

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



FSC CLASS 8734  
NAICS Code: 541380, 541690  
Contract Number: GS-07F-6087P  
Contract Period: 09/14/2009 through 09/12/19



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**

627-1007 Introduction to New Services/Products

873-1 Mechanical Testing and Analysis

873-2 Chemical Testing and Analysis Services

873-3 Electric Testing and Analysis Services

873-4 Geothermal and Thermal/Fire 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:**

Patrick Merritt  
Phone: (210) 522-5422  
Fax: (210) 522-3950  
Email: [patrick.merritt@swri.org](mailto:patrick.merritt@swri.org)

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

Contracts Department  
Phone: (210) 522-2231  
Fax: (210) 522-3559  
Email: [contract@swri.org](mailto:contract@swri.org)

## TERMS AND CONDITIONS

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

627-1007 Introduction to New Services/Products

873-1 Mechanical Testing and Analysis

873-2 Chemical Testing and Analysis Services

873-3 Electric Testing and Analysis Services

873-4 Geothermal and Thermal/Fire 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: \$500,000**

**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: \$ 5,000.00**

**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: N/A**
- 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
- 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 06/02/2010

## CUSTOMER 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 requests 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.

## **ABOUT SWRI®**

Southwest Research Institute (SwRI) is an independent, nonprofit applied research and development organization. The staff of more than 3,300 specializes in the creation and transfer of technology in engineering and the physical sciences. The Institute occupies more than 1,200 acres in San Antonio, Texas, and provides nearly 2 million square feet of laboratories, test facilities, workshops and offices. SwRI's total revenue for fiscal year 2008 was \$563 million.

### **SwRI's Mission:**

**Benefiting government, industry and the public through innovative science and technology.**

### **Research areas include:**

- Aerospace Electronics and Information Technology
- Applied Physics
- Automation and Data Systems
- Chemistry and Chemical Engineering
- Engine, Emissions and Vehicle Research
- Fuels and Lubricants Research
- Geosciences and Engineering
- Mechanical and Materials Engineering
- Signal Exploitation and Geolocation
- Space Science and Engineering
- Training, Simulation, and Performance Improvement

## FACTS ABOUT 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 in the United States and abroad. The Institute is governed by a board of directors, which is advised by approximately 100 trustees.

Based on preliminary consultation with a client, SwRI prepares a proposal outlining the project's scope of work. Subject to client wishes, programs are kept confidential. As part of a long-held tradition, patent rights arising from sponsored research are often assigned to the client. SwRI generally retains the rights to Institute-funded advancements.

SwRI offers multidisciplinary, problem-solving services in a variety of areas in engineering and the physical sciences. Historically, nearly 2,000 projects are open at the Institute at any one time. These projects are funded almost equally between the government and commercial sectors. SwRI's total revenue for fiscal year 2008 was \$563 million. In 2008, SwRI directed \$7 million to its internally sponsored R&D program, which is designed to encourage new ideas and innovative technologies.

SwRI's headquarters occupies more than 2 million square feet of office and laboratory space on a more than 1,200-acre site in San Antonio. The Institute has business offices in Houston; and Washington; and technical offices and laboratories in Ann Arbor, Mich.; Atlanta; Beijing, China; Boulder, Colo.; Fort Hood, Texas; Hill Air Force Base, Utah; Huntsville, Ala.; Hanover and Rockville, Md.; Layton, Utah; Minneapolis, Minn.; O'Fallon, Ill.; Oklahoma City, Okla.; Warner Robins, Ga.; and Lorton, Va. In addition, SwRI provides environmental monitoring expertise at munitions disposal sites at the Umatilla Army Depot at Hermiston, Ore., the Pine Bluff Chemical Depot at Pine Bluff, Ark., and the Newport Chemical Depot at Newport, Ind.

At the close of fiscal year 2008, the staff numbered 3,323, including 273 professionals who hold doctorate-level degrees and 526 at the master's level degrees. In 2008, staff members published 511 papers in the technical literature; made 345 presentations at technical conferences, seminars and symposia around the world; submitted 55 invention disclosures; filed 41 patent applications; and received 39 U.S. patent awards. The Institute supports professional development of its staff through on-site technical and training courses and tuition reimbursement.

