients consistent with project and promotional opportunities; prepares, presents, and follows up on research proposals; prepares and presents research reports to clients, and leads at least two successful proposals during tenure. Supervises or coordinates the work of drafters, technicians, and other technical and administrative support staff assigned to specific projects. Serves as phase manager on major projects and as project manager on projects of limited scope and complexity, and demonstrates the ability to meet project/phase technical costs and schedule objectives. Presents, publishes, or co-authors at least two technical papers during tenure. Develops proficiency in writing and

## Mechanical & Materials Engineering Division

verbal presentation skills and mastery of computer software common to technical field or specialization. Obtains professional engineering registration or other similar credentials. Develops expertise in working in, and organizing project teams. Deals regularly with other researchers throughout the Institute. Maintains membership in at least one professional society and seeks opportunities to participate no technical committees.

### Senior Research Engineer

**QUALIFICATIONS:** Five years engineering experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements, and evaluation of system. Manages small to medium size projects. Mentors junior staff and leads small technical teams in finding solutions to client posed technical problems.

### Senior Research Scientist

**QUALIFICATIONS:** Five years scientific experience or comparable work experience or its equivalent (a Master's degree plus one year of experience, or a Doctorate with no experience). Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Plans, designs, coordinates, and controls the progress of project work to meet client objectives; prepares and presents research reports to clients; supervises others as project manager on relatively large projects, assuming full responsibility for technical, financial, and project completion goals. Assumes responsibility for highly specialized technical objectives or problems where the relationships between cause and effect are difficult to establish and little or no precedence exists, and the use of creative imaginative thinking is required. Leads proposal efforts and new promotional work. Maintains familiarity with the progress and problems in the technical areas in which working.

### Student Engineer

**QUALIFICATIONS:** A temporary employee who is employed in an internship and/or coop relationship and must be currently enrolled or intend to remain enrolled in school.

**RESPONSIBILITIES:** Receives and prosecutes tasking as directed by a senior staff member assigned as a mentor.

## Mechanical &amp; Materials Engineering Division

**Engineering Technologist**

**QUALIFICATIONS:** Fifteen years experience in a technical support position. High school or equivalent education and a combination of 15 to 20 years of continuing education or trade school and/or related experience or a bachelor's degree with to five years experience in the field of specialization. Exceptional performance with capacity for engineering/scientific work and other project work at the professional level. Work independently with initiative, judgment and good communication skills and expertise. Knowledge of advanced systems, applications of new technology in field of specialization. Supervise subordinate staff and effectively communicate with clients.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. May work independently; supervise junior technical staff in accomplishing the laboratory aspects of a project, including working directly with client or subcontractor representatives. Writes reports and may take project or phase management for small projects or testing jobs. Takes the lead technical role in the laboratory on large projects working with members of the engineering staff to accomplish primarily hardware related project requirements. This may include fabrication or purchase of special equipment and interacting with outside vendors.

**Senior Engineering Technologist**

**QUALIFICATIONS:** 20 years experience in a technical support position. High school or equivalent education and a combo of 20 years continuing education and/or related experience, or a bachelor's degree in technology from an accredited university with five (5) years to 10 years experience in the field of specialization. A master's degree plus one year of experience, or a Doctorate with no experience. Completion of promotional and project management courses, and an advanced degree in a technical field desirable. Experience in successful project management, proposal preparation, and marketing activities. Shows maturity of technical expertise and assumes responsibility for highly specialized technical objectives using creative imaginative solutions.

**RESPONSIBILITIES:** Performs hardware/software efforts related to systems development, including requirements definition, planning, design development, installation, testing, review of design requirements and the evaluation of systems. Manages small to medium size projects. Mentors junior staff and leads small technical teams in finding solutions to client posed technical problems. Advises scientific and engineering staff in field of specialization. Writes and present technical papers to peers in field of specialization.

**Senior Technician**

**QUALIFICATIONS:** Incumbent should have knowledge of complex blueprints, engineering drawings or equipment schematics, custom sample preparation, and testing procedures peculiar to a field of effort; basic engineering or scientific principles relative to the field of technical support, design, and fabrication of engineering and scientific testing apparatus; test data manipulation; and maintenance and repair of specialized equipment. They should also have the

## Mechanical & Materials Engineering Division

ability to supervise subordinate technical support staff effectively in completion of project activities and communicate well with scientific and engineering staff. New employees should have a high school or equivalent education and a combination of five to ten years of continuing education, or trade school and/or related experience. An Associate's degree is preferred at this level. Validated tests are given to determine level of knowledge and skill in a particular field.

**RESPONSIBILITIES:** Using personal discretion and knowledge, constructs components, subunits, models, and adaptations of standard equipment. Troubleshoots problems with test equipment and components and corrects malfunctions or secures appropriate service for repair. Conducts customized tests or experiments that require minor modifications in test setup or procedures.

## Staff Engineer

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required.

## Technician

**QUALIFICATIONS:** Incumbents should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to store and retrieve data; inventory maintenance, and ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. A high school or equivalent education and a combination of one to five years' continuing education, or trade school and/or related experience are required. An Associate's Degree may be required for some positions at this level.

## Mechanical & Materials Engineering Division

**RESPONSIBILITIES:** Sets up experimental apparatus following written or verbal instructions or graphic representations of desired testing environment; prepares samples, specimens, and test materials following defined procedures. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance on equipment, vehicles, etc. following established schedules and procedures. Fabricates equipment and testing apparatus components following blueprints, engineering schematics, equipment manuals, handwritten or drawn notes, and performs simple design tasks as directed by supervisor. Performs routine computation and data manipulation following defined procedures and assists in the interpretation and manipulation of data, particularly in calling attention to any data anomalies. Maintains and orders required materials used in the fabrication and running of tests performed in technical field. Uses a PC and PC applications to manipulate test data, communicates with Institute staff, and provides required work documentation. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

### Staff Scientist

**QUALIFICATIONS:** Individual must be recognized as a critical resource, having established a reputation for technical excellence in the Institute at large and to some extent in the external community. Work is often consultative in nature and self-initiated. Individual is expected to work independently and require little or no supervision. Provides guidance to middle and top management in areas of expertise and on research trends. Individual serves as mentor to junior staff and often is the senior individual representing the Institute in a certain technical area. Individual must fulfill principal level researcher responsibilities and have experience of five years at that level. An advanced degree in a chosen technical field is desirable. Individual should also assume a training and development responsibility for less experienced technical staff.

**RESPONSIBILITIES:** Takes the lead in the promotion of new projects and programs in area of expertise and establishing future technology needs based on interaction with clients and potential clients and expert knowledge of the technology. Contributes to department and divisional planning activities by providing insight on future technological needs in areas of expertise and leads in the development of new division and Institute capabilities. Reviews research outcomes and recommendation of more junior technical staff to make final assessments. Manages major research projects and has full responsibility and control over the time schedule, budget, and technical objectives of the project. Applies advanced scientific or engineering principles, theories, and concepts in developing original research programs and solution to complex research programs where little or no precedence exists and innovation is required.

### Staff Technician

**QUALIFICATIONS:** Ten years experience in a technical support position. High school or equivalent education and a combination of 10 to 15 years of continuing education or trade school and/or related experience. An Associates' degree is highly desired. Possess in-depth skills and expertise in a specialty field and provides key support to scientific and engineering and project personnel. Performs independent tasks with minimum supervision. Supervise and

## Mechanical & Materials Engineering Division

train subordinate staff, communicate effectively, verbally and in writing with client, peers, management and supervisors.

**RESPONSIBILITIES:** Takes a leading role in data acquisition, test set up, design of special test apparatus and other aspects of laboratory efforts on a project. Reviews data for accuracy and relevance. Designs and builds special test fixturing. Works independently to obtain data or construct special test apparatus based on instructions from engineering staff. May write standard test reports or input sections to larger reports.

## Technician

**QUALIFICATIONS:** Incumbents should have knowledge of tasks associated with the technical work area; technical jargon; specialized equipment; use of hand-held calculator; application of mathematical functions such as addition, subtraction, multiplication, division, and percentages; use of PC to store and retrieve data; inventory maintenance, and ordering procedures. Must be able to read and follow schematics; equipment manuals; blueprints and drawings; and sample preparation and testing procedures peculiar to the field of effort. The technician should also demonstrate the ability to follow verbal and written instructions. A high school or equivalent education and a combination of one to five years' continuing education, or trade school and/or related experience are required. An Associate's Degree may be required for some positions at this level.

**RESPONSIBILITIES:** Sets up experimental apparatus following written or verbal instructions or graphic representations of desired testing environment; prepares samples, specimens, and test materials following defined procedures. Conducts and observes standardized tests following test parameters and, as required, obtains and records data or ensures data has been captured by an automated system. Troubleshoots problems encountered with test equipment or other items associated with conducting tests in field of specialization. Conducts routine maintenance on equipment, vehicles, etc. following established schedules and procedures. Fabricates equipment and testing apparatus components following blueprints, engineering schematics, equipment manuals, handwritten or drawn notes, and performs simple design tasks as directed by supervisor. Performs routine computation and data manipulation following defined procedures and assists in the interpretation and manipulation of data, particularly in calling attention to any data anomalies. Maintains and orders required materials used in the fabrication and running of tests performed in technical field. Uses a PC and PC applications to manipulate test data, communicates with Institute staff, and provides required work documentation. Engages in safe work practices and advises supervisor on improvements to test equipment fabrication, installation, and operation to ensure a safe laboratory operation.

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# **APPENDIX B**

## **DIVISION LABOR RATES**

# CHEMISTRY & CHEMICAL ENGINEERING DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Adm. Coordinator	\$58.29	\$60.03	\$61.85	\$63.77	\$65.66	\$67.57
Administrative Assistant	\$64.82	\$66.70	\$68.74	\$70.90	\$72.96	\$75.16
Clerk 2	\$35.04	\$36.07	\$37.18	\$38.31	\$39.46	\$40.59
Clerk 3	\$38.43	\$39.52	\$40.74	\$42.04	\$43.23	\$44.55
Director-R&D	\$230.30	\$238.23	\$246.72	\$255.32	\$264.21	\$273.23
Engineer	\$84.92	\$87.84	\$90.96	\$94.13	\$97.44	\$100.74
Engineering Technologist	\$98.18	\$101.59	\$105.20	\$108.86	\$112.66	\$116.49
Executive Assistant	\$83.63	\$86.51	\$89.60	\$92.69	\$95.95	\$99.22
Group Leader-R&D	\$128.23	\$132.67	\$137.39	\$142.19	\$147.12	\$152.14
Institute Scientist	\$237.59	\$245.81	\$254.53	\$263.42	\$272.56	\$281.90
Laboratory Assistant	\$34.17	\$35.37	\$36.62	\$37.90	\$39.19	\$40.58
Manager-R&D	\$166.06	\$171.78	\$177.91	\$184.12	\$190.53	\$197.05
Principal Engineer	\$173.19	\$179.15	\$185.55	\$191.99	\$198.66	\$205.48
Principal Scientist	\$150.44	\$155.60	\$161.18	\$166.77	\$172.60	\$178.50
QA Technician	\$46.78	\$48.42	\$50.12	\$51.88	\$53.69	\$55.52
Research Assistant	\$61.36	\$63.46	\$65.72	\$67.99	\$70.34	\$72.80
Research Engineer	\$95.03	\$98.26	\$101.76	\$105.36	\$109.01	\$112.74
Research Scientist	\$87.84	\$90.86	\$94.11	\$97.37	\$100.78	\$104.20
Research Technologist	\$87.36	\$90.33	\$93.58	\$96.83	\$100.17	\$103.62
Scientist	\$70.20	\$72.64	\$75.23	\$77.84	\$80.54	\$83.28
Secretary	\$43.04	\$44.27	\$45.62	\$47.04	\$48.46	\$49.86
Senior Coordinator	\$68.74	\$70.73	\$72.89	\$75.18	\$77.40	\$79.68
Senior Secretary	\$60.73	\$62.51	\$64.40	\$66.44	\$68.41	\$70.40
Senior Specialist	\$102.79	\$106.34	\$110.15	\$113.97	\$117.92	\$121.97
Senior Technician	\$56.31	\$58.21	\$60.34	\$62.41	\$64.61	\$66.77
Specialist	\$88.80	\$91.85	\$95.14	\$98.46	\$101.83	\$105.36
Sr. Engr. Technologist	\$114.27	\$118.23	\$122.41	\$126.70	\$131.14	\$135.59
Sr. Research Engineer	\$138.63	\$143.45	\$148.53	\$153.73	\$159.07	\$164.48
Sr. Research Scientist	\$102.12	\$105.65	\$109.41	\$113.21	\$117.14	\$121.15
Sr. Research Technologist	\$142.28	\$147.19	\$152.42	\$157.73	\$163.26	\$168.83
Staff Scientist	\$175.86	\$181.90	\$188.39	\$194.93	\$201.74	\$208.62
Staff Technician	\$83.80	\$86.69	\$89.78	\$92.93	\$96.18	\$99.45
Student Assistant	\$36.02	\$37.10	\$38.20	\$39.42	\$40.58	\$41.78
Student Engineer	\$50.14	\$51.86	\$53.69	\$55.57	\$57.51	\$59.47
Student Scientist	\$40.58	\$41.95	\$43.45	\$44.95	\$46.55	\$48.13
Student Technician	\$36.17	\$37.25	\$38.39	\$39.56	\$40.74	\$41.93
Supervisor-R&D	\$93.10	\$96.33	\$99.74	\$103.22	\$106.82	\$110.46
Technician	\$43.21	\$44.73	\$46.30	\$47.95	\$49.59	\$51.28

