EXHIBIT B
STATEMENT OF WORK

Title: UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services

Requisition Number: 004070

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TABLE OF CONTENTS

List of Acronyms

Acronym	Definition
ACM	Asbestos Containing Material
API	American Petroleum Institute
CA	Compressed Air System
CCW	Common Cooling Water
CM	Construction Manager
CWS	Cooling Water System
CWS4	Cooling Water System #4
ECSE	Enhanced Capabilities for Subcritical Experiments
ECW	Electronics Cooling Water
EPP	Environmentally Preferable Products
ES&H	Environmental Safety and Health
F/T	Flush and Test
FCI	Fluid Controls Institute, Inc
FES	Fire Extinguishing System
FIT	Flow Information Transmitter
FV	Flow Control Valve
GFE	Government Furnished Equipment
GFP	Government Furnished Property
GMS	Gas Management System
I/O	Input / Output

Acronym	Definition
ISA	International Society of Automation
LAO	Los Alamos Operations at Los Alamos, NM
LCD	Liquid Crystal Display
LIT	Level Indicating Transmitter
LO	Livermore Operations at Livermore, CA
LSH	Leak Detector
M&O	Maintenance and Operation
MSTS	Mission Support and Test Services, LLC
NFO	Nevada Field Office
NLV	North Las Vegas Facility
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPT	National Pipe Thread
PDIT	Pressure Differential Indicating Transmitter
PI	Pressure Indication
PO	Pilot Operated
PSV	Pressure Safety Valve
PULSE	Primary Underground Laboratory Subcritical Experimentation.
PV	Pressure Control Valve
RCM	Radiological Control Manual
RF	Raised Face
RGD	Radiation-Generating Devices

Acronym	Definition
RPP	Radiation Protection Program
RSLA	Remote Sensing Lab at Andrews AFB, Maryland
RSLN	Remote Sensing Lab at Nellis AFB, North Las Vegas, NV
RWP	Radiological Work Permit
SA	Service Air
SME	Subject Matter Expert
SSSP	Site-Specific Safety Plan
STR	Subcontract Technical Representative
TE	Temperature Indicating Transmitter
TR	Thermal Relief
TV	Temperature Control Valve
UW	Utility Water System
XV	On-Off (Valve)

B-1 INTRODUCTION AND BACKGROUND

1. Introduction

The Nevada National Security Sites (NNSS) is a U.S. Department of Energy, National Nuclear Security Administration (NNSA) installation, operated by Mission Support and Test Services, LLC (MSTS or CONTRACTOR), comprising approximately 3,561 square kilometers (1,375 square miles) of federally owned land located in southeastern Nye County, Nevada. Located approximately 105 kilometers (65 miles) northwest of Las Vegas, Nevada, the NNSS is accessed from U.S. Highway 95, which roughly forms the southern boundary of the site.

The MSTS also operates the North Las Vegas Facility (NLV); the Remote Sensing Lab at Nellis AFB, North Las Vegas, NV (RSLN); the Remote Sensing Lab at Andrews AFB, Maryland (RSLA); Special Technologies Lab at Santa Barbara, CA (STL); Livermore Operations at Livermore, CA (LO); and Los Alamos Operations at Los Alamos, NM (LAO).

2. Background

At the Nevada National Security Site (NNSS), the PULSE facility is purpose-built to provide a unique underground experiment test bed for conducting highly sensitive Subcritical Experiments (SCE). The U1a Complex Enhancement Project (UCEP) is a mission-critical initiative involving the precise design, construction, and

integration (including specialized mining) of highly custom structures, systems, and components (SSCs) directly required for the installation, precise operation, and continuous maintenance of advanced scientific equipment essential to SCEs. Within this demanding UCEP environment at the PULSE facility, the integrity and operational readiness of its support systems are paramount. These systems, encompassing specialized cooling water distribution units, manifolds, complex piping infrastructures, and highly sensitive specialty valves and instruments, are not standalone components but are critically interdependent. They collectively provide essential information, precise control, and integral overpressure protection, functioning as an integrated system whose seamless performance is non-negotiable for the safety, reliability, and successful execution of SCEs.