The Institute holds more than 900 patents awarded to its staff members, has earned 33 R&D 100 awards, and has been inducted in the U.S. Space Foundation's Space Technology Hall of Fame. The Institute has received two Department of Defense James S. Cogswell Outstanding Industrial Security Achievement Awards. The American Society of Mechanical Engineers has recognized our split-Hopkinson pressure bar

apparatus (2006) and the Southern Gas Association analog (1990), developed by SwRI in 1955 for the natural gas industry, as ASME National Historic Engineering Landmarks. Several SwRI divisions have achieved ISO 9001 or ISO 14001 certification and ISO/IEC Guide 25 accreditation. The Ford Motor Company has designated the Institute a Tier 1 product development engineering services supplier and has awarded the Institute its Q1-2000 award.

SwRI offers a wide-ranging network of representatives to discuss Institute capabilities, business opportunities and projects. In addition to the more than 20 offices worldwide, the Institute maintains a comprehensive presence on the Internet. SwRI retains an extensive network of consultants in Asia and Europe and has established numerous technology alliances with internationally known corporations and organizations.

The Institute has 11 technical divisions cooperating in multidisciplinary approaches to problem-solving. A partial listing of research areas includes: advanced electronics; aircraft structural integrity; antennas, radio wave propagation and electromagnetic modeling; automation, robotics, and intelligent systems; automotive engineering; avionics and support systems; ballistics and explosion hazards; bioengineering, biomechanics and biomaterials; chemistry and chemical engineering; communications systems and signal processing; corrosion and electrochemistry; cyber security and information assurance; Earth and planetary sciences; engineering mechanics; environmental and health sciences; fire technology; fluid systems and fluid machinery; fracture mechanics; fuels and lubricants; geochemistry and radiochemistry; geological and mining engineering; geophysical and geological investigations; hydrology and geohydrology; information and electronic warfare; intelligent transportation systems and vehicles; internal combustion engine emissions research; manufacturing technology; marine technology; materials sciences; medical information systems; modeling and simulation; nondestructive evaluation; oil and gas exploration and development; optics and sensor technology; penetration and armor mechanics; pipeline technology; probabilistic mechanics and uncertainty quantification; risk and hazard assessment; signal exploitation and geolocation; software engineering; space science; space instrumentation and spacecraft systems; structural engineering; surface modification and coatings; surveillance technology, training systems and simulators; unmanned aerial vehicles and systems; vehicle, engine and powertrain design, research and development.

Thomas Baker Slick Jr., an oilman-rancher-philanthropist, founded SwRI. Slick's vision of an internationally known scientific research center in San Antonio, took root with his donation of a ranchland site west of the city -- where Institute operations are still carried out. Slick challenged a group of pioneer scientists and engineers from around the nation to move to the new center to seek revolutionary advancements in many areas by developing and applying technology.

For more information about SwRI and its capabilities, contact the Business Development Office, Southwest Research Institute, 6220 Culebra Road, P.O. Box 28510, San Antonio, Texas 78228-0510, Phone (210) 522-2122, Fax (210) 522-3496.

**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**

**BEST VALUE  
BLANKET PURCHASE AGREEMENT  
FEDERAL SUPPLY SCHEDULE**

\_\_\_\_\_ (Insert Customer Name)

In the spirit of the Federal Acquisition Streamlining Act (Agency) and (Contractor) enter into a cooperative agreement to further reduce the administrative costs of acquiring commercial items from the General Services Administration (GSA) Federal Supply Schedule Contract(s) \_\_\_\_\_.

Federal Supply Schedule contract BPAs eliminate contracting and open market costs such as: search for sources; the development of technical documents, solicitations and the evaluation of offers. Teaming Arrangements are permitted with Federal Supply Schedule Contractors in accordance with Federal Acquisition Regulation (FAR) 9.6.

This BPA will further decrease costs, reduce paperwork, and save time by eliminating the need for repetitive, individual purchases from the schedule contract. The end result is to create a purchasing mechanism for the Government that works better and costs less.

Signatures

\_\_\_\_\_ Agency Date

\_\_\_\_\_ Contractor Date

**(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 DATES / DELIVERY SCHEDULES

- (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.**



## **CONTRACTOR TEAM AGREEMENTS**

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.

## 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:

### 873-2 Chemical Testing and Analysis Services

In addition to characterizing regulated emissions of HC, CO, NO<sub>x</sub>, PM, and smoke from engine and vehicle exhaust, SwRI has sampling and analysis facilities for quantifying unregulated emissions, many that are considered to be toxic compounds. Capability for chemical characterization of exhaust gas constituents includes the following list:

- Aldehydes and ketones by collection and derivitization with dinitrophenylhydrazine (DNPH) and analysis by HPLC/UV;
- Alcohols by GC-FID;
- Detailed C<sub>1</sub> – C<sub>12</sub> hydrocarbon speciation by GC-FID;
- Real-time FTIR monitoring of NO<sub>2</sub>, N<sub>2</sub>O, NH<sub>3</sub>, CO, CO<sub>2</sub>, CN, CH<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>3</sub>H<sub>8</sub>, C<sub>3</sub>H<sub>6</sub>, 1,3-butadiene, isobutalene, formaldehyde, acetylaldehyde, SO<sub>2</sub>, n-pentane, iso-octane, benzene, CH<sub>2</sub>, H<sub>2</sub>S;
- N<sub>2</sub>O by GC-ECD;
- Ammonia and sulfate by IC;
- Real time mass spectroscopy monitoring of NH<sub>3</sub>, NO, NO<sub>2</sub>, HNO<sub>2</sub>, CO<sub>2</sub>, CO, O<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, COS, CS<sub>2</sub>, H<sub>2</sub>S, CH<sub>3</sub>SH, HCHO, C<sub>2</sub>H<sub>5</sub>CHO, C<sub>6</sub>H<sub>5</sub>HO, CH<sub>3</sub>COOH, MTBE, ETBE, CH<sub>3</sub>OH, C<sub>2</sub>H<sub>5</sub>OH, C<sub>3</sub>H<sub>7</sub>OH, C<sub>4</sub>H<sub>7</sub>HO, C<sub>5</sub>H<sub>9</sub>HO;
- High resolution (HR) GC/HR MS capabilities for polycyclic aromatic hydrocarbons (PAH), nitrated PAH, dioxins/furans analyses;
- ICP capabilities for metals and elements analyses;
- Particulate filter characterization for soluble organic fraction and volatile organic fraction;
- Sampling and analysis of mobile source particulate, including particulate sizing, counting, particle size differentiated number, mass, morphology, and chemical characterization can all be performed at SwRI.

### 627-1007 Introduction to New Services/Products

Introduction to New Services/Products - Laboratory testing and analysis services not covered above include, but are not limited to, emissions testing of a wide range of

engines and vehicles including light and medium-duty vehicles, and heavy-duty and non-road engines. The laboratory is capable of testing gasoline, diesel, and alternative-fueled engines. An example of the types of New Services SwRI can offer are:

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

The SwRI Locomotive Technology Center (LTC) has extensive exhaust emission testing capabilities. The LTC provides direct access to a Class 1 railroad main line, and 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.

### **Heavy-duty and Non-road Engine Testing**

SwRI's emissions laboratory has 30 test cells capable of performing emissions tests on truck, bus, and non-road engines, in conformance with EPA CFR requirements. Facilities are capable of testing diesel, gasoline, and alternative-fueled engines. The division can also provide certification and emission reduction technology development for non-road engines, including small utility engines, forklift engines, marine outboard engines and inboard pleasure craft.

### **Vehicle Testing**

SwRI has chassis dynamometer facilities for light and medium-duty vehicle testing. Facilities are in conformance with EPA requirements, and can accommodate gasoline, diesel and alternative fuels. A heavy-duty chassis dynamometer is available that can test full size on-highway truck tractors and buses.

## **APPENDIX A**

### **DIVISION 03 OVERVIEW AND LABOR CATEGORY DESCRIPTIONS**

## **ENGINE, EMISSIONS & VEHICLE RESEARCH OVERVIEW**

The Engine, Emissions and Vehicle Research Division (EEVRD) 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.

EEVRD can accommodate engines and vehicles run on conventional, alternative, and exotic fuels. Each emission dynamometer/test cell has its own dedicated emissions sampling capabilities that include a full flow exhaust constant volume sampling system and analytical instruments. In addition to characterizing regulated emissions of HC, CO, NO<sub>x</sub>, PM, and smoke from engine and vehicle exhaust, EEVRD has sampling and analysis facilities for quantifying unregulated emissions, many that are considered to be toxic compounds. Emission sampling, analysis, and engine and vehicle operations comply with EPA Federal Test Procedures (FTP). For processes outside existing practices of FTP, EEVRD uses existing FTP practices as a guide, along with sound engineering judgment, to expand capabilities to satisfy client and research needs.

A primary focus of EEVRD is the study of engine and vehicle emissions. Our staff and facilities have been developed around the science of characterizing emissions from mobile sources. A formal quality system is in place, and our staff is intent on generating accurate and reliable data for our clients. Over more than 35 years, we have served regulatory groups, as well as those subject to regulation and those developing technology to control or reduce emissions from internal combustion engines. SwRI has the facilities, equipment, and the expertise necessary to address the needs of almost any program related to mobile source emissions characterization and control.

