

ENGINEERING SERVICES  
FOR  
SUPPORT OF NAVY'S VERY LOW FREQUENCY TRANSMITTER PROGRAM  
VARIOUS LOCATIONS THROUGHOUT THE WORLD  
STATEMENT OF WORK  
N4740801D8209

### 1.0 INTRODUCTION

The Naval Facilities Engineering Service Center (NFESC) provides specialized engineering, scientific, and technical products and services to accomplish tasks and functions assigned by the Naval Facilities Engineering

Command (NAVFAC) and by other Navy, Marine Corps, DoD, and Federal customers. The personnel of NFESC's Energy & Utilities Department are the Navy's experts in energy and utilities systems, plants, and equipment ashore.

### 2.0 SCOPE

The primary focus of this contract is to perform design of new and perform modifications / repairs on existing

Very Low Frequency (VLF) transmitting facilities. The contractor shall provide project development, preparation of 1391 documents with supporting documentation, preparation of plans, specifications and construction cost estimates for repair, engineering, technical, project monitoring & control, (delete: minor OR

MAJOR) construction, equipment procurement, and installation services modification and/or upgrading of various Radio Transmitter Facilities throughout the world and will be performed on an accelerated schedule in

order to meet strategic fleet support objects, in the following areas:

Towers, plant, systems, and equipment design, installation, operation, maintenance, overhaul, repair, and troubleshooting:

Antennas arrays.

Tall guyed towers.

Failsafe insulators.

Ground screens.

Helix houses.

Transmitters.

Heating, Ventilating, and Air Conditioning (HVAC) systems

Un-interruptible power supplies

Direct Digital Controls (DDC) – facilities management systems

Supervisory Control and Data Acquisition (SCADA) systems

Electrical and communications systems engineering and technical services

Electrical power distribution system condition, integrity, and operability assessment

Power quality studies and analyses

High voltage

Radio frequency interference analysis and troubleshooting

Low frequency (LF) and very low frequency (VLF) communications services

Reciprocating engines, systems, and plant design, installation, operation, maintenance, overhaul, repair, and troubleshooting – both mechanical drive and power generation applications

Combustion turbines, systems, and plant design, installation, operation, maintenance, overhaul, repair, and troubleshooting – both mechanical drive and power generation applications

Machinery condition monitoring and analysis – vibration, thermography, etc.

Utilities distribution systems and pipeline engineering and technical services – including:

On-site evaluations to determine system condition, integrity, and operability

Development and implementation of technical solutions, including repair, refurbishment, and rectification

Utilities systems include steam, high temperature hot water (HTHW), hydraulic and thermal fluids, POL (petroleum, oils, and lubricants), compressed air, other compressed gasses, industrial water, potable water, etc.

### 3.0 REQUIREMENTS

Specific detailed requirements shall be specified in individual Delivery Orders. The contractor shall provide engineering, technical, project monitoring & control, equipment procurement and installation

services and support, including all labor, supervision, materials, facilities, equipment, and quality assurance services and support, necessary to accomplish the specified work in the prescribed timeframe as specified in individual delivery orders.

3.1 Project development, monitoring, control, and execution products and services shall include:

Perform engineering and technical investigations and studies, make recommendations, and provide related services.

Provide on-site overhaul, repair and replacement of existing equipment

Perform economic and engineering/technical viability studies and analyses

Develop SOWs, specifications, data requirements, etc.

Develop/prepare engineering drawings through both computer aided and manual methods

Develop designs, perform design reviews

Review design, construction, operation, maintenance, and training plans and submittals

Perform construction monitoring, inspection, and on-site quality assurance (QA)

Perform plant, system, and equipment start-up, testing, commissioning, and troubleshooting

Provide technical training

3.2 Utilities engineering, technical, equipment procurement, construction, and installation products and services.

Types of work shall include:

Demolition, Construction, Installation, and Testing (Design-Build)

Demolition projects may require the use of explosives

Perform or provide oversight over the design, procurement, installation, testing and evaluation, modernization, overhaul, repair, modification, refurbishment, and demolition of utility plants, towers, systems, and equipment, including but not limited to those listed in the section entitled "Types of systems and equipment...."

Perform or provide oversight over equipment, system, tower, plant, and facility construction, inspection, quality

assurance, start-up, commissioning, and acceptance testing in compliance with FAA regulations, ASCE & EIA/TIA load criteria, OSHA, ASME and API.

Engineering Services & Studies:

Conduct engineering and technical studies.

Provide feasibility, equipment selection, and life assessment engineering studies that include all listed plants, systems, and equipment.

Perform concept design, DD Form 1391 preparation, systems design, Title II QA/QC services, and system commissioning and validation.