# ENGINE, EMISSIONS AND VEHICLE RESEARCH DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Adm. Coordinator	\$60.01	\$61.77	\$63.65	\$65.64	\$67.55	\$69.54
Assistant Director-R&D	\$225.90	\$233.67	\$241.95	\$250.41	\$259.14	\$268.00
Clerk 2	\$34.26	\$35.25	\$36.31	\$37.44	\$38.57	\$39.72
Clerk 3	\$37.57	\$38.64	\$39.83	\$41.08	\$42.27	\$43.54
Director-R&D	\$281.02	\$290.70	\$301.03	\$311.55	\$322.37	\$333.42
Engine Operator	\$39.19	\$40.52	\$41.95	\$43.45	\$44.95	\$46.50
Engineer	\$94.31	\$97.56	\$101.02	\$104.58	\$108.23	\$111.90
Engineering Technologist	\$88.48	\$91.52	\$94.77	\$98.10	\$101.49	\$104.98
Executive Assistant	\$101.25	\$104.74	\$108.49	\$112.22	\$116.15	\$120.13
Group Leader-R&D	\$148.11	\$153.21	\$158.67	\$164.20	\$169.91	\$175.74
Institute Engineer	\$282.40	\$292.11	\$302.53	\$313.08	\$323.95	\$335.06
Manager-R&D	\$182.38	\$188.66	\$195.38	\$202.22	\$209.22	\$216.40
Principal Engineer	\$163.05	\$168.66	\$174.67	\$180.75	\$187.06	\$193.42
Program Manager	\$176.66	\$182.75	\$189.28	\$195.87	\$202.69	\$209.63
Research Analyst	\$97.11	\$100.46	\$104.02	\$107.67	\$111.41	\$115.20
Research Assistant	\$76.58	\$79.21	\$82.06	\$84.87	\$87.84	\$90.86
Research Engineer	\$112.28	\$116.15	\$120.28	\$124.49	\$128.80	\$133.22
Research Scientist	\$98.67	\$102.07	\$105.72	\$109.41	\$113.21	\$117.06
Research Technologist	\$107.05	\$110.72	\$114.67	\$118.70	\$122.82	\$126.99
Secretary	\$46.21	\$47.51	\$49.00	\$50.56	\$52.03	\$53.53
Senior Secretary	\$57.94	\$59.62	\$61.47	\$63.38	\$65.25	\$67.17
Senior Technical Specialist	\$135.54	\$140.19	\$145.20	\$150.27	\$155.50	\$160.81
Senior Technician	\$57.79	\$59.77	\$61.86	\$64.06	\$66.27	\$68.53
Sr. Research Engineer	\$138.13	\$142.88	\$147.97	\$153.13	\$158.44	\$163.85
Sr. Research Scientist	\$139.63	\$144.42	\$149.60	\$154.79	\$160.17	\$165.67
Staff Drafter	\$75.81	\$78.42	\$81.20	\$84.04	\$86.99	\$89.93
Staff Scientist	\$200.69	\$207.60	\$215.00	\$222.50	\$230.23	\$238.12
Staff Technician	\$75.18	\$77.77	\$80.54	\$83.33	\$86.26	\$89.20
Supervisor-R&D	\$102.25	\$105.78	\$109.56	\$113.39	\$117.35	\$121.32
Technician	\$39.16	\$40.52	\$41.95	\$43.45	\$44.95	\$46.46

# AEROSPACE ELECTRONICS AND INFORMATION TECHNOLOGY DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Administrative Assistant	\$84.26	\$86.73	\$89.38	\$92.19	\$94.86	\$97.69
Analyst	\$89.83	\$92.93	\$96.24	\$99.60	\$103.07	\$106.57
Engineer	\$96.76	\$100.07	\$103.64	\$107.28	\$111.01	\$114.79
Engineering Technologist	\$91.33	\$94.45	\$97.84	\$101.21	\$104.77	\$108.34
Manager-R&D	\$170.68	\$176.53	\$182.80	\$189.19	\$195.79	\$202.46
Principal Analyst	\$165.58	\$171.28	\$177.39	\$183.59	\$189.96	\$196.47
Principal Engineer	\$185.02	\$191.35	\$198.19	\$205.13	\$212.25	\$219.50
Research Analyst	\$104.60	\$108.17	\$112.06	\$115.96	\$119.98	\$124.11
Research Engineer	\$105.08	\$108.70	\$112.58	\$116.51	\$120.54	\$124.66
Senior Technician	\$63.77	\$65.97	\$68.34	\$70.68	\$73.18	\$75.65
Sr. Engr. Technologist	\$114.12	\$118.02	\$122.22	\$126.50	\$130.90	\$135.36
Sr. Research Analyst	\$138.50	\$143.27	\$148.35	\$153.53	\$158.84	\$164.30
Sr. Research Engineer	\$138.16	\$142.88	\$147.97	\$153.18	\$158.49	\$163.92
Student Assistant	\$34.52	\$35.51	\$36.62	\$37.75	\$38.86	\$40.02
Student Engineer	\$60.83	\$62.95	\$65.20	\$67.43	\$69.79	\$72.18

## AUTOMATION AND DATA SYSTEMS DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Institute Analyst	\$73.59	\$75.72	\$78.05	\$80.49	\$82.86	\$85.31
Administrative Assistant	\$73.59	\$75.72	\$78.05	\$80.49	\$82.86	\$85.31
Analyst	\$97.46	\$100.78	\$104.39	\$108.03	\$111.80	\$115.59
Designer	\$80.42	\$83.19	\$86.13	\$89.15	\$92.25	\$95.43
Director-R&D	\$213.62	\$220.99	\$228.85	\$236.85	\$245.05	\$253.46
Engineer	\$97.60	\$100.95	\$104.58	\$108.17	\$111.98	\$115.77
Engineering Technologist	\$93.44	\$96.68	\$100.10	\$103.62	\$107.19	\$110.87
Institute Engineer	\$239.79	\$248.05	\$256.86	\$265.82	\$275.08	\$284.48
Manager-R&D	\$190.46	\$197.01	\$204.03	\$211.15	\$218.47	\$225.97
Principal Analyst	\$193.80	\$200.48	\$207.63	\$214.87	\$222.35	\$229.95
Principal Engineer	\$184.44	\$190.78	\$197.55	\$204.45	\$211.58	\$218.85
Program Manager	\$196.88	\$203.66	\$210.87	\$218.24	\$225.84	\$233.54
Research Analyst	\$114.32	\$118.24	\$122.45	\$126.72	\$131.14	\$135.60
Research Engineer	\$118.93	\$123.01	\$127.42	\$131.87	\$136.45	\$141.13
Senior Designer	\$111.95	\$115.77	\$119.90	\$124.11	\$128.44	\$132.82
Senior Secretary	\$57.82	\$59.53	\$61.32	\$63.23	\$65.11	\$67.03
Senior Technical Specialist	\$157.50	\$162.94	\$168.74	\$174.62	\$180.71	\$186.88
Senior Technician	\$67.38	\$69.69	\$72.16	\$74.68	\$77.30	\$79.92
Sr. Engr. Technologist	\$138.62	\$143.36	\$148.45	\$153.66	\$159.00	\$164.41
Sr. Research Analyst	\$160.33	\$165.86	\$171.75	\$177.72	\$183.93	\$190.23
Sr. Research Engineer	\$143.47	\$148.43	\$153.68	\$159.07	\$164.61	\$170.24
Sr. Research Scientist	\$150.50	\$155.67	\$161.22	\$166.84	\$172.63	\$178.56
Staff Drafter	\$96.45	\$99.76	\$103.32	\$106.95	\$110.64	\$114.45
Student Assistant	\$34.73	\$35.75	\$36.84	\$37.97	\$39.08	\$40.28
Student Engineer	\$69.69	\$72.08	\$74.68	\$77.25	\$79.95	\$82.68
Systems Analyst	\$111.17	\$115.00	\$119.11	\$123.23	\$127.54	\$131.89

## APPLIED PHYSICS DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Institute Analyst	\$67.03	\$68.99	\$71.11	\$73.34	\$75.49	\$77.72
Administrative Assistant	\$67.03	\$68.99	\$71.11	\$73.34	\$75.49	\$77.72
Director-R&D	\$222.50	\$230.17	\$238.35	\$246.69	\$255.25	\$263.98
Engineer	\$96.40	\$99.67	\$103.25	\$106.82	\$110.55	\$114.33
Engineering Technologist	\$91.02	\$94.13	\$97.48	\$100.87	\$104.39	\$107.97
Institute Scientist	\$244.17	\$252.55	\$261.54	\$270.71	\$280.09	\$289.67
Laboratory Assistant	\$33.87	\$35.04	\$36.30	\$37.53	\$38.86	\$40.20
Manager-R&D	\$143.39	\$148.35	\$153.59	\$158.96	\$164.48	\$170.15
Principal Engineer	\$169.95	\$175.80	\$182.07	\$188.42	\$194.99	\$201.66
Principal Scientist	\$160.25	\$165.79	\$171.68	\$177.63	\$183.84	\$190.14
Research Engineer	\$107.92	\$111.66	\$115.63	\$119.66	\$123.80	\$128.05
Research Scientist	\$106.39	\$110.04	\$113.94	\$117.92	\$122.05	\$126.23
Scientist	\$82.93	\$85.77	\$88.82	\$91.92	\$95.14	\$98.38
Secretary	\$44.83	\$46.14	\$47.51	\$49.02	\$50.50	\$51.95
Senior Secretary	\$55.98	\$57.58	\$59.37	\$61.22	\$63.03	\$64.86
Senior Technician	\$60.26	\$62.34	\$64.56	\$66.83	\$69.14	\$71.51
Sr. Engr. Technologist	\$122.67	\$126.88	\$131.42	\$135.98	\$140.69	\$145.53
Sr. Research Engineer	\$127.05	\$131.46	\$136.10	\$140.85	\$145.77	\$150.74
Sr. Research Scientist	\$125.67	\$129.97	\$134.59	\$139.31	\$144.14	\$149.07
Staff Engineer	\$198.89	\$205.77	\$213.09	\$220.51	\$228.16	\$236.00
Staff Scientist	\$187.16	\$193.58	\$200.48	\$207.50	\$214.73	\$222.04
Staff Technician	\$81.38	\$84.19	\$87.21	\$90.23	\$93.34	\$96.58
Technician	\$46.69	\$48.28	\$50.01	\$51.73	\$53.53	\$55.34

## MECHANICAL & MATERIALS ENGINEERING DIVISION

Hourly Labor Rates for Fixed Price or Time and Materials Orders

Prices Shown are Net - Discounts Have Been Deducted

This pricing is current thru: Mod AO01, dated 01/23/07

Fiscal Year When Labor will be Performed:						
LABOR CATEGORY	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Administrative Assistant	\$71.78	\$73.90	\$76.14	\$78.53	\$80.86	\$83.24
Director-R&D	\$265.96	\$275.10	\$284.89	\$294.82	\$305.08	\$315.53
Engineer	\$84.39	\$87.30	\$90.41	\$93.55	\$96.83	\$100.15
Engineering Technologist	\$98.80	\$102.21	\$105.84	\$109.51	\$113.33	\$117.22
Institute Engineer	\$234.71	\$242.78	\$251.43	\$260.23	\$269.23	\$278.46
Institute Scientist	\$229.49	\$237.40	\$245.88	\$254.42	\$263.27	\$272.30
Manager-R&D	\$179.30	\$185.47	\$192.07	\$198.78	\$205.71	\$212.73
Principal Engineer	\$165.01	\$170.65	\$176.74	\$182.92	\$189.28	\$195.77
Principal Scientist	\$174.74	\$180.75	\$187.20	\$193.74	\$200.48	\$207.30
Research Engineer	\$112.46	\$116.34	\$120.47	\$124.66	\$129.02	\$133.45
Secretary	\$47.63	\$49.02	\$50.56	\$52.15	\$53.67	\$55.24
Senior Secretary	\$61.92	\$63.72	\$65.66	\$67.73	\$69.73	\$71.78
Senior Technician	\$62.17	\$64.31	\$66.60	\$68.90	\$71.30	\$73.78
Sr. Engr. Technologist	\$125.39	\$129.73	\$134.33	\$139.01	\$143.87	\$148.78
Sr. Research Engineer	\$134.47	\$139.12	\$144.06	\$149.10	\$154.29	\$159.55
Sr. Research Scientist	\$134.96	\$139.59	\$144.54	\$149.60	\$154.79	\$160.10
Staff Engineer	\$194.26	\$200.93	\$208.08	\$215.34	\$222.82	\$230.43
Staff Scientist	\$193.87	\$200.54	\$207.71	\$214.92	\$222.43	\$230.04
Staff Technician	\$82.78	\$85.65	\$88.67	\$91.76	\$94.99	\$98.23
Student Engineer	\$70.07	\$72.46	\$75.04	\$77.65	\$80.40	\$83.12
Technician	\$47.90	\$49.51	\$51.28	\$53.11	\$54.95	\$56.83

**APPENDIX C**

**FIXED PRICE PER TEST CATALOG**

**873-2**

**ANALYTICAL AND  
ENVIRONMENTAL CHEMISTRY**

**DIVISION 01 GSA PROPOSAL INFORMATION**

The enclosed prices are based on a 30-day turnaround for one sample consisting of clean water or soil samples. In the event a matrix is a difficult matrix, the turnaround is faster, or the method is required to be modified, there will be a need to discuss negotiation of prices for the special circumstances.