B-2 OBJECTIVE

MSTS requires the services of an experienced and highly specialized SUBCONTRACTOR whose expertise extends to the intricate demands of the UCEP environment, demonstrating a profound understanding of mission-critical systems. This encompasses an optional comprehensive flush and test (F/T) services for the new cooling water systems piping, executed precisely according to the design documents referenced in Sections B-3 and B-4. Furthermore, the SUBCONTRACTOR shall be responsible for the end-to-end provision of critical components: including the design, procurement, and fabrication of three Cooling Water Distribution Units (CDWUs), nine associated distribution manifolds, and 25 associated Chilled Doors. This also entails providing all necessary specialty valves, flowmeters, level, pressure, differential pressure, and temperature sensors for various UCEP support systems. Beyond component provision, the SUBCONTRACTOR will furnish highly skilled and technically adequate support for the installation of all components, as well as the identification, vetting, and management of a qualified sub-tier to execute the specialized flush and test services for the entire integrated system. While MSTS's Project Management Office retains oversight of project controls, the inherent complexities of these interconnected systems, coupled with their critical role within the PULSE facility's SCE mission, necessitate a SUBCONTRACTOR with a proven, system-wide understanding and the capability to manage all facets of this integrated effort, rather than fragmented expertise.

B-3 DESCRIPTION OF WORK

The SUBCONTRACTOR shall provide technically qualified resources that work as a part of a team under the direct oversight of MSTS. SUBCONTRACTOR resources shall be responsible for independently planning, organizing, and performing a wide variety of non-hazardous specialized administrative/technical duties in support of the successful completion of goals and deliverables. Additionally, the SUBCONTRACTOR shall furnish all necessary labor, technical and professional services, supervision, materials, tools, equipment, consumables, and payment of any applicable taxes to perform all operations necessary and required to perform the scope as directed by MSTS.

Unless otherwise approved, the SUBCONTRACTOR shall work in accordance with MSTS subcontract requirements.

The work scope for this activity includes the resources, material and/or equipment necessary to accomplish the following MSTS activities:

Description of Work: UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services

MSTS requires the services of a highly experienced and specialized SUBCONTRACTOR to execute a comprehensive, integrated scope of work critical to the UCEP mission at the PULSE facility. This work encompasses the full lifecycle provision and integration of highly specialized systems and components, including cooling water distribution units, associated manifolds and chilled doors, complex piping systems, and precision instrumentation, culminating in specialized flush and test services. All work shall be performed in strict adherence to MSTS subcontract requirements and applicable design documents, specifications, and drawings referenced in Sections B-3 and B-4, and the Submittal Register (Appendix A), unless otherwise approved.

The SUBCONTRACTOR's primary responsibilities include, but are not limited to, the following integrated activities:

1. Design, Procurement, Fabrication, and Delivery of Critical Systems and Components:

i. **Cooling Water Distribution Units (CWDUs):** Provide three (3) floor-mounted CWDUs, each comprising a heat exchanger, expansion tank, circulation pumps, internal piping, valves, associated instrumentation (control valves, relief valves, pressure and temperature sensors), and a control system. These CWDUs shall form complete, self-contained operating packages meeting all requirements of Specification 15-0-012 and 19-0-102, including but not limited to design, materials, fabrication, quality assurance, submittals, inspection, testing, documentation, and shipping requirements, with the intent that these CWDUs are commercially available pre-designed units. For each CWDU, the SUBCONTRACTOR shall confirm all design requirements and constraints, develop and obtain CONTRACTOR (MSTS) approval for final designs, procure all necessary assemblies/components/subcomponents, and acquire any required set-up computer programs/software. This process shall be formally documented through design submittal and approval records.

ii. **Cooling Water Manifolds and Chilled Doors:** Provide nine (9) commercially available manifolds (also called distribution headers), with internal piping, valves, and fittings that meet referenced specifications, P&IDs, and drawings. Provide a total of thirty-three (33) associated commercially available Chilled Doors (including MCD-M4-42U600-3, 42U600/3, Cools 7-14 KW, FULL PLC LOGIC/CTRL, BOTTOM FEED, and MCD-M4-42U600, 42U600/3, Cools 7-14 KW, FULL PLC LOGIC/CTRL, TOP FEED models, specific quantities as detailed in referenced specifications), each with internal piping and fittings that meet referenced specifications, P&IDs, and drawings. This includes providing thirty-three (33) MCD-IP: MOTIVAIR CHILLEDDOOR AND CDU BACNET IP COMMUNICATION DEVICE, thirty-three (33): MOTIVAIR CHILLEDDOOR A/B POWER FEED, C14 PLUG TYPE, twenty-two (22) MCD-PRESSURE: MOTIVAIR CHILLEDDOOR PRESSURE CONTROL, and two (2) MCD-M4-M12-PARTS: MOTIVAIR SPARE PARTS FOR CHILLED DOOR MODELS M4-M12 (including 1 fan, 2 probes, 1 PCO display, and 1 valve). For these components, the SUBCONTRACTOR shall confirm all applicable design requirements and constraints, develop designs for any required integration elements, obtain CONTRACTOR approval for all designs, procure all necessary assemblies/components/subcomponents, and acquire any required set-up computer programs/software. This entire process shall be thoroughly documented.