Provide engineering drawing services – develop/prepare, scan, and edit architectural and engineering drawings

using both computer assisted (CAD) and manual drafting methods.

Engineering services and studies may include, but are not limited to:

Dynamic shock and loading analysis. (to include shock, aeolian vibrations, galloping)

Non-linear structural design and analysis.

Design of cable arrays and support structures.

Design of tall towers.

Building heating and cooling load calculations

Air duct system sizing calculations

Piping system pressure drop calculations

DDC/EMCS system design

Structural analysis of buildings and components

Construction cost estimates

Construction and installation specifications

Environmental impact assessments and reports

Engineering and technical problem investigations and recommendations

Electrical work:

150 KV and higher

RF environment (10-100 KHz)

De-icing circuitry.

Power quality investigations and troubleshooting

Power line fault locating service

Electrical systems analysis – overhead and underground electrical distribution. Measure parameters to document load profiles and identify power flows to individual circuits, feeders, and loads.

Electrical disturbances – high and low voltage electrical distribution. Troubleshoot and identify causes of power quality problems. Procure, test, and install equipment to resolve electrical problems such as faults, surges, and harmonics.

3.3 Government Furnished Equipment and Information shall include:

1000 foot + guyed antenna towers.

Insulated guys and bases.

Helix House.

Cable structural systems .

Transmitters.

Specialized rigging systems (hoist, elevators, counterweights).

Engine and Turbine Plants, Equipment, and Controls.

Complete reciprocating internal combustion engine plants, including engine assemblies with all associated equipment, systems, and controls for either mechanical drive or power generation applications.

Complete gas turbine plants, including turbine engine assemblies with all associated equipment, systems, and controls for either mechanical drive or power generation applications.

Thermal Plants, Equipment, and Controls

Steam generators and boilers, and high temperature hot water (HTHW) generators and boilers and all associated equipment, systems, and controls.

Pipelines and Piping Systems, Equipment, and Controls

Electrical Systems, Equipment, and Controls

Electrical transmission and distribution equipment (100 KV and/or 0.5 MV), cable, insulators, corona rings, etc.

Failsafe insulators.

Bushings.

Grounding and bonding.

Special insulators.

Overhead and underground medium, and high voltage electrical distribution systems.

Substation equipment, including switchgear and transformers.

Electrical Supervisory Control and Data Acquisition (SCADA) systems and equipment.

Electrical metering for low, medium, and high voltage systems.

Un-interruptible power supply systems.

Facility interior and exterior lighting and wiring.

HVAC Systems, Equipment, and Controls

All HVAC equipment, sensors, and controls.

All HVAC equipment, air-cooled, water-cooled, hydronic and air handling equipment.

Utilities Monitoring and Control Systems and Equipment

Utility distribution pipelines and plant piping systems, including steam, high temperature hot water (HTHW), hydraulic and thermal fluids, POL (petroleum, oils and lubricants), compressed air and other compressed gasses, industrial water, potable water, etc.

3.4 Engineering Studies and Program Support

Additional engineering and program support to be provided by the contractor includes:

Required systems and equipment can generally be classified as electromechanical, and may involve electrical, electronic, mechanical, and fluid processes and interfaces.

Develop, produce, and distribute reports, including color graphics. The contractor shall follow the guidelines

contained in the Publication Standards for Maintenance and Operations Manuals dated March, 1991. The contractor shall also submit deliverables in Microsoft Word.

Conduct design reviews, data package evaluations, feasibility studies, systems analyses, data reviews, and

engineering analyses relative to facilities, facility equipment, and components.

#### 4.0 SPECIAL CONSIDERATIONS

Projects defined in individual delivery orders will require accelerated schedules to meet strategic fleet support objectives. As such rapid response and completion of D.O. within specified timeframes are primary requirements.

Secret level security clearances are required for working at some military facilities. The contractor shall provide personnel who meet security requirements as needed.

#### 5.0 PLACE OF PERFORMANCE

The place of performance will be specified in individual delivery orders but will encompass government installations, academic institutions, and contractor facilities worldwide.

#### 6.0 PERIOD OF PERFORMANCE

The period of performance will be specified in individual delivery orders.

#### 7.0 DELIVERY ORDERS

The contractor shall perform work as specifically authorized in individual delivery orders, which will be issued

by the Contracting Officer or duly authorized Ordering Officers.

#### 8.0 DOCUMENTATION

All required technical information, reports, and data shall be delivered in accordance with the Contract Data

Requirements List (CDRL), DD Form 1423, Exhibit A, and as may be required by CDRLs provided with individual delivery orders.