All prices have been used for both government and commercial contracts in the same vicinity for small numbers of samples.

# MEDIA

TABLE 1. MEDIA SAMPLED AND RELEVANT ANALYSES

Sampling In	Media Sampled	Sampling In	Media Sampled
Air	Ambient Source Occupational	Water	Drinking Municipal Waste Process Ground Surface marine
Soil	Surface Subsurface		
Sediment	Marine Freshwater		
Solids	Incinerator waste Fly ash Still bottoms Particulates Tars Asphalts House dust	Oils	Transformers Condensates Waste Crude petroleum Refined petroleum
		Biota	Vegetation Foodstuffs Human Tissue Marine animals

Analyzed Performed			
Organics	Carbamate pesticides Chlorinated dibenzodioxins and dibenzofurans Herbicides Methyl mercury Organic phosphorous/nitrogen pesticides Organochlorine pesticides Polynuclear aromatics Polychlorinated biphenyls Semivolatile organics Volatile organics		
Inorganics	Metals Wet chemistry		
Radiochemistry	Most radionuclides		
Others	ASTM	Ignitability	EP toxicity
	Pesticide registration	Corrosivity	Reactivity

Item #	Description	Type	Matrix	Method	# samples	Price
1	1 metal	ICP	Water	ILM03.0	1	\$660
2	1 metal	ICP	Water	ILM03.0	2-5	\$350
3	1 metal	ICP	Water	ILM03.0	6-10	\$143
4	1 metal	ICP	Water	ILM03.0	11-15	\$96
5	1 metal	ICP	Water	ILM03.0	16-20	\$79
6	add 1 metal	ICP	Water	ILM03.0	1	\$32
7	add 1 metal	ICP	Water	ILM03.0	2-5	\$20
8	add 1 metal	ICP	Water	ILM03.0	6-10	\$12
9	add 1 metal	ICP	Water	ILM03.0	11-15	\$10
10	add 1 metal	ICP	Water	ILM03.0	16-20	\$10
11	1 metal	GFAA	Water	ILM03.0	1	\$700
12	1 metal	GFAA	Water	ILM03.0	2-5	\$375
13	1 metal	GFAA	Water	ILM03.0	6-10	\$158
14	1 metal	GFAA	Water	ILM03.0	11-15	\$109
15	1 metal	GFAA	Water	ILM03.0	16-20	\$91
16	add 1 metal	GFAA	Water	ILM03.0	1	\$140
17	add 1 metal	GFAA	Water	ILM03.0	2-5	\$88
18	add 1 metal	GFAA	Water	ILM03.0	6-10	\$53
19	add 1 metal	GFAA	Water	ILM03.0	11-15	\$45
20	add 1 metal	GFAA	Water	ILM03.0	16-20	\$42
21	HG	CVAA	Water	ILM03.0	1	\$700
22	HG	CVAA	Water	ILM03.0	2-5	\$375
23	HG	CVAA	Water	ILM03.0	6-10	\$158
24	HG	CVAA	Water	ILM03.0	11-15	\$109
25	HG	CVAA	Water	ILM03.0	16-20	\$91
26	CN	CN	Water	ILM03.0	1	\$680
27	CN	CN	Water	ILM03.0	2-5	\$363
28	CN	CN	Water	ILM03.0	6-10	\$151
29	CN	CN	Water	ILM03.0	11-15	\$103
30	CN	CN	Water	ILM03.0	16-20	\$85
31	TAL +CN	Met + Wet	Water	ILM03.0	1	\$1,100
32	TAL +CN	Met + Wet	Water	ILM03.0	2-5	\$625
33	TAL +CN	Met + Wet	Water	ILM03.0	6-10	\$308
34	TAL +CN	Met + Wet	Water	ILM03.0	11-15	\$236
35	TAL +CN	Met + Wet	Water	ILM03.0	16-20	\$209
36	TAL metals	Met	Water	ILM03.0	1	\$1,000
37	TAL metals	Met	Water	ILM03.0	2-5	\$563
38	TAL metals	Met	Water	ILM03.0	6-10	\$271
39	TAL metals	Met	Water	ILM03.0	11-15	\$205
40	TAL metals	Met	Water	ILM03.0	16-20	\$180
41	1 metal	ICP	Soil	ILM03.0	1	\$680
42	1 metal	ICP	Soil	ILM03.0	2-5	\$363
43	1 metal	ICP	Soil	ILM03.0	6-10	\$151
44	1 metal	ICP	Soil	ILM03.0	11-15	\$103
45	1 metal	ICP	Soil	ILM03.0	16-20	\$85
46	add 1 metal	ICP	Soil	ILM03.0	1	\$32
47	add 1 metal	ICP	Soil	ILM03.0	2-5	\$20
48	add 1 metal	ICP	Soil	ILM03.0	6-10	\$12
49	add 1 metal	ICP	Soil	ILM03.0	11-15	\$10
50	add 1 metal	ICP	Soil	ILM03.0	16-20	\$10

Item #	Description	Type	Matrix	Method	# samples	Price
51	1 metal	GFAA	Soil	ILM03.0	1	\$720
52	1 metal	GFAA	Soil	ILM03.0	2-5	\$388
53	1 metal	GFAA	Soil	ILM03.0	6-10	\$166
54	1 metal	GFAA	Soil	ILM03.0	11-15	\$115
55	1 metal	GFAA	Soil	ILM03.0	16-20	\$97
56	add 1 metal	GFAA	Soil	ILM03.0	1	\$140
57	add 1 metal	GFAA	Soil	ILM03.0	2-5	\$88
58	add 1 metal	GFAA	Soil	ILM03.0	6-10	\$53
59	add 1 metal	GFAA	Soil	ILM03.0	11-15	\$45
60	add 1 metal	GFAA	Soil	ILM03.0	16-20	\$42
61	HG	CVAA	Soil	ILM03.0	1	\$720
62	HG	CVAA	Soil	ILM03.0	2-5	\$388
63	HG	CVAA	Soil	ILM03.0	6-10	\$166
64	HG	CVAA	Soil	ILM03.0	11-15	\$115
65	HG	CVAA	Soil	ILM03.0	16-20	\$97
66	CN	CN	Soil	ILM03.0	1	\$680
67	CN	CN	Soil	ILM03.0	2-5	\$363
68	CN	CN	Soil	ILM03.0	6-10	\$151
69	CN	CN	Soil	ILM03.0	11-15	\$103
70	CN	CN	Soil	ILM03.0	16-20	\$85
71	TAL +CN	Met + Wet	Soil	ILM03.0	1	\$1,120
72	TAL +CN	Met + Wet	Soil	ILM03.0	2-5	\$638
73	TAL +CN	Met + Wet	Soil	ILM03.0	6-10	\$316
74	TAL +CN	Met + Wet	Soil	ILM03.0	11-15	\$243
75	TAL +CN	Met + Wet	Soil	ILM03.0	16-20	\$215
76	TAL metals	Met	Soil	ILM03.0	1	\$1,020
77	TAL metals	Met	Soil	ILM03.0	2-5	\$575
78	TAL metals	Met	Soil	ILM03.0	6-10	\$278
79	TAL metals	Met	Soil	ILM03.0	11-15	\$211
80	TAL metals	Met	Soil	ILM03.0	16-20	\$186
81	1 metal	ICP	Water	SW-846	1	\$640
82	1 metal	ICP	Water	SW-846	2-5	\$338
83	1 metal	ICP	Water	SW-846	6-10	\$136
84	1 metal	ICP	Water	SW-846	11-15	\$90
85	1 metal	ICP	Water	SW-846	16-20	\$73
86	add 1 metal	ICP	Water	SW-846	1	\$32
87	add 1 metal	ICP	Water	SW-846	2-5	\$20
88	add 1 metal	ICP	Water	SW-846	6-10	\$12
89	add 1 metal	ICP	Water	SW-846	11-15	\$10
90	add 1 metal	ICP	Water	SW-846	16-20	\$10
91	1 metal	GFAA	Water	SW-846	1	\$680
92	1 metal	GFAA	Water	SW-846	2-5	\$363
93	1 metal	GFAA	Water	SW-846	6-10	\$151
94	1 metal	GFAA	Water	SW-846	11-15	\$103
95	1 metal	GFAA	Water	SW-846	16-20	\$85
96	add 1 metal	GFAA	Water	SW-846	1	\$140
97	add 1 metal	GFAA	Water	SW-846	2-5	\$88
98	add 1 metal	GFAA	Water	SW-846	6-10	\$53
99	add 1 metal	GFAA	Water	SW-846	11-15	\$45
100	add 1 metal	GFAA	Water	SW-846	16-20	\$42

Item #	Description	Type	Matrix	Method	# samples	Price
101	HG	CVAA	Water	SW-846	1	\$680
102	HG	CVAA	Water	SW-846	2-5	\$363
103	HG	CVAA	Water	SW-846	6-10	\$151
104	HG	CVAA	Water	SW-846	11-15	\$103
105	HG	CVAA	Water	SW-846	16-20	\$85
106	TAL metals	Met	Water	SW-846	1	\$980
107	TAL metals	Met	Water	SW-846	2-5	\$550
108	TAL metals	Met	Water	SW-846	6-10	\$263
109	TAL metals	Met	Water	SW-846	11-15	\$198
110	TAL metals	Met	Water	SW-846	16-20	\$174
111	1 metal	ICP	Soil	SW-846	1	\$660
112	1 metal	ICP	Soil	SW-846	2-5	\$350
113	1 metal	ICP	Soil	SW-846	6-10	\$143
114	1 metal	ICP	Soil	SW-846	11-15	\$96
115	1 metal	ICP	Soil	SW-846	16-20	\$79
116	add 1 metal	ICP	Soil	SW-846	1	\$32
117	add 1 metal	ICP	Soil	SW-846	2-5	\$20
118	add 1 metal	ICP	Soil	SW-846	6-10	\$12
119	add 1 metal	ICP	Soil	SW-846	11-15	\$10
120	add 1 metal	ICP	Soil	SW-846	16-20	\$10
121	1 metal	GFAA	Soil	SW-846	1	\$700
122	1 metal	GFAA	Soil	SW-846	2-5	\$375
123	1 metal	GFAA	Soil	SW-846	6-10	\$158
124	1 metal	GFAA	Soil	SW-846	11-15	\$109
125	1 metal	GFAA	Soil	SW-846	16-20	\$91
126	add 1 metal	GFAA	Soil	SW-846	1	\$140
127	add 1 metal	GFAA	Soil	SW-846	2-5	\$88
128	add 1 metal	GFAA	Soil	SW-846	6-10	\$53
129	add 1 metal	GFAA	Soil	SW-846	11-15	\$45
130	add 1 metal	GFAA	Soil	SW-846	16-20	\$42
131	HG	CVAA	Soil	SW-846	1	\$700
132	HG	CVAA	Soil	SW-846	2-5	\$375
133	HG	CVAA	Soil	SW-846	6-10	\$158
134	HG	CVAA	Soil	SW-846	11-15	\$109
135	HG	CVAA	Soil	SW-846	16-20	\$91
136	TAL metals	Met	Soil	SW-846	1	\$1,000
137	TAL metals	Met	Soil	SW-846	2-5	\$563
138	TAL metals	Met	Soil	SW-846	6-10	\$271
139	TAL metals	Met	Soil	SW-846	11-15	\$205
140	TAL metals	Met	Soil	SW-846	16-20	\$180
141	1 metal	ICP	Waste	SW-846	1	\$700
142	1 metal	ICP	Waste	SW-846	2-5	\$375
143	1 metal	ICP	Waste	SW-846	6-10	\$158
144	1 metal	ICP	Waste	SW-846	11-15	\$109
145	1 metal	ICP	Waste	SW-846	16-20	\$91
146	add 1 metal	ICP	Waste	SW-846	1	\$40
147	add 1 metal	ICP	Waste	SW-846	2-5	\$25
148	add 1 metal	ICP	Waste	SW-846	6-10	\$15
149	add 1 metal	ICP	Waste	SW-846	11-15	\$13
150	add 1 metal	ICP	Waste	SW-846	16-20	\$12