iii. **Specialty Valves and Instrumentation:** Provide a comprehensive suite of specialty valves, flowmeters, level, pressure, differential pressure, and temperature sensors for various UCEP support systems, as identified by series numbers 01889-19-MAS-003 through -010. This involves determining the components/subassemblies required for each instrument/valve (or approved equivalent) from the datasheets, procuring all necessary items (including one extra set of any gaskets, O-rings, or other software required for assembly), procuring any required set-up computer programs/software for each affected instrument/valve, assembling, setting up/aligning instruments/valves to data sheet specifications, and performing functional shop testing. The SUBCONTRACTOR shall ensure all software firmware versions are documented and, where available, provide archive versions. The SUBCONTRACTOR shall confirm all design requirements and constraints, develop and obtain CONTRACTOR approval for designs, procure all necessary assemblies/components/subcomponents for each instrument/valve, and acquire any required set-up computer programs/software. This shall be evidenced through comprehensive documentation including design validation reports and procurement records.

iv. **Ancillary Components:** Provide all CWDU-associated electrical, instrumentation, electronic components, wiring, Programmable Logic Controller (PLC) control systems, Variable Frequency Drives (VFD), junction boxes, and all interconnecting hoses and fittings (Simple connections for the piping (designed, procured, and installed by others) between the CWDUs and the manifolds and the manifolds and their cooling loads. Final lengths to be determined in engineering submittals, but not to exceed 1,000

feet overall length). Refer to 19-0-102 for Instrumentation and Control Requirements for Packaged Equipment. For all ancillary components, the SUBCONTRACTOR shall confirm design requirements and constraints, develop and obtain CONTRACTOR approval for designs, procure all necessary assemblies/components/subcomponents, and acquire any required set-up computer programs/software. Formal documentation of these steps, including relevant submittals and approval records, is required.

v. **Assembly and Packaging:** Assemble CWDUs and associated systems into installation packages, and label each component as specified. Package all instruments/valves as specified, ensuring all components are labeled according to requirements. Refer to 19-0-102 for Instrumentation and Control Requirements for Packaged Equipment.

vi. **Shipping and Spares:** Ship all packaged components to MSTS in accordance with Section 1.6 of 15-0-012, 19-0-102, and Section 1.4 of the 19-0-20X series of data sheet/specifications. Also, provide all equipment for site installation and component testing and any replacement parts for one year of service including seals, belts and any other part called out for repair or replacement in the MANUFACTURER's Operations and Maintenance (O&M) manual.

2. Specialized Flush and Test Services for Integrated Piping Systems: (OPTIONAL SCOPE)

i. **Execution of Flush and Test (F/T) Services:** Provide comprehensive flush and test services for piping that has been installed by the CONTRACTOR in the underground drifts. This includes integration and interfaces with existing PULSE CA and UW systems, and between new piping and components/equipment such as Scorpius water-cooled components, Scorpius pneumatic components, ECW piping and valves in U1a.102F Drift, CCW components/equipment (CCW pump skids, CCW heat exchangers, Cooling Water Distribution Units, Diagnostic rack cooling water doors, Air handling units), and SA components/equipment skids. For these critical F/T services, the SUBCONTRACTOR shall confirm all specific requirements and operational constraints, develop, and obtain CONTRACTOR approval for detailed flush and test plans and procedures, procure all necessary specialized F/T equipment and materials, and acquire any required set-up computer programs/software specifically for F/T activities. This entire process, from planning to execution, shall be rigorously documented for MSTS review and approval.