The Engine, Emissions and Vehicle Research Division is certified to ISO 9001:2000 "Quality Management Systems - Requirements" and ISO 14001:2004 "Environmental Management Systems." The Emissions Research and Development Department is accredited to ISO/IEC 17025:2005 "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, EMISSIONS & VEHICLE RESEARCH OVERVIEW

**Bruce B. Bykowski**, Vice President

**Magdi K. Khair**, Institute Engineer

**Thomas W. Ryan III**, Institute Engineer

**Charles E. Roberts, Jr.**, Institute Engineer

- **Emissions R&D**
  - Engine Certification and Emission Development
  - Chemistry and Particle Science
  - Medium Speed Diesel Engines
  - Light-Duty Vehicle Emissions
  - Aftertreatment Technology
  
- **Engine and Vehicle R&D**
  - Aftertreatment R&D
  - Diesel Technology
  - Powertrain Controls
  - Advanced Vehicle Technology
  - Advanced Combustion and Emissions
  
- **Design and Development**
  - Engine Development
  - Engine Design and Analysis
  - Drivetrain Design and Development
  - PTL

## **DIVISION 03 LABOR CATEGORY DESCRIPTIONS**

### **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.

## **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 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.

## **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 multidisciplinary 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, 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 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.

## **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

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.

## 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 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.

### **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.

## **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 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 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.

## **APPENDIX B**

### **DIVISION 03 LABOR RATES**

**LABOR RATES (\$)**  
**Hourly Labor Rates for Fixed Price or Time & Materials Orders**  
**For Division 03 Work Performed at a SwRI-Site Location**

<b>LABOR CATEGORY</b>	<b>FY 10</b>	<b>FY 11</b>	<b>FY 12</b>	<b>FY 13</b>	<b>FY 14</b>
Administrative Assistant	79.10	80.53	82.77	85.06	87.44
Administrative Coordinator	52.90	53.88	55.40	56.94	58.53
Assistant Manager-R&D	152.35	156.14	161.24	166.31	171.42
Assistant Supervisor-R&D	97.97	100.43	103.69	106.96	110.22
Director-R&D	327.17	335.30	346.23	357.16	368.10
Engineer	108.23	110.92	114.55	118.17	121.78
Engineering Technologist	108.71	111.44	115.07	118.71	122.35
Executive Assistant	95.87	98.27	101.46	104.70	107.87
General Clerk 2	38.15	38.84	39.94	41.06	42.17
General Clerk 3	43.93	44.72	45.97	47.24	48.57
Group Leader - R&D	165.74	169.87	175.45	180.97	186.52
Institute Engineer	321.01	329.03	339.73	350.49	361.19
Manager-R&D	214.12	219.45	226.60	233.73	240.91
Principal Administrative Coordinator	95.84	97.64	100.34	103.14	105.99
Principal Engineer	208.46	213.67	220.62	227.60	234.56
Principal Res. Technologist	164.74	168.84	174.34	179.84	185.35
Principal Scientist	193.83	198.70	205.15	211.66	218.12
Principal Technician	79.28	81.26	83.91	86.56	89.25
Program Manager-R&D	225.66	231.30	238.84	246.40	253.94
Programmer Analyst	98.48	100.90	104.21	107.47	110.76
Research Assistant	93.69	96.02	99.15	102.30	105.39
Research Engineer	126.53	129.67	133.89	138.10	142.35
Research Scientist	103.76	106.35	109.82	113.28	116.78
Research Technologist	117.38	120.30	124.20	128.16	132.06
Senior Secretary	66.60	67.81	69.72	71.66	73.63
Senior Specialist	135.07	138.45	142.95	147.49	151.96
Senior Technician	69.13	70.84	73.16	75.48	77.81
Specialist	93.71	96.02	99.18	102.30	105.47
Sr. Administrative Coordinator	69.76	71.05	73.02	75.03	77.12
Sr. Engr. Technologist	146.14	149.76	154.66	159.56	164.43
Sr. Research Analyst	137.10	140.54	145.13	149.72	154.28
Sr. Research Engineer	154.97	158.85	163.98	169.19	174.36
Sr. Research Scientist	161.80	165.82	171.25	176.63	182.09
Sr. Research Technologist	136.95	140.34	144.94	149.47	154.09
Staff Craft Technician	94.38	96.76	99.90	103.06	106.21
Staff Engineer	241.78	247.80	255.88	263.98	272.01
Staff Technician	94.31	96.69	99.82	102.98	106.15
Supervisor-R&D	126.63	129.80	134.01	138.26	142.46
Technical Advisor	218.78	224.26	231.54	238.89	246.20
Technician	50.08	51.33	53.00	54.70	56.39