Item #	Description	Type	Matrix	Method	# samples	Price
151	1 metal	GFAA	Waste	SW-846	1	\$740
152	1 metal	GFAA	Waste	SW-846	2-5	\$400
153	1 metal	GFAA	Waste	SW-846	6-10	\$173
154	1 metal	GFAA	Waste	SW-846	11-15	\$122
155	1 metal	GFAA	Waste	SW-846	16-20	\$103
156	add 1 metal	GFAA	Waste	SW-846	1	\$160
157	add 1 metal	GFAA	Waste	SW-846	2-5	\$100
158	add 1 metal	GFAA	Waste	SW-846	6-10	\$60
159	add 1 metal	GFAA	Waste	SW-846	11-15	\$51
160	add 1 metal	GFAA	Waste	SW-846	16-20	\$48
161	HG	CVAA	Waste	SW-846	1	\$740
162	HG	CVAA	Waste	SW-846	2-5	\$400
163	HG	CVAA	Waste	SW-846	6-10	\$173
164	HG	CVAA	Waste	SW-846	11-15	\$122
165	HG	CVAA	Waste	SW-846	16-20	\$103
166	TAL metals	Met	Waste	SW-846	1	\$1,100
167	TAL metals	Met	Waste	SW-846	2-5	\$625
168	TAL metals	Met	Waste	SW-846	6-10	\$308
169	TAL metals	Met	Waste	SW-846	11-15	\$236
170	TAL metals	Met	Waste	SW-846	16-20	\$209
171	1 metal	ICP	Water	EPA 600	1	\$640
172	1 metal	ICP	Water	EPA 600	2-5	\$338
173	1 metal	ICP	Water	EPA 600	6-10	\$136
174	1 metal	ICP	Water	EPA 600	11-15	\$90
175	1 metal	ICP	Water	EPA 600	16-20	\$73
176	add 1 metal	ICP	Water	EPA 600	1	\$32
177	add 1 metal	ICP	Water	EPA 600	2-5	\$20
178	add 1 metal	ICP	Water	EPA 600	6-10	\$12
179	add 1 metal	ICP	Water	EPA 600	11-15	\$10
180	add 1 metal	ICP	Water	EPA 600	16-20	\$10
181	1 metal	GFAA	Water	EPA 600	1	\$680
182	1 metal	GFAA	Water	EPA 600	2-5	\$363
183	1 metal	GFAA	Water	EPA 600	6-10	\$151
184	1 metal	GFAA	Water	EPA 600	11-15	\$103
185	1 metal	GFAA	Water	EPA 600	16-20	\$85
186	add 1 metal	GFAA	Water	EPA 600	1	\$140
187	add 1 metal	GFAA	Water	EPA 600	2-5	\$88
188	add 1 metal	GFAA	Water	EPA 600	6-10	\$53
189	add 1 metal	GFAA	Water	EPA 600	11-15	\$45
190	add 1 metal	GFAA	Water	EPA 600	16-20	\$42
191	HG	CVAA	Water	EPA 600	1	\$680
192	HG	CVAA	Water	EPA 600	2-5	\$363
193	HG	CVAA	Water	EPA 600	6-10	\$151
194	HG	CVAA	Water	EPA 600	11-15	\$103
195	HG	CVAA	Water	EPA 600	16-20	\$85
196	1C Form #1	Met	Water	EPA 600	1	\$1,100
197	1C Form #1	Met	Water	EPA 600	2-5	\$625
198	1C Form #1	Met	Water	EPA 600	6-10	\$308
199	1C Form #1	Met	Water	EPA 600	11-15	\$236
200	1C Form #1	Met	Water	EPA 600	16-20	\$209

Item #	Description	Type	Matrix	Method	# samples	Price
201	1 metal	ICP	TCLP	SW-846	1	\$640
202	1 metal	ICP	TCLP	SW-846	2-5	\$338
203	1 metal	ICP	TCLP	SW-846	6-10	\$136
204	1 metal	ICP	TCLP	SW-846	11-15	\$90
205	1 metal	ICP	TCLP	SW-846	16-20	\$73
206	add 1 metal	ICP	TCLP	SW-846	1	\$32
207	add 1 metal	ICP	TCLP	SW-846	2-5	\$20
208	add 1 metal	ICP	TCLP	SW-846	6-10	\$12
209	add 1 metal	ICP	TCLP	SW-846	11-15	\$10
210	add 1 metal	ICP	TCLP	SW-846	16-20	\$10
211	1 metal	GFAA	TCLP	SW-846	1	\$680
212	1 metal	GFAA	TCLP	SW-846	2-5	\$363
213	1 metal	GFAA	TCLP	SW-846	6-10	\$151
214	1 metal	GFAA	TCLP	SW-846	11-15	\$103
215	1 metal	GFAA	TCLP	SW-846	16-20	\$85
216	add 1 metal	GFAA	TCLP	SW-846	1	\$140
217	add 1 metal	GFAA	TCLP	SW-846	2-5	\$88
218	add 1 metal	GFAA	TCLP	SW-846	6-10	\$53
219	add 1 metal	GFAA	TCLP	SW-846	11-15	\$45
220	add 1 metal	GFAA	TCLP	SW-846	16-20	\$42
221	HG	CVAA	TCLP	SW-846	1	\$680
222	HG	CVAA	TCLP	SW-846	2-5	\$363
223	HG	CVAA	TCLP	SW-846	6-10	\$151
224	HG	CVAA	TCLP	SW-846	11-15	\$103
225	HG	CVAA	TCLP	SW-846	16-20	\$85
226	RCRA 8	Met	TCLP	SW-846	1	\$900
227	RCRA 8	Met	TCLP	SW-846	2-5	\$500
228	RCRA 8	Met	TCLP	SW-846	6-10	\$233
229	RCRA 8	Met	TCLP	SW-846	11-15	\$173
230	RCRA 8	Met	TCLP	SW-846	16-20	\$150
231	Acidity	Wet	Water	305.1	1-20	\$65
232	acid-sol S=	Wet	Water	9030A	1-20	\$100
233	Acin insol S=	Wet	Water	9030A	1-20	\$100
234	Alk-Tot	Wet	Water	310.1	1-20	\$65
235	Alk- forms	Wet	Water	SM2320	1-20	\$65
236	NH4	Wet	Water	350.x	1-20	\$65
237	Anions (A)	IC	Water	300.0	1-20	\$125
238	Anions (B)	IC	Water	300.0	1-20	\$200
239	Anions	IC	Water	9056	1-20	\$125
240	BOD	Wet	Water	sm5210	1-20	\$165
241	Br	Wet	Water	320.1	1-20	\$65
242	COD	Wet	Water	410.x	1-20	\$65
243	Cl	Wet	Water	325.x	1-20	\$45
244	Cl	Wet	Water	9250,1,2,3	1-20	\$45
245	Color	Wet	Water	110.x	1-20	\$65
246	Corr.	Wet	Water	1110	1-20	\$200
247	CN-Amen	Wet	Water	335.x	1-20	\$75
248	CN-Amen	Wet	Water	9010,12	1-20	\$75
249	CN-tot	Wet	Water	335.x	1-20	\$50
250	CN-tot	Wet	Water	9010,12	1-20	\$50

Item #	Description	Type	Matrix	Method	# samples	Price
251	F- Dist	Wet	Water	340.x	1-20	\$665
252	F- Raw	Wet	Water	340.x	1-20	\$50
253	Hardness	Wet	Water	130.x	1-20	\$45
254	Hex Cr	Wet	Water	218.4,5	1-20	\$165
255	pH	Wet	Water	150.1	1-20	\$35
256	pH	Wet	Water	9040	1-20	\$35
257	Hydro-P	Wet	Water	365.x	1-20	\$175
258	I	Wet	Water	345.1	1-20	\$65
259	TKN	Wet	Water	351.x	1-20	\$100
260	NO3	Wet	Water	352.1	1-20	\$45
261	NO3	Wet	Water	9200	1-20	\$45
262	NO3/NO2	Wet	Water	353.x	1-20	\$45
263	NO2	Wet	Water	354.1	1-20	\$45
264	Odor	Wet	Water	140.1	1-20	\$335
265	O & G	Wet	Water	413.x	1-20	\$165
266	O & G	Wet	Water	9070	1-20	\$165
267	TOC	Wet	Water	sm5310	1-20	\$125
268	PO4	Wet	Water	365.x	1-20	\$65
269	TRPH	Wet	Water	418.1	1-20	\$165
270	Phenolics-TR	Wet	Water	420.x	1-20	\$165
271	Phenolics	Wet	Water	9065,6,7	1-20	\$165
272	P- All forms	Wet	Water	365.x	1-20	\$250
273	P- Tot	Wet	Water	365.x	1-20	\$100
274	TDS	Wet	Water	160.1	1-20	\$45
275	TSS	Wet	Water	160.2	1-20	\$45
276	Settleable Solids	Wet	Water	sm2540	1-20	\$45
277	TS	Wet	Water	160.3	1-20	\$45
278	Vol Solids	Wet	Water	sm2540	1-20	\$65
279	SiO2	Wet	Water	370.1	1-20	\$135
280	SiO2	Wet	Water	370.1	1-20	\$65
281	Cond	Wet	Water	120.1	1-20	\$35
282	Cond	Wet	Water	9050	1-20	\$35
283	SO4	Wet	Water	375.x	1-20	\$45
284	SO4	Wet	Water	9035,6,8	1-20	\$45
285	S=	Wet	Water	376.x	1-20	\$45
286	Surfactants	Wet	Water	sm5540	1-20	\$335
287	TOC	Wet	Water	9060	1-20	\$165
288	TOX	Wet	Water	9020,22	1-20	\$335
289	Turbidity	Wet	Water	180.1	1-20	\$35
290	Acid sol S=	Wet	Non-Aqueous	9030A	1-20	\$125
291	Acid insol S=	Wet	Non-Aqueous	9030A	1-20	\$125
292	Anions (A)	IC	Non-Aqueous	300.0	1-20	\$150
293	Anions (B)	IC	Non-Aqueous	300.0	1-20	\$225
294	Ash	Wet	Non-Aqueous	D482	1-20	\$65
295	Cat Ex Cap	Wet	Non-Aqueous	9080	1-20	\$200
296	Cat Ex Cap	Wet	Non-Aqueous	9081	1-20	\$200
297	Corr.	Wet	Non-Aqueous	1110	1-20	\$335
298	CN-Amen	Wet	Non-Aqueous	9013,10,12	1-20	\$115
299	CN-tot	Wet	Non-Aqueous	9013,10,12	1-20	\$115
300	extr. S=	Wet	Non-Aqueous	9031	1-20	\$115

Item #	Description	Type	Matrix	Method	# samples	Price
301	Free liq.	Wet	Non-Aqueous	9095	1-20	\$35
302	BTU	Wet	Non-Aqueous	D240	1-20	\$335
303	pH	Wet	Non-Aqueous	9040	1-20	\$45
304	pH	Wet	Non-Aqueous	9045	1-20	\$45
305	Ignight	Wet	Non-Aqueous	1010, 1020	1-20	\$165
306	O & G	Wet	Non-Aqueous	9071	1-20	\$165
307	TRPH	Wet	Non-Aqueous	418.1	1-20	\$165
308	Phenolics	Wet	Non-Aqueous	9065,6,7	1-20	\$235
309	Physical Disc	Wet	Non-Aqueous	D4979	1-20	\$35
310	React CN	Wet	Non-Aqueous	9010	1-20	\$165
311	React S	Wet	Non-Aqueous	9030A	1-20	\$165
312	S.G.	Wet	Non-Aqueous	D854	1-20	\$165
313	TOC	Wet	Non-Aqueous	9060	1-20	\$165
314	Water	Wet	Non-Aqueous	D1744	1-20	\$200
315	Anions	Wet	Non-Aqueous	9056	1-20	\$200
316	Cl	Wet	Non-Aqueous	9250,1,2,3	1-20	\$85
317	Hex Cr	Wet	Non-Aqueous	218.4,5	1-20	\$335
318	NO3	Wet	Non-Aqueous	9200	1-20	\$85
319	SO4	Wet	Non-Aqueous	9035,6,8	1-20	\$85
320	Air dry	Wet	Soil	USGS	1-20	\$35
321	Acid dig	ICP	Water	3005	1-20	\$5
322	Acid dig	ICP	Water	3010	1-20	\$10
323	Acid dig	GFAA	Water	3020	1-20	\$10
324	Acid dig - As,Se	GFAA	Water	7060, 7740	1-20	\$25
325	Acid dig - Ag	GFAA	Water	7761	1-20	\$10
326	Acid dig - Hg	CVAA	Water	7470	1-20	\$10
327	Dissolution	ICP	Waste	3040	1-20	\$100
328	Acid dig	ICP	Soil	3050	1-20	\$10
329	Acid dig	ICP	Waste	3050	1-20	\$20
330	Acid dig	GFAA	Soil	3050	1-20	\$10
331	Acid dig	GFAA	Waste	3050	1-20	\$20
332	Acid dig - Hg	CVAA	Soil	7471	1-20	\$10
333	Acid dig - Hg	CVAA	Waste	7471	1-20	\$20
334	Particle size red	Met	Non-Aqueous	1311	1-20	\$65
335	TCLP	Met	Non-Aqueous	1311	1-20	\$165
336	Sus met dig	ICP	Water	200.0	1-20	\$10
337	Sus met dig	GFAA	Water	200.0	1-20	\$10
338	Sus met dig - Hg	CVAA	Water	200.0	1-20	\$10
339	Tot met dig	ICP	Water	200.7	1-20	\$10
340	Tot met dig	GFAA	Water	200.0	1-20	\$10
341	Tot met- Hg	CVAA	Water	245.x	1-20	\$10
342	Tot rec Met dig	ICP	Water	200.7	1-20	\$5
343	Tot rec Met dig	GFAA	Water	200.0	1-20	\$5
344	Bomb Prep	Met	Non-Aqueous	5050	1-20	\$175
345	Sat extract	Met or Wet	Soil	MSA	1-20	\$75
346	1:1 extract	Met or Wet	Soil	MSA	1-20	\$75
347	1:5 extract	Met or Wet	Soil	MSA	1-20	\$50
348	1:10 extract	Met or Wet	Soil	300.0	1-20	\$50
349	shake extract	Met or Wet	Waste	D3987	1-20	\$165
350	fusion dis	ICP	Soil	D4503	1-20	\$165