ii. **Systems Included:** The scope specifically covers F/T for the following critical systems with piping in the underground drifts: ECW (underground piping in U1a.102 and .102F Drifts), CCW (CWS 1/2/3), CWS4, SA, CA, and UW, as detailed in individual line lists (01889-16-LST-001, 01889-16-LST-006, 01889-16-LST-007, 01889-16-LST-008, 01889-16-LST-005, 01889-16-LST-009, 01889-16-LST-010).

iii. **F/T Planning and Procedures:** Develop and submit detailed flush and test plans for each system, based upon Section 345 of ASME B31.3 (2014), 01889-16-0-005, and 04618-16-0-001. Plans shall address flushing/cleaning strategy, prerequisites, precautions, flushing boundaries (with annotated P&IDs), witnessing and inspection requirements, sampling requirements, temporary flushing setup and connections, tools and instruments, flush water quality requirements, chemical cleaning requirements, backflushing equipment and terminal ends, and flush water and/or chemical cleaning conservation. The test plan shall address prerequisites, precautions, test boundaries (with annotated P&IDs), stand-off distances from pressurized piping, witnessing and inspection requirements, temporary test equipment setup and connections, tools and instruments, test water quality, test duration, test pressure (see 01889-16-LST-001, Line List, and 04618-16-LST-001, Piping Line List), and test water conservation. Procedures for flushing and testing activities shall be prepared and submitted for review and approval. Due to the hazards, complexity, and infrequent nature of flushing and testing of piping systems, the procedures shall be prepared for and performed as in-hand use. The procedures shall include: cover page, revision log, table of contents, purpose, scope, responsibilities, precautions and limitations, prerequisites, performance (discrete steps with responsibility for execution), acceptance criteria, valve line-ups, pre-flush and pre-test

checklists, and templates for flush and test reports. Isolation valves that establish the flush or test boundaries shall have LO/TO tags affixed to the valves prior to the start of the flush or test as required by CD-0280.037, “Lockout/Tagout”, or acceptable alternative. The supply and return headers in the Accelerator Hall have multiple branch lines connecting the headers to the ASD equipment. Each branch line includes an isolation valve that may function as the flush and test boundary. Hoses, tubes, or fittings between the isolation valves and the ASD equipment are not in the scope of the F/T Services. Isolation valves shall be in the shut position with the outlets plugged. Locations without a branch line shall have plugs inserted in the threadolets. The specific ASD headers and associated equipment that are out of the F/T scope are identified in the P&ID drawings referenced in Appendix B-5: Applicable Documents, Specifications, and Drawings.

- Required flush and test water composition and quality parameters.

iv. **Resources and Management for F/T:** Provide F/T plan, work control documents, equipment, material, calibrated instrumentation, quality fill and flush water, chemicals, water/chemical collection provisions, and test and sample documentation. This includes responsibility for temporary piping/hoses from manifolds to SUBCONTRACTOR’s equipment and temporary piping, tubing, hoses, etc. necessary to connect the SUBCONTRACTOR equipment to the piping being flushed and tested. SUBCONTRACTOR personnel shall connect and disconnect temporary piping, tubing, hoses, etc. to/from permanently installed piping and equipment skids. SUBCONTRACTOR shall be responsible to connect and disconnect temporary pipes, tubes, hoses, etc. necessary to bypass equipment that need not be flushed or tested: CCW pump skids, CCW heat exchangers, CCW vessels, Air handling units (AHUs), SA compressor skids. SUBCONTRACTOR shall drain and dry piping after completion of testing. SUBCONTRACTOR is responsible for supply, collection, and disposal of flushing, cleaning, and testing fluids.

v. **Sub-Tier Management for F/T:** The SUBCONTRACTOR shall manage a qualified sub-tier (or self-perform if possessing the requisite certifications) that possesses demonstrated experience and relevant certifications (e.g., specific ASME/API certifications for piping system F/T, NDT certifications) in performing specialized flush and test services in nuclear or high-hazard industrial environments. The sub-tier's qualifications shall be subject to MSTS approval.