#### 9.0 EXPERIENCE AND QUALIFICATIONS

Experience and qualifications of contractors, subcontractors, and personnel must be relevant to planning and design of similar projects to Navy design criteria on an accelerated schedule within cost controls. To be considered relevant, experience and qualifications must be pertinent to the type of work being contracted for under a particular delivery order, and must be pertinent to antenna/towers/plants/systems/equipment similar in type, size, and capacity to the towers/plants, systems, and/or equipment being contracted for under the particular delivery order. For example, contractors, subcontractors, and key personnel for comprehensive VLF projects shall be experienced in evaluating, designing and constructing structures and support systems to enable the facility to meet its mission. Items include but are not limited to:

tall guyed towers (1000 feet +)

large cable arrays \*

insulated guys and bases

150 KV and higher RF environment (VLF and LF range, 10-100 KHz range)

non-linear structural design and analysis

dynamic effects (shock, aeolian vibrations, galloping)

de-icing circuitry

specialized rigging systems (hoists, elevators, counterweights)

\* Note that large cable arrays may consist of 26 major towers (800 - 100 feet high) which support 12 panels of radiating cables 3000 ft by 1800 ft; the entire system is roughly two square miles in area.

##### 9.1 Contractor and subcontractor requirements:

Contractors and subcontractors shall be experienced and fully qualified (particular focus on the qualifications of the project manager and design professionals) in the electronic and structural design of Low Frequency antenna

towers, HVAC for cooling of associated transmitters within the transmitter buildings, and primary and emergency power, including power conditioning, design, procurement, installation, test and evaluation, modernization, modification, overhaul, repair, refurbishment and/or demolishing of utility systems, and equipment, including but not necessarily limited to those listed hereinbefore. This shall include complete equipment, tower, system, plant, and facility commissioning.

All work shall conform to the latest applicable codes and standards of the appropriate governing body (i.e., federal, state, or local authority having jurisdiction) and of the appropriate standards setting organization (e.g., AEE, ASCE, ASME, ANSI, API, AWWA, EIA/TIA, IEEE, FAA, NEMA, NFPA, ISO, OSHA, etc.) Contractors must demonstrate familiarity with and ability to apply all applicable codes, specifications, and standards.

Contractors shall be fully qualified to work in hazardous locations, such as high pressure containing, high temperature, and high voltage equipment, confined spaces, high towers, etc., and shall demonstrate an

understanding of the applicable codes.

Contractors performing utility distribution pipeline work must be familiar with all applicable codes and specifications including ASME, API, state, and CFR instructions.

#### 9.2 Labor category attributes

**Project / Program Manager:** A graduate engineer or registered professional engineer, desired with a minimum of ten years of relevant utilities engineering.

**Senior Project Engineer:** A graduate engineer or registered professional engineer, desired with a minimum of ten years of relevant utilities engineering.

**Senior Engineer:** A bachelor degree in engineering, desired with a minimum of five years of relevant utilities engineering experience with similar equipment and facilities.

**Engineer:** A bachelors degree or equivalent in the engineering discipline being worked in (electrical, electronic, mechanical, civil, architectural, or structural), typically with a minimum of two years engineering experience and one year of relevant experience with facilities and equipment.

**Junior Engineer:** A bachelors degree in engineering.

**Technical Specialist:** Desired with a minimum of five years of relevant working experience with facilities and equipment.

**Technician:** Desired with a minimum of three years of relevant experience in mechanical, electrical, or hydraulic systems on facilities equipment and systems.

**Public Relations Specialist:** A bachelors degree in public affairs / public relations, desired with five or more years of relevant experience in managing a public relations program.

**Computer Systems Analyst:** A bachelors degree in computer science, desired with five or more years of relevant experience in computer systems analysis.

**Senior Technical Writer/Editor:** A bachelors degree or equivalent, desired with five or more years of relevant experience in the preparation and development of technical documentation.

**Specifications Writer:** Typically three or more years of relevant experience in preparing, updating, and r revising federal and military specifications. (Comprehensive knowledge of Defense Standardization Manual DOD 4120.3-M, Military Standards MIL-STD-961 and MIL-STD-962 and Federal Property Management Regulation FPMR 101-29 is expected.)

**Drafter:** Desired a graduate of an accredited technical school or equivalent with three or more years experience in technical illustrative drawing by both CAD and manual methods.

**Illustrator / Graphics Specialist:** Desired minimum of a graduate of an accredited technical school or equivalent with three or more years relevant experience in technical illustrating and/or artistic illustration.

**Senior Technical Typist/Word Processor:** Desired threee or more years experience in processing of complex and lengthy technical reports which include tables, graphs, charts, or multiple columns.

- **Data Entry Clerk/Clerk-Typist:** Desired one or more years experience in searching for, interpretation, selection, or coding of items to be entered from a variety of source documents, and in performance of routine clerical and typing work.

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