Item #	Description	Type	Matrix	Method	# samples	Price
351	fusion dis	ICP	Waste	D4503	1-20	\$165
352	2x pre conc	Met	Water	None	1-20	\$13
353	5x pre conc	Met	Water	None	1-20	\$13
354	10x pre conc	Met	Water	None	1-20	\$13
355	acid dig	ICP	Soil	3050	1-20	\$10
356	acid dig	ICP	Waste	3050	1-20	\$20
357	acid dig	GFAA	Soil	3050	1-20	\$10
358	acid dig	GFAA	Waste	3050	1-20	\$20
359	acid dig - Ag	GFAA	Water	7760	1-20	\$13
360	diss. dig	ICP	Water	200.7	1-20	\$5
361	Tot rec dig	ICP	Water	200.7	1-20	\$5
362	diss dig	GFAA	Water	200.9	1-20	\$5
363	tot rec dig	GFAA	Water	200.9	1-20	\$5
364	tot Hg dig	CVAA	Water	245.x	1-20	\$10
365	exchange ext	Met or Wet	Soil	MSA	1-20	\$165
366	microwave dig	Met	Water	3015	1-20	\$25
367	microwave dig	Met	Non-Aqueous	3051	1-20	\$65
368	waste prep	Met	Non-Aqueous	E829	1-20	\$165
369	TCLP TAL's	Met	Water TCLP	SW-846	1	\$1,100
370	TCLP TAL's	Met	Water TCLP	SW-846	2-5	\$625
371	TCLP TAL's	Met	Water TCLP	SW-846	6-10	\$308
372	TCLP TAL's	Met	Water TCLP	SW-846	11-15	\$236
373	TCLP TAL's	Met	Water TCLP	SW-846	16-20	\$209
374	TCLP TAL's	Met	Soil TCLP	SW-846	1	\$1,100
375	TCLP TAL's	Met	Soil TCLP	SW-846	2-5	\$625
376	TCLP TAL's	Met	Soil TCLP	SW-846	6-10	\$308
377	TCLP TAL's	Met	Soil TCLP	SW-846	11-15	\$236
378	TCLP TAL's	Met	Soil TCLP	SW-846	16-20	\$209
379	TCLP TAL's	Met	Waste TCLP	SW-846	1	\$1,200
380	TCLP TAL's	Met	Waste TCLP	SW-846	2-5	\$688
381	TCLP TAL's	Met	Waste TCLP	SW-846	6-10	\$346
382	TCLP TAL's	Met	Waste TCLP	SW-846	11-15	\$268
383	TCLP TAL's	Met	Waste TCLP	SW-846	16-20	\$239
384	UTS TAL	Met	Water	SW-846	1	\$1,100
385	UTS TAL	Met	Water	SW-846	2-5	\$625
386	UTS TAL	Met	Water	SW-846	6-10	\$308
387	UTS TAL	Met	Water	SW-846	11-15	\$236
388	UTS TAL	Met	Water	SW-846	16-20	\$209
389	UTS TAL	Met	TCLP	SW-846	1	\$1,200
390	UTS TAL	Met	TCLP	SW-846	2-5	\$688
391	UTS TAL	Met	TCLP	SW-846	6-10	\$346
392	UTS TAL	Met	TCLP	SW-846	11-15	\$268
393	UTS TAL	Met	TCLP	SW-846	16-20	\$239
394	1 metal	ICP	Water	EPA 200.7	1	\$640
395	1 metal	ICP	Water	EPA 200.7	2-5	\$338
396	1 metal	ICP	Water	EPA 200.7	6-10	\$136
397	1 metal	ICP	Water	EPA 200.7	11-15	\$90
398	1 metal	ICP	Water	EPA 200.7	16-20	\$73
399	add 1 metal	ICP	Water	EPA 200.7	1	\$32
400	add 1 metal	ICP	Water	EPA 200.7	2-5	\$20

Item #	Description	Type	Matrix	Method	# samples	Price
401	add 1 metal	ICP	Water	EPA 200.7	6-10	\$12
402	add 1 metal	ICP	Water	EPA 200.7	11-15	\$10
403	add 1 metal	ICP	Water	EPA 200.7	16-20	\$10
404	1 metal	GFAA	Water	EPA 200.9	1	\$680
405	1 metal	GFAA	Water	EPA 200.9	2-5	\$363
406	1 metal	GFAA	Water	EPA 200.9	6-10	\$151
407	1 metal	GFAA	Water	EPA 200.9	11-15	\$103
408	1 metal	GFAA	Water	EPA 200.9	16-20	\$85
409	add 1 metal	GFAA	Water	EPA 200.9	1	\$140
410	add 1 metal	GFAA	Water	EPA 200.9	2-5	\$88
411	add 1 metal	GFAA	Water	EPA 200.9	6-10	\$53
412	add 1 metal	GFAA	Water	EPA 200.9	11-15	\$45
413	add 1 metal	GFAA	Water	EPA 200.9	16-20	\$42
414	HG	CVAA	Water	EPA 245	1	\$680
415	HG	CVAA	Water	EPA 245	2-5	\$363
416	HG	CVAA	Water	EPA 245	6-10	\$151
417	HG	CVAA	Water	EPA 245	11-15	\$103
418	HG	CVAA	Water	EPA 245	16-20	\$85
419	1C Form #1	Met	Water	EPA 600	1	\$1,100
420	1C Form #1	Met	Water	EPA 600	2-5	\$625
421	1C Form #1	Met	Water	EPA 600	6-10	\$308
422	1C Form #1	Met	Water	EPA 600	11-15	\$236
423	1C Form #1	Met	Water	EPA 600	16-20	\$209
424	Alk	Wet	Water	D1067	1-20	\$65
425	NH4	Wet	Water	350.x	1-20	\$65
426	Anions	IC	Water	300.0	1-20	\$125
427	Anions	IC	Non-Aqueous	300.0	1-20	\$165
428	Anions	IC	Water	300.0	1-20	\$200
429	Anions	IC	Non-Aqueous	300.0	1-20	\$665
430	Ash	Wet	Non-Aqueous	Fed Spec	1-20	\$65
431	Ash	Wet	Waste	E829	1-20	\$65
432	Ca	Wet	Extract	MSA	1-20	\$200
433	COD	Wet	Water	410.4	1-20	\$60
434	Corr.	Wet	Water	SM	1-20	\$335
435	CN-tot	Wet	Water	335.4	1-20	\$65
436	Cond	Wet	Water	D1125	1-20	\$45
437	Ext NH4	Wet	Extract	MSA	1-20	\$200
438	Ext NO3	Wet	Extract	MSA	1-20	\$200
439	Ext NO2	Wet	Extract	MSA	1-20	\$235
440	Flashpoint	Wet	Non-Aqueous	1010, 1020	1-20	\$200
441	F- Dist	Wet	Water	sm4500	1-20	\$665
442	F- Raw	Wet	Water	sm4500	1-20	\$65
443	BTU	Wet	Waste	E711	1-20	\$335
444	Hex Cr	Wet	Water	218.6	1-20	\$335
445	Hex Cr	Wet	Water	7196	1-20	\$265
446	Hex Cr	Wet	Non-Aqueous	7196	1-20	\$665
447	Hydrazine	Wet	Water	D1385	1-20	\$335
448	TIC	Wet	Soil	MSA	1-20	\$165
449	Visc	Wet	Non-Aqueous	D445	1-20	\$235
450	TKN	Wet	Soil	MSA	1-20	\$165

Item #	Description	Type	Matrix	Method	# samples	Price
451	TKN	Wet	Water	351.2	1-20	\$165
452	Mg	Wet	Extract	MSA	1-20	\$200
453	Moist	Wet	Waste	E790	1-20	\$100
454	NO3	Wet	Water	353.3	1-20	\$65
455	NO3/NO2	Wet	Water	353.2	1-20	\$65
456	P- Orth	Wet	Water	365.1	1-20	\$85
457	TRPH	Wet	Non-Aqueous	9073	1-20	\$165
458	Phenolics	Wet	Water	420.4	1-20	\$235
459	P- All forms	Wet	Water	365.1	1-20	\$250
460	P- Tot	Wet	Water	365.1	1-20	\$100
461	P- Sol	Wet	Soil	MSA	1-20	\$200
462	Proximate	Wet	Non-Aqueous	ASTM	1-20	\$335
463	Proximate	Wet	Waste	ASTM	1-20	\$365
464	OC to TOC	Wet	Soil	MSA	1-20	\$335
465	Bulk Density	Wet	Waste	D5057	1-20	\$65
466	CN - Screen	Wet	Waste	D5049	1-20	\$100
467	CN - Screen	Wet	Waste	D5049	1-20	\$100
468	CN - Screen	Wet	Waste	D5049	1-20	\$200
469	Ox - Screen	Wet	Waste	D4981	1-20	\$100
470	S - Screen	Wet	Waste	D4981	1-20	\$100
471	SiO2	Wet	Water	D859	1-20	\$165
472	Na	Wet	Extract	MSA	1-20	\$200
473	TC	Wet	Soil	MSA	1-20	\$165
474	CHN	Wet	Waste	E777	1-20	\$250
475	TKN	Wet	Waste	E778	1-20	\$250
476	Tot - Sulfur	Wet	Waste	E775	1-20	\$250
477	Turbidity	Wet	Water	180.1	1-20	\$65
478	Ultimate	Wet	Waste	ASTM	1-20	\$1,000
479	Volitile Matter	Wet	Waste	E897	1-20	\$100
480	Acid Dig	ICP	Non-Aqueous	3031	1-20	\$35
481	Acid Dig	GFAA	Non-Aqueous	3031	1-20	\$35
482	Acid Dig	ICP	Soil	3050	1-20	\$10
483	Acid Dig	ICP	Waste	3050	1-20	\$20
484	Acid Dig	GFAA	Soil	3050	1-20	\$10
485	Acid Dig	GFAA	Waste	3050	1-20	\$20
486	Alk Dig for Cr6	Met	Non-Aqueous	3060	1-20	\$200
487	Dissolution	ICP	Non-Aqueous	3040	1-20	\$100
488	Dist for Acid S=	Wet	Water	9030B	1-20	\$50
489	Dist for Acid S=	Wet	Non-Aqueous	9030B	1-20	\$50
490	Dist Acid in S=	Wet	Water	9030B	1-20	\$50
491	Dist Acid in S=	Wet	Non-Aqueous	9030B	1-20	\$50
492	Dist CN-amen	Wet	Water	9010B	1-20	\$50
493	Dist CN-tot	Wet	Water	9010B	1-20	\$50
494	extr for extr CN-A	Wet	Non-Aqueous	9013	1-20	\$135
495	Extr for extr CN-T	Wet	Non-Aqueous	9013	1-20	\$135
496	Microwave Dig	ICP	Non-Aqueous	3052	1-20	\$65
497	1 metal	ICP	Water	6010B	1	\$640
498	1 metal	ICP	Water	6010B	2-5	\$338
499	1 metal	ICP	Water	6010B	6-10	\$136
500	1 metal	ICP	Water	6010B	11-15	\$90