vi. **CONTRACTOR Support:** The CONTRACTOR will support SUBCONTRACTOR F/T activities by providing site access as needed, laydown areas on the surface and underground for SUBCONTRACTOR’s vehicles and equipment, site specific training, and having completed preliminary leak checks of piping systems to identify and correct large leaks. CONTRACTOR shall provide power to SUBCONTRACTOR’s flush and test equipment, CA and UW to facility manifolds, and non-potable utility water to facility manifolds for general SUBCONTRACTOR site use, not for the specialized flush and test process. CONTRACTOR labor will be available to support SUBCONTRACTOR’S connection of equipment and set up of temporary flush and test equipment, if requested. CONTRACTOR will be responsible for the repair of any leaks identified during flushing or testing. CONTRACTOR personnel will be responsible for reassembly of systems following completion of testing and performing associated leak checks following reassembly. CONTRACTOR is responsible for removing or isolating components and equipment that will not be subjected to test pressure in accordance with Appendix B of Specification 16-0-005. CONTRACTOR will place the systems in the appropriate layup condition. CONTRACTOR will provide As Built Drawings for the following piping systems: UW, CA, ECW, and CCW (loops CWS1/2/3/4), and SA. The CONTRACTOR's Subcontract Technical Representative (STR) will provide oversight and review as defined in this SOW but will not provide dedicated continuous field assistance or monitoring during F/T activities beyond the specified labor support.

3. Quality Assurance/Quality Control and Safety:

i. **QA/QC:** SUBCONTRACTOR shall submit a Quality Assurance/Quality Control (QA/QC) Plan for CONTRACTOR approval. QA and QC on this project will include the flush and test of piping according to

American Society of Mechanical Engineers (ASME) and International Organization for Standardization (ISO) standards. The SUBCONTRACTOR Plan shall specify appropriate verification methods for performing inspections of F/T activities in accordance with the subcontract requirements, including utilizing a third-party inspector, hired by the SUBCONTRACTOR. The third-party inspector shall report their findings directly to CONTRACTOR. Also, SUBCONTRACTOR shall provide the following certifications to STR for review: Measurement and Test Equipment certifications calibrated to ISO 17025. CONTRACTOR Quality Assurance personnel will be responsible to validate and retain all SUBCONTRACTOR certifications. Perform Acceptance Testing per 15-0-012 and 19-0-102, before shipment:

a. Energize any electrical circuits at least 24 hours before the tests are conducted. The instrumentation SHALL remain energized throughout the test.

b. A complete functional test of all the system's features and components SHALL be performed, including simulated inputs / outputs and communication interface to CONTRACTOR's PCS.

c. Software testing and software testing documentation SHALL meet requirements of IEEE-829.

d. Hydrostatic testing with <50 ppm chloride water.

e. QA Program per ISO 9001 or AS9100; all welds inspected per ASNT SNT-TC-1A.

f. Develop and obtain approval for a design that meets the performance requirements.

g. Develop sample and inspection plans that identify the parameters to be verified and the associated acceptance criteria. The SUBCONTRACTOR shall document the successful completion of the samples and inspections in sample and inspection reports.

ii. **Safety Program:** The SUBCONTRACTOR'S Safety Program shall comply with the CONTRACTOR's safety requirements as described in Exhibit E. A full-time OSHA certified/CONTRACTOR approved safety representative shall be present during construction flush and test activities. Lockout/Tagout (LO/TO) activities during flushing and testing shall comply with CONTRACTOR's Company Directives CD-0280.037, "Lockout/Tagout" and CD-0280.026, "Electrical Safety", or CONTRACTOR approved acceptable alternatives. LO/TOs necessary for the execution of flushing and testing activities shall be approved by the CONTRACTOR before placement. SUBCONTRACTOR shall coordinate with the STR to obtain authorization, in advance, before transporting and using electronics with Wi-Fi/Bluetooth capabilities, lasers or radiological devices (e.g. nuclear density gauge), and Global Positioning System. SUBCONTRACTOR shall obtain written permission from CONTRACTOR at least two months prior to bringing a radioactive source of any type onsite; SUBCONTRACTOR shall comply with written conditions. CONTRACTOR will provide required personal protective equipment (PPE) necessary for access to the underground (belt, flashlight, and self-rescuer). SUBCONTRACTOR is responsible for providing its personnel with hard hat, steel-toed shoes, safety glasses with side shields, and any other PPE necessary to safely conduct flush and test activities. Tools and equipment utilized during flush and test services at PULSE must be cleared by RADCON prior to removal from NNSS in accordance with OP-0441.212.