Item #	Description	Type	Matrix	Method	# samples	Price
501	1 metal	ICP	Water	6010B	16-20	\$73
502	add 1 metal	ICP	Water	6010B	1	\$32
503	add 1 metal	ICP	Water	6010B	2-5	\$20
504	add 1 metal	ICP	Water	6010B	6-10	\$12
505	add 1 metal	ICP	Water	6010B	11-15	\$10
506	add 1 metal	ICP	Water	6010B	16-20	\$10
507	1 metal	ICP	Soil	6010B	1	\$660
508	1 metal	ICP	Soil	6010B	2-5	\$350
509	1 metal	ICP	Soil	6010B	6-10	\$143
510	1 metal	ICP	Soil	6010B	11-15	\$96
511	1 metal	ICP	Soil	6010B	16-20	\$79
512	add 1 metal	ICP	Soil	6010B	1	\$32
513	add 1 metal	ICP	Soil	6010B	2-5	\$20
514	add 1 metal	ICP	Soil	6010B	6-10	\$12
515	add 1 metal	ICP	Soil	6010B	11-15	\$10
516	add 1 metal	ICP	Soil	6010B	16-20	\$10
517	1 metal	ICP	Waste	6010B	1	\$700
518	1 metal	ICP	Waste	6010B	2-5	\$375
519	1 metal	ICP	Waste	6010B	6-10	\$158
520	1 metal	ICP	Waste	6010B	11-15	\$109
521	1 metal	ICP	Waste	6010B	16-20	\$91
522	add 1 metal	ICP	Waste	6010B	1	\$40
523	add 1 metal	ICP	Waste	6010B	2-5	\$25
524	add 1 metal	ICP	Waste	6010B	6-10	\$15
525	add 1 metal	ICP	Waste	6010B	11-15	\$13
526	add 1 metal	ICP	Waste	6010B	16-20	\$12
527	Acid Sol - S=	Wet	Water	9034, 9215	1-20	\$125
528	Acid Sol - S=	Wet	Non-Aqueous	9034, 9215	1-20	\$150
529	Acid Insol - S=	Wet	Water	9034, 9215	1-20	\$125
530	Acid Insol - S=	Wet	Non-Aqueous	9034, 9215	1-20	\$150
531	Br	Wet	Water	9211	1-20	\$125
532	Br	Wet	Non-Aqueous	9211	1-20	\$125
533	Cl	Wet	Water	9212,50,51,	1-20	\$65
534	Cl	Wet	Non-Aqueous	9212,50,51,	1-20	\$65
535	Dermal Corr	Wet	Water	1120	1-20	\$335
536	Dermal Corr	Wet	Non-Aqueous	1120	1-20	\$335
537	CN- Tot and Amen	Wet	Water	9014, 9213	1-20	\$125
538	extr Cn - Tot and A	Wet	Non-Aqueous	9014, 9213	1-20	\$150
539	EOX	Wet	Non-Aqueous	9023	1-20	\$665
540	F-	Wet	Water	9214	1-20	\$125
541	F-	Wet	Non-Aqueous	9214	1-20	\$125
542	Ignitability	Wet	Non-Aqueous	1030	1-20	\$200
543	NO3	Wet	Water	9210	1-20	\$65
544	NO3	Wet	Non-Aqueous	9210	1-20	\$65
545	Walkley Black	Wet	Soil	MSA	1-20	\$135
546	Paint filter	Wet	Non-Aqueous	9095	1-20	\$45
547	React CN	Wet	Water	9014	1-20	\$165
548	React CN	Wet	Non-Aqueous	9014	1-20	\$165
549	React S	Wet	Water	9034	1-20	\$165
550	React S	Wet	Non-Aqueous	9034	1-20	\$165

Item #	Description	Type	Matrix	Method	# samples	Price
551	Salinity	Wet	Water	sm2520	1-20	\$65
552	Cond	Wet	Water	9050	1-20	\$45
553	CN	Wet	Water	9014, 9213	1-20	\$100
554	Extr CN	Wet	Non-Aqueous	9014, 9213	1-20	\$100
555	Moist	Wet	Non-Aqueous	E949	1-20	\$65
556	TOX	Wet	Water	450.1	1-20	\$265
557	NO2	Wet	Water	353.2	1-20	\$65
558	Sample pretreat	Wet	Solid	ASTM	1-20	\$335
559	Ash	Wet	Non-Aqueous	E830	1-20	\$65
560	BTU	Wet	Non-Aqueous	E711	1-20	\$335
561	Inorg Carbonate	Wet	Non-Aqueous	MSA	1-20	\$165
562	Moist	Wet	Non-Aqueous	E790	1-20	\$100
563	TC	Wet	Non-Aqueous	MSA	1-20	\$165
564	CHN	Wet	Non-Aqueous	E777	1-20	\$335
565	TKN	Wet	Non-Aqueous	E778	1-20	\$335
566	Moist	Wet	Non-Aqueous	E949	1-20	\$165
567	Residue	Wet	Non-Aqueous	160.3	1-20	\$165
568	Tot - Sulfur	Wet	Non-Aqueous	E775	1-20	\$335
569	Viscosity	Wet	Non-Aqueous	D1200	1-20	\$335
570	Volitile Matter	Wet	Non-Aqueous	E897	1-20	\$100
571	Dis Dig	ICP-MS	Water		200.8 1-20	\$5
572	Tot Rec Dig	ICP-MS	Water		200.8 1-20	\$10
573	Nitric Digestion	FAAS	Water	SM3030E	1-20	\$10
574	1 metal	ICP-MS	Water		200.8 1	\$700
575	1 metal	ICP-MS	Water		200.8 2-5	\$375
576	1 metal	ICP-MS	Water		200.8 6-10	\$158
577	1 metal	ICP-MS	Water		200.8 11-15	\$109
578	1 metal	ICP-MS	Water		200.8 16-20	\$91
579	add 1 metal	ICP-MS	Water		200.8 1	\$48
580	add 1 metal	ICP-MS	Water		200.8 2-5	\$30
581	add 1 metal	ICP-MS	Water		200.8 6-10	\$18
582	add 1 metal	ICP-MS	Water		200.8 11-15	\$15
583	add 1 metal	ICP-MS	Water		200.8 16-20	\$14
584	1 metal	FAAS	Water	SM3111	1	\$620
585	1 metal	FAAS	Water	SM3111	2-5	\$325
586	1 metal	FAAS	Water	SM3111	6-10	\$128
587	1 metal	FAAS	Water	SM3111	11-15	\$84
588	1 metal	FAAS	Water	SM3111	16-20	\$67
589	Classification	WET	Soil	D2487	1-20	\$365
590	Liquid limit	WET	Soil	D4318	1-20	\$365
591	Water Content	WET	Soil	D2216	1-20	\$35
592	Total Chlorine	WET	Petroleum		9076 1-20	\$365
593	Total EDTA	WET	Soil	D3113	1-20	\$335
594	Total EDTA	WET	Non-Aqueous	D3113	1-20	\$365
595	Unchelated EDTA	WET	Soil	D3113	1-20	\$265
596	Unchelated EDTA	WET	Non-Aqueous	D3113	1-20	\$300
597	HEM	WET	Water		1664 1-20	\$165
598	Hg	WET	Water		1631 1-20	\$275
599	HEM	WET	Non-Aqueous		1664 1-20	\$165
600	SGT-HEM	WET	Water		1664 1-20	\$185

Item #	Description	Type	Matrix	Method	# samples	Price
601	Tot Dig	FAA	Water	EPA 200.0	1-20	\$5
602	Tot Rec Dig	FAA	Water	EPA 200.0	1-20	\$10
603	Antimony	HyAA	Water	7062	1	\$700
604	Antimony	HyAA	Water	7062	2-5	\$375
605	Antimony	HyAA	Water	7062	6-10	\$158
606	Antimony	HyAA	Water	7062	11-15	\$109
607	Antimony	HyAA	Water	7062	16-20	\$91
608	Antimony	HyAA	Soil	7062	1	\$720
609	Antimony	HyAA	Soil	7062	2-5	\$388
610	Antimony	HyAA	Soil	7062	6-10	\$166
611	Antimony	HyAA	Soil	7062	11-15	\$115
612	Antimony	HyAA	Soil	7062	16-20	\$97
613	Antimony	HyAA	Waste	7062	1	\$760
614	Antimony	HyAA	Waste	7062	2-5	\$413
615	Antimony	HyAA	Waste	7062	6-10	\$181
616	Antimony	HyAA	Waste	7062	11-15	\$128
617	Antimony	HyAA	Waste	7062	16-20	\$108
618	Arsenic	HyAA	Water	7062	1	\$700
619	Arsenic	HyAA	Water	7062	2-5	\$375
620	Arsenic	HyAA	Water	7062	6-10	\$158
621	Arsenic	HyAA	Water	7062	11-15	\$109
622	Arsenic	HyAA	Water	7062	16-20	\$91
623	Arsenic	HyAA	Soil	7062	1	\$720
624	Arsenic	HyAA	Soil	7062	2-5	\$388
625	Arsenic	HyAA	Soil	7062	6-10	\$166
626	Arsenic	HyAA	Soil	7062	11-15	\$115
627	Arsenic	HyAA	Soil	7062	16-20	\$97
628	Arsenic	HyAA	Waste	7062	1	\$760
629	Arsenic	HyAA	Waste	7062	2-5	\$413
630	Arsenic	HyAA	Waste	7062	6-10	\$181
631	Arsenic	HyAA	Waste	7062	11-15	\$128
632	Arsenic	HyAA	Waste	7062	16-20	\$108
633	Selenium	HyAA	Water	7742	1	\$700
634	Selenium	HyAA	Water	7742	2-5	\$375
635	Selenium	HyAA	Water	7742	6-10	\$158
636	Selenium	HyAA	Water	7742	11-15	\$109
637	Selenium	HyAA	Water	7742	16-20	\$91
638	Selenium	HyAA	Soil	7742	1	\$720
639	Selenium	HyAA	Soil	7742	2-5	\$388
640	Selenium	HyAA	Soil	7742	6-10	\$166
641	Selenium	HyAA	Soil	7742	11-15	\$115
642	Selenium	HyAA	Soil	7742	16-20	\$97
643	Selenium	HyAA	Waste	7742	1	\$760
644	Selenium	HyAA	Waste	7742	2-5	\$413
645	Selenium	HyAA	Waste	7742	6-10	\$181
646	Selenium	HyAA	Waste	7742	11-15	\$128
647	Selenium	HyAA	Waste	7742	16-20	\$108
648	UTS TAL metals	Met	Soil	SW-846	1	\$1,200
649	UTS TAL metals	Met	Soil	SW-846	2-5	\$688
650	UTS TAL metals	Met	Soil	SW-846	6-10	\$346

Item #	Description	Type	Matrix	Method	# samples	Price
651	UTS TAL metals	Met	Soil	SW-846	11-15	\$268
652	UTS TAL metals	Met	Soil	SW-846	16-20	\$239
653	UTS TAL metals	Met	Waste	SW-846	1	\$1,300
654	UTS TAL metals	Met	Waste	SW-846	2-5	\$750
655	UTS TAL metals	Met	Waste	SW-846	6-10	\$383
656	UTS TAL metals	Met	Waste	SW-846	11-15	\$300
657	UTS TAL metals	Met	Waste	SW-846	16-20	\$269
658	1 metal	FAA	Water	SW-846	1	\$660
659	1 metal	FAA	Water	SW-846	2-5	\$350
660	1 metal	FAA	Water	SW-846	6-10	\$143
661	1 metal	FAA	Water	SW-846	11-15	\$96
662	1 metal	FAA	Water	SW-846	16-20	\$79
663	add 1 metal	FAA	Water	SW-846	1	\$140
664	add 1 metal	FAA	Water	SW-846	2-5	\$88
665	add 1 metal	FAA	Water	SW-846	6-10	\$53
666	add 1 metal	FAA	Water	SW-846	11-15	\$45
667	add 1 metal	FAA	Water	SW-846	16-20	\$42
668	1 metal	FAA	Soil	SW-846	1	\$680
669	1 metal	FAA	Soil	SW-846	2-5	\$363
670	1 metal	FAA	Soil	SW-846	6-10	\$151
671	1 metal	FAA	Soil	SW-846	11-15	\$103
672	1 metal	FAA	Soil	SW-846	16-20	\$85
673	add 1 metal	FAA	Soil	SW-846	1	\$140
674	add 1 metal	FAA	Soil	SW-846	2-5	\$88
675	add 1 metal	FAA	Soil	SW-846	6-10	\$53
676	add 1 metal	FAA	Soil	SW-846	11-15	\$45
677	add 1 metal	FAA	Soil	SW-846	16-20	\$42
678	1 metal	FAA	Waste	SW-846	1	\$720
679	1 metal	FAA	Waste	SW-846	2-5	\$388
680	1 metal	FAA	Waste	SW-846	6-10	\$166
681	1 metal	FAA	Waste	SW-846	11-15	\$115
682	1 metal	FAA	Waste	SW-846	16-20	\$97
683	add 1 metal	FAA	Waste	SW-846	1	\$140
684	add 1 metal	FAA	Waste	SW-846	2-5	\$88
685	add 1 metal	FAA	Waste	SW-846	6-10	\$53
686	add 1 metal	FAA	Waste	SW-846	11-15	\$45
687	add 1 metal	FAA	Waste	SW-846	16-20	\$42
688	Arsenic	HyAA	Water	206.5	1	\$700
689	Arsenic	HyAA	Water	206.5	2-5	\$375
690	Arsenic	HyAA	Water	206.5	6-10	\$158
691	Arsenic	HyAA	Water	206.5	11-15	\$109
692	Arsenic	HyAA	Water	206.5	16-20	\$91
693	1 metal	FAA	Water	EPA 200.0	1	\$660
694	1 metal	FAA	Water	EPA 200.0	2-5	\$350
695	1 metal	FAA	Water	EPA 200.0	6-10	\$143
696	1 metal	FAA	Water	EPA 200.0	11-15	\$96
697	1 metal	FAA	Water	EPA 200.0	16-20	\$79
698	add 1 metal	FAA	Water	EPA 200.0	1	\$140
699	add 1 metal	FAA	Water	EPA 200.0	2-5	\$88
700	add 1 metal	FAA	Water	EPA 200.0	6-10	\$53

Item #	Description	Type	Matrix	Method	# samples	Price
701	add 1 metal	FAA	Water	EPA 200.0	11-15	\$45
702	add 1 metal	FAA	Water	EPA 200.0	16-20	\$42
703	Alkalinity	WET	Non-Aqueous	MSA 10-3.2	1-20	\$75
704	Total Halides	IC	Water	9056	1-20	\$125
705	Total Halides	IC	Non-Aqueous	9056	1-20	\$200
706	Nitric/Perc. Dig	MET	Aqueous	sm3030H	1-20	\$65
707	Nitric/Perc. Dig	MET	Non-Aqueous	sm3030H	1-20	\$65



**873-4**

**FIRE TECHNOLOGY**

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Aboveground Fuel Tanks (UFC A-II-F-1, SwRI 93-01, UL 2085) Fire, Hose Stream, Impact, Ballistic and Leakage Tests.....	22,000
AC07 Section 4.2 Roof Penetration Test	
Single test or first test .....	750
Subsequent tests .....	450
ASTM C518 Thermal Conductance Test, one 12 x 12 in. (0.30 x 0.30 m), max. 4-in. thickness, single test or first test .....	975
Subsequent tests .....	800
ASTM C1166 Flame Test (only), ten 1 x 12 in. (2.54 x 30.48 cm), max. 0.5-in. thickness.....	475
ASTM 229 Test.....	1,200
ASTM D568 Flammability of Flexible Plastics, 1 x 18 in. (25.4 x 456.2 mm) four each direction, max. 0.5-in. thickness .....	475
ASTM D635, D380/UL 94/UBC26-7 Test for Flammability of Rigid Plastics greater than 0.050 in. thick (number and size of Specimens depends on the part) .....	475-875
ASTM D1360 Fire Retardancy of Paints	
Cost per material.....	1,200
Subsequent tests .....	900
ASTM D1692 Flammability of Plastic Sheeting and Cellular Plastics, ten 2 x 6 in., (5.08 x 15.24 cm). Max. 0.5-in. thickness .....	575
ISO871, ASTM D1929/UBC 26-6 Ignition Properties of Plastics, fourteen 0.75 x 0.75 in. (1.91 x 1.91 cm), max. 2-in. thickness.....	975
Subsequent tests .....	800
ASTM D2859/DOC-FF-1-70 Pill Test, ten 9 x 9 in. (22.86 x 22.86 cm) .....	450
ASTM D2863/ISO 4589-2/Oxygen Index Test (30 specimens, sizes vary depending on material)	
First material .....	775
Second material.....	650
ASTM D3014, Standard Test Method for Flame Height, Time of Burning, and Loss of Mass of Rigid Thermoset Cellular Plastics in a Vertical Position.....	595
ASTM D3065, Standard Test Methods for Flammability Aerosol Products.....	760
ASTM D5485 Corrosivity Using the Cone Calorimeter .....	1,460
ASTM D6413, Standard Test Method for Flame Resistance of Textiles, Vertical Test .....	595
ASTM E84/NFPA 255/UL 723/UBC 8-1/UL C102.2 Flame Spread Test, single test or first test.....	635
Nominal 24 x 300 in. (0.61 x 7.63 m) or equivalent, max. 4-in. thickness	
Tests 2 – 10 .....	535 ea
Tests 11 + .....	495 ea
Additional Charges:	
Gypsum Substrate .....	45
GRC Substrate.....	125
Douglas Fir Substrate (For Paints/Coatings) .....	350
Coating Systems: 1 <sup>st</sup> coat (brush or roller) no charge, each additional coat, labor (per manhour).....	80
Burnout (if required) .....	200
ASTM E108/NFPA 256/UBC 15-2/UL 790 Roof Test (Class A, B, and C), (without Rain Test) includes report .....	1,150-6,000
See attached information sheet for prices on different classes, individual runs, deck construction, etc.	
ASTM E136/UBC 26-6 Vertical Tube Furnace, six cubes 1.5 x 2 x 1.5 in. (3.81 x 5.1 x 3.81 cm) single test or first test .....	975
Subsequent tests .....	800

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ASTM E162/D3675 Vertical Radiant Panel Test, six 6 x 18 in. (15.24 x 45.72 cm), max. 1-in. thickness .....	750
ASTM E648/NFPA 253/FTS 372 NBS Flooring Radiant Panel, five 10 x 41.5 in. (25.4 x 105.4 cm), max. 1-in thickness .....	850
ASTM E662 (screening tests)	
First screening test (single test run in either exposure).....	375
Second screening test (single test run in either exposure) .....	250
ASTM E662/NFPA 258/ABD0031 Smoke (AITM 2.0007 B), FAA 25.853 Smoke/BSS 7238 NBS Smoke Chamber, twelve 3 x 3 in. (7.62 x 7.62 cm), max. 1-in. thickness) .....	750
ASTM E970 Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source Five 10 x 41.5-in. (25.4 x 105.4 cm).....	850
ASTM E1321 Lateral Ignition Flame Travel (LIFT) .....	1,600
ASTM E1354/ISO 5660/NFPA 271 Cone Calorimeter Rate of Heat Release, 4 x 4-in. (100 x 100-mm), max. 2-in. (50.8 mm) Thickness (triplicate tests recommended per material)	
First run.....	295
Subsequent runs.....	175
Minimum of 3 runs (required) .....	645
Critical Heat Flux Test.....	525
ASTM E2067 Full-scale Calorimeter	
Full instrumentation – first test .....	9,295
Limited instrumentation – first test .....	3,135
ASTM F1387 Standard Specification for Mechanically Attached Fittings (MAF)	
Furnace Calibration .....	3,000
First Article Test Program, Setup and Cleanup.....	2,000
First Proof Test, Fire Exposure Test, and Hydrostatic Test (single fitting) .....	1,500
Additional tests performed consecutively (each fitting) .....	1,000
BMRI 5624, "Laboratory Equipment and Test Procedures for Evaluating Explosibility of Dusts"	
Minimum explosive concentration .....	1,800
CARB (California Air Resource Board) Test Method 511 – Pressure Test or Equivalent .....	470
CARB (California Air Resource Board) Test Method 510, 511, and 512 – Auto Shut-off, Auto Closer, and Flow Rate Testing .....	770
CARB (California Air Resource Board) Test Method 513, (5-day diurnal cycle) or equivalent.....	1,130
CCLI Course, Curriculum, and Laboratory Improvement – Adaptation and Implementation (A&I) Track .....	35,000
CFR Title 33, Vol. 2, Section 183.590, Heptane Fire Testing .....	3,510
DIN 4102-1 Fire Behavior of Building Materials and Elements DIN 4102-1, Class B2 Materials .....	530
ECE R34 Fire Performance Evaluation of Fuel Tanks of a Plastic Material	
Resistance to fire (three tests) .....	9,525
Collision .....	1,460
Mechanical Strength (two tanks).....	1,155
Permeability (per tank).....	1,260
Resistance to High Temperature (per tank) .....	630
EPA TO-15, Toxic Organics in Ambient Air (pricing independent of fire test) .....	900/analysis
FAA TESTS (See Attachment)	

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FM Standard 4922 Evaluation of Exhaust Ducts	
Set-up and First Test .....	5,650
Additional Test .....	2,950
Set-up and First Combination Test .....	7,825
Additional Combination Test .....	4,825
Smoke Removal Evaluation .....	600
FMCSA (Federal Motor Carrier Safety Administration)	
Drop Test .....	3,300
Pressure Test .....	1,550
Leakage Test .....	3,000
Safety Venting Test .....	7,200
One report documenting all tests .....	1,375
FMVSS302 Motor Vehicle Interior Materials Fire Test, ten 4 x 14 in.(10.16 x 35.56 cm)	
First Set of Ten .....	475
Subsequent Tests in Series .....	400
FURNITURE/MATTRESS TEST:	
CALIFORNIA BULLETIN 117 Cigarette Test .....	750
Set-up .....	1,500
Each Test .....	750
GM907P Procedure for Testing Flammability of Materials .....	585
IEEE 383 (Section 2.5) Testing .....	1,200
ISO 15540 Testing -- Fire Resistance of Hose Assemblies	
First Test .....	5,450
Subsequent Tests .....	1,090
First Screening Test .....	3,725
Subsequent screening tests .....	985
NEBS/Bellcore Needle Flame Test	
Single Test or First Test .....	475
Subsequent Tests .....	325
NEBS Network Equipment Building System	
Single Test or First Test .....	5,100
Additional cabinets run consecutively and first test .....	2,600
Additional location .....	900
NES 711 Five samples required, size 75 x 75 mm (2.95 x 2.95 in.) with maximum thickness of 25 mm (0.98 in.) .....	1,600
NFPA255 – See ASTM E84	
NFPA 259 (UBC 26-1) Potential Heat of Building Materials, single test or first test .....	
Test 2 - 6 .....	975 ea
Test 7 + .....	850 ea
Test 7 + .....	650 ea
NFPA 265/UBC 8-2	
Room Corner Test – first test .....	3,500
Each additional consecutive test .....	2,800
NFPA 268 Radiant Panel Test Exterior Wall System	
Test .....	1,500
Calibration .....	550
Base substrate and wall frame construction .....	450

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NFPA 285 – See UBC 26-9	
NFPA 701 Test Method 1/UL214 Part 1 Drapery Test (ten 6 in. x 15 ¾ in., machine direction only).....	475
NFPA 701 Test Method 2/UL214 Part 2 Fabric Test (Flat sheets – ten 5 x 48-in.) (Fold materials – eight 24 x 48-in.)	
Cost per material.....	650
Cleaning or water leaching (if required) .....	350
OTI 95 634 Jet Fire Test	
First 2-hour Fire Exposure test, planer and large pipe geometries .....	19,865
Each additional consecutive test.....	9,500
Instrumentation of Test Samples .....	2,500
Planar Box w/Web .....	2,500
PSA Peugeot-Citroen, Fuel Line Flame Resistance Tests	
Setup and First Test.....	5,525
Each Consecutive Test.....	1,230
QUARTER-SCALE TESTS [MIL-T-24708(SH)]	
Assembly constructed by SwRI .....	1,400
Completed Assembly Furnished by Client .....	1,050
SBI Test (3 specimens of 1.5 x 1 m; 3 specimens of 1.5 x 0.5 m)	
First material (3 tests) (including calibration) .....	2,700
Subsequent materials .....	1,800
STD791C Method 6052.1 High Temperature-High Pressure Spray Ignition Test .....	3,500
STD791C Method 6053.1 Manifold Ignition Test .....	4,000
School Bus Seat Fire Block Test	
Single Test or First Test.....	1,800
Each Consecutive Test.....	1,200
SWRI 99-02 Crawl Space Test	
Setup, first test and comparison test (SwRI Suggested Sub-Floor Assemblies and Specimen Installation) .....	2,900
Subsequent tests .....	2,400
Cubicle construction.....	450
TB 6034 Requirements and test procedure for resistance of a mattress/box springs set to fire .....	730
University Of Pittsburgh Toxicity Test (UPITT)	
First Test.....	2,850
Subsequent Tests .....	2,600
First Screening Test.....	975
Subsequent screening tests conducted consecutively as part of the same series.....	650
UBC 26-1 (ASTM D2015/NFPA 259) Potential Heat of Building Materials, single test or first test .....	975 ea
Test 2 - 6.....	850 ea
Test 7+.....	650 ea
UBC 26-2 (Formerly UBC 17-3) Thermal Barriers Test, one 48 x 48 in. (1.22 x 1.22 m) (base price) .....	2,400
UBC 26-3 (Formerly UBC 17-5) Room Corner Test – first test .....	5,000
Each Additional Consecutive Test .....	3,500
UBC 26-6 Ignition Properties .....	975
Subsequent tests .....	800

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UBC 26-7 Light-Transmitting Plastics	
First Test.....	575
Subsequent Tests.....	475
UBC 26-9 (NFPA 285) Intermediate-Scale, Multistory Test For Exterior Walls.....	9,150
Construction and Instrumentation .....	4,000
UBC 8-1 (Formerly UBC 42-1, see ASTM E84), & Section 407/1990/BOCA 1403.5.1 Thirty-minute Flame Spread Test on Fire-Retardant Treated Wood (one 24 x 300 in. or equivalent specimen).....	1,200
UBC 8-2 – See NFPA 265	
UL 162 Test (plus fuel costs)	
Setup and First Test (7x7 pan) .....	3,245
Each Additional Test.....	1,235
Foam Quality and Drain Time Measurements (as necessary) .....	75/duplicate run
Induction Tests (includes foam quality).....	150/duplicate run
UL 199 Sprinkler Actuation Test (Water Bath)	
Setup and First Test.....	3,070
Each Additional Sprinkler Head .....	80
Hydrostatic Testing (each) .....	50
UL 711 Class A Test - Crib (plus wood crib construction costs)	
Setup and First Trial.....	2,760
Each Additional Trial.....	780
UL 711 Class A Test - Panel (plus panel construction costs)	
Setup and First Trial.....	3,395
Each Additional Trial.....	1,670
UL 711 Class A Test (plus fuel costs)	
Setup and First Trial (< 10 x 10) .....	3,250
Each Additional Trial .....	1,250
UL 746-C Flame Test .....	525
UL 1887 Fire Test of Plastic Sprinkler Pipe (12 x 300-in. Tray of pipe/tubing), single test or first test.....	1,400
Subsequent tests .....	1,100
UL 1975 Fire Tests for Foamed Plastics Used for Decorative Purposes	
First Test.....	3,000
Each succeeding test.....	2,500
UL 2218 Impact Resistance of Prepared Roofing (Hail Test) .....	950
Deck and application of roofing supplies by SwRI .....	100
Subsequent tests .....	750
WATER VAPOR TRANSMISSION TEST .....	3,000

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STRUCTURAL & ENVIRONMENTAL PERFORMANCE TEST

AC-11 DURABILITY PERFORMANCE TESTS – STRUCTURAL PERFORMANCE TESTS – WEATHER RESISTIVE TESTS

AC-11 DURABILITY TESTS

ASTM G26-96/ASTM G53 Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) with and without Water for Exposure of Nonmetallic Materials (Five 6 x 6-in. specimens required by standard) .....	6,300/system
AC-11 SECT 5.4 Freeze/Thaw Test (Five 6 x 6 in. specimens required by standard).....	2,300/system
AC11 SEC 5.3.5 and 5.4.5 Comparative Bond Test (Five 3 x 3-in. specimens required by standard) for Weatherometer and Freeze Thaw Cycles .....	3,800/system

STRUCTURAL PERFORMANCE TESTS

ASTM C297-94 Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane (Five 2 x 2-in. specimens per system) First test .....	525/system
Subsequent test in series.....	400/system
ASTM E330-97 Structural Performance Of Exterior Window, Curtain Walls and Doors By Uniform Static Air Pressure Difference (Three 4 x 8 ft specimens per system) .....	4,200/system
ASTM E695-97 Measuring Relative Resistance of wall, floor and roof construction to impact loading.....	3,200/system
ASTM E72-98 Transverse Horizontal Symmetrical Load Test (Three 4 x 8 ft specimens per system).....	3,600/system
ASTM E72-98 Transverse Horizontal Non-Symmetrical Load Test (Three 4 x 8-ft specimens per system).....	3,600/system
ASTM E72-98 Transverse Vertical Symmetrical Load Test (Three 4 x 8 ft specimens per system).....	3,600/system
ASTM E72-98 Transverse Vertical Non-Symmetrical Load Test (Three 4 x 8 ft specimens per system) .....	3,600/system
ASTM E72-98 Compressive Strength Tests of Panels for Building Construction (Six 4 x 8 ft specimens per system).....	4,200/system
ASTM E72-98 Tensile Strength Tests of Panels for Building Construction (Three 4 x 8 ft specimens per system) .....	4,200/system
ASTM E72-98 Racking Load Tests of Panels for Building Construction (Three 8 x 8 ft specimens per system).....	4,200/system

WEATHER RESISTIVITY PERFORMANCE TESTS

AC-24 SECT 6.11 Water Drainage Test for EIFS (Annex 1).....	4,200/system
AC-59 Sect. 5(F3) Retrained Environmental Cycling Test.....	6,500/system
ASTM E331-96 Test Method For Water Penetration Of Exterior Windows, Curtain Walls and Doors By Static Pressure Difference (Three 4 x 8 ft specimens required per system) .....	3,600/system
AC-24/Nov. '99, SECT 6.10/ASTM E1233 (Proc. A)/ASTM E331 Water Resistive Coating test .....	4,500/system
ASTM G53-96 Practice for Operating Light and Water Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Material (Five 8 x 12-in. specimens required per system) .....	5,000/system

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BREAKDOWN OF IMO FTP CODE and HIGH SPEED CRAFT CODE Test Charges

<sup>1</sup> IMO MSC.61(67) Part 1/IMO FTP Code Part 1/ISO 1182/IMO A. 799 Non-Combustibility Test (5 Cylindrical specimens, diameter 45 mm, height 50 mm)	
Single Test or First Test.....	975
Subsequent Tests.....	800
<sup>1</sup> IMO MSC.61(67) Part 2/IMO FTP Code Part 2 Smoke And Toxicity Test (9 specimens of 75 x 75 mm, max 25 mm thick)	
Single Test or First Test.....	2,450
Subsequent Tests.....	1,950
Screening Test - 3 runs @ 50 kW/m <sup>2</sup> (1 with Toxicity).....	1,200
Subsequent Tests.....	800
<sup>1</sup> IMO MSC.61(67) Parts 5 and 6/IMO FTP Code Parts 5 and 6/IMO A.653/ASTM E1317 Surface Flammability Test (3 specimens of 155 x 800 mm)	
Single Test or First Test.....	1,600
Subsequent Tests.....	1,200
Screening Test (1 run).....	800
Subsequent Tests.....	400
IMO A.753(18)/ASTM F1173 Fire, Hydrostatic, and Electrical Resistance Test of Water Filled Plastic Pipes	
First Fire Test.....	2,700
Subsequent Fire Tests.....	2,200
First Hydrostatic Test.....	900
Subsequent Hydrostatic Tests.....	600
First Electrical Resistance Test (ASTM F1173, Section C2.0).....	900
Subsequent Electrical Resistance Test.....	600
IMO MSC.61(67) Part 7/IMO FTP Code Part 7/IMO A.563 (14), Test For Vertically Supported Textiles And Films (30 specimens, 220 x 170 mm, 50 mm maximum thickness)	
Single Test or First Material.....	695
Subsequent Tests.....	595
IMO MSC.61(67) Part 8/IMO FTP Code Part 8/IMO A.652(16) Test For Upholstered Furniture (8 specimens - 2 pieces each; 1 <sup>st</sup> piece - 450 x 300 mm; 2nd piece 450 x 150 mm, each with a maximum thickness of 75 mm. If a cover is to be tested with the system, 8 specimens are required of nominal thickness, 800 x 650 mm)	
Single Test or First Material.....	975
Subsequent Tests.....	695
IMO MSC.61(67) Part 9/IMO FTP Code Part 9/IMO A.685(17) Test For Bedding Components (6 specimens if tested w/o covers; 12 specimens if tested w/covers 450 x 350 mm in full nominal thickness)	
Single Test or First Material.....	975
Subsequent Tests.....	695
ISO 1716 Heat Of Combustion (set of three tests)	
First Material.....	850
Subsequent Materials.....	750
ISO 5659 Part 2 (NFPA 270) Optical Density Test (9 specimens of 75 x 75 mm, max 25 mm thick)	
Single Test or First Material.....	1,600
Subsequent Materials.....	1,200
ISO 9705 Room Test (Specimens cover back wall, side walls, and ceilings of 2.44m x 3.66 x 2.44m room)	
First Test (including calibration).....	5,400
Subsequent Tests in a Series.....	3,600
ISO 5660/ASTM 1354/NFPA 271 Cone Calorimeter Rate of Heat Release; See ASTM E1354	

<sup>1</sup> Test items provided by client or procured by SwRI at cost plus handling fee

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Fire Test Only

Spread of Flame (SF) Test	
Class A, B or C .....	595
Intermittent Flame (IF) Test	
Class A, B or C .....	595
Burning Brand (BB) Test	
Class A, B or C .....	595
Flying Brand (FB) Test (Wood Shakes Only)	
Class A, B or C .....	595

Note: A Single Test Only of Any of The Above Modes ..... 750

Optional Services

Base Decks Construction by SwRI .....	125
Additional Materials Supplies by SwRI.....	cost + fee
Video/per 120 minute cassette .....	150

Examples: (SwRI labor for application of roofing materials and optional services not included)

Complete Class A Test Fees Only for Combustible Deck, Consists of 2 SF, 2 IF , 4 BB.....4,760  
If SwRI Supplies Base Decks .....5,760

Complete Class B Test Fees Only For Combustible Deck, Consists of 2 SF, 2 IF, 2 BB .....3,570  
If SwRI Supplies Base Deck .....4,320

Noncombustible Deck Classifications Require Spread of Flame Tests Only

Complete Class A or B For Noncombustible Deck Consist of 2 SF .....	1,190
If SwRI Supplies Decks.....	1,440

Note: All Decks are 40-in. wide x 52-in. long, Except for Spread Flame Deck Lengths, Which Are:

- Class A - 8 ft
- Class B - 9 ft
- Class C - 13 ft

A Complete Combustible Deck Classification Includes Burning Brand, Intermittent Flame, Spread of Flame Test and Report.

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FAA, TOXICITY TESTS

ABD0031 (AITM 3.0005) (Supercedes ATS 1000.001) (Toxicity)

Base fee per material (includes triplicate runs in flaming and nonflaming) modes, and sampling for HCN, NO<sub>2</sub>, SO<sub>2</sub> + H<sub>2</sub>S. CO. HF and HCl; (6 gases)

FTIR..... 1,800

BOEING BSS 7239 (Flaming mode only)

Base fee per material (includes triplicate runs in flaming modes, and sampling for HCN, NO<sub>2</sub>, SO<sub>2</sub> + H<sub>2</sub>S. CO. HF and HCl; (6 gases)

Drager..... 1,200

FAA 25.853/ABD0031 (AITM 2.0005 A Flame Spread Test), Bunsen Burner Test (covering three types of test procedures: 12 sec.

Vertical, 60 sec. Vertical, Horizontal Test) four 2.75 x 12 in. (7.0 x 30.5 cm) specimens

(unless actual part smaller) per material..... 575

Each additional material..... 425

NES 713 (10 sq. in. or 2 lb of material per material tested. Test run in duplicate.) ..... 3,600

SMP 800-C Bombardier Toxicity Test (CO, CO<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>, HCl, HF, HBr, HCN;

One specimen each, flaming and nonflaming, 3.0 x 3.0 in., maximum 1 in. thickness)

FTIR..... 2,250

FTIR/ASTM E800/as a supplement to any standard test (CO, CO<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>, HCl, HF, HBr, HCN, acrolein)

First Test..... 750/Analysis

Subsequent tests conducted as part of the same series..... 500/Analysis

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GAS, LIQUID, AND SOLID CHEMICAL EXPLOSIBILITY TESTS

ASTM E681/LEL Test/UEL Test	
Single Limit (LEL or UEL Test) .....	1,765
Both Limits (LEL and UEL Test)	
First Test.....	2,200
Additional tests.....	1,765
ASTM E918	
Both Limit	
First Test.....	2,200
Additional tests.....	1,765
ASTM E1232 .....	1,765
ASTM E2079	
First Test.....	2,200
Additional tests .....	1,765
ASTM G72	
First Test (Triplicate Runs).....	1,765
Additional Tests (Triplicate Runs) .....	1,180

NOTE: Engineering time can be added to a project cost based on engineer's estimate.  
Cleanup costs must be estimated based on the product tested.  
All materials not included in the price list are billed at cost plus fee.

873-99

ENGINE AND VEHICLE RESEARCH

## CATALOG PRICES

### Hydraulic Fluid Flammability Tests

Federal Test Method Standard 791C Method 6052.1 High Temperature High-pressure Spray Ignition	One Fluid:	\$500 per test
	Two or more:	\$350 per test

Federal Test Method Standard 791C Method 6053.1 Manifold Ignition Test	One Fluid:	\$500 per test
	Two or more:	\$350 per test

Wick Cycling-Boeing/Douglas Test Method	One Fluid:	\$500 per test
	Two or more:	\$350 per test

Paint Sprayer – Boeing/Douglas Test Method	One Fluid:	\$500 per test
	Two or more:	\$350 per test

### Filtration Tests

SAE J1488	Emulsified Fuel/ Water Separation Test	\$400 setup \$1,000 per test
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SAE J1839	Course Fuel/ Water Separation Test	\$400 setup \$1,000 per test
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ISO 4548-12	Multi-pass Filtration Testing	\$400 setup \$850 per test
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