4. Project Management, Planning, and Reporting:

i. **Integrated Project Planning:** Conduct integrated project planning activities, including the development, implementation, and maintenance of project schedule, status of resources, meetings and report(s) on the activities, and progress toward accomplishing project objectives. This will include elements of and support for CONTRACTOR's Earned Value Management System (EVMS) (see submittals identified in Section B-10).

ii. **Scheduling and Reporting:** The SUBCONTRACTOR shall be required to provide a resource/value loaded schedule to the CONTRACTOR monthly for earned value management of tasks. This shall include document reviews and comment resolution, preparation and approval of activity level work

control documents (ALWCDs), setup of temporary equipment, flushing, testing, documentation of results, removal of temporary equipment, disposal of flush and test water/chemicals, and project closeout. The SUBCONTRACTOR shall provide daily reports listing: work planned, and work accomplished, inspections performed (with results), flushes performed and sample results, tests accomplished and sample results, and any issues encountered and how remedied (or further action plan/log to remedy).

iii. **Project Execution Plan (PEP):** The SUBCONTRACTOR shall submit a Project Execution Plan (PEP) for review and approval by the CONTRACTOR. The PEP shall reflect needs for space for F/T trailer(s), power requirements, staging areas or laydown yards for equipment, materials, fill and flush water, chemicals, etc. The PEP shall provide information related to the sequencing of F/T activities, including work authorization and control, mobilization and demobilization schedules, suggested hold points to allow CONTRACTOR quality control personnel to observe or verify F/T activities, including sampling of flush water or chemicals.

iv. **Meetings and Communication:** SUBCONTRACTOR shall provide Project Management support to CONTRACTOR. SUBCONTRACTOR shall conduct review meetings and provide the agenda and meeting minutes. Before starting F/T activities, SUBCONTRACTOR and CONTRACTOR shall jointly conduct a strategy and planning meeting to discuss any outstanding requirements, PULSE safety procedures and expectations, and review local installation requirements for temporary equipment necessary for F/T activities. Before starting F/T, SUBCONTRACTOR and CONTRACTOR shall jointly conduct a Kick-off Meeting to introduce the parties of the project to one another and go over the unique aspects of F/T for this project. SUBCONTRACTOR shall have a representative physically present at the F/T Kick-Off Meeting.

v. **Work Control:** The Subcontractor shall develop work control documents as described in Section 6 of Exhibit E. Before starting F/T activities or other activity level work, the approved work control documents shall be listed on the PULSE Plan of the Day/Plan of the Week and released for work by PULSE Operations. Work control documents shall be completed two (2) weeks prior to the start of F/T activities outlined in the work control documents. Requests to connect systems and/or equipment to existing power, communications, UW, and CA infrastructure shall be submitted to the STR in writing at least four (4) weeks in advance.

5. Compliance and General Site Information:

i. **Site Operations:** The PULSE facility operates Monday through Thursday from 0700 until 1730. Surface work hours are 0700 until 1730. Underground work hours are typically 0830 until 1700. The SUBCONTRACTOR is responsible for scheduling its work activities consistent with the operating hours and days of the PULSE facility. Work can be performed on a second shift, with advance authorization from CONTRACTOR. Prior to scheduling any secondary or overtime shifts, SUBCONTRACTOR shall obtain CONTRACTOR written authorization permitting such secondary shift or overtime. A minimum of ten (10) days advance notice shall be provided to the CONTRACTOR for consideration of any secondary or overtime shift. The SUBCONTRACTOR is responsible for the additional costs associated with minimum safe facility staffing and operation of the access shafts and underground systems.

ii. **Verification:** SUBCONTRACTOR shall be responsible for verification of dimensions, measurements, applicable codes and standards, equipment, and components. This may be accomplished through the use of as-built drawings, on-site investigations, and coordination with applicable suppliers, as necessary to assure accuracy and compliance.

iii. **Waste Management:** SUBCONTRACTOR shall submit a Waste Management Plan to CONTRACTOR for approval before F/T activities begin. The plan shall include water and chemical materials as well as water with chlorine greater than 20 ppm shall be dechlorinated to less than 20 ppm prior to disposal.

6. Task(s)

The SUBCONTRACTOR shall perform all tasks necessary to provide a complete and integrated solution, encompassing the design, fabrication, testing, and delivery of all specified systems and components, and providing the expert technical support required for their successful integration and eventual system-wide validation. The SUBCONTRACTOR's role is to deliver fully tested and documented components and to provide expert advisory support to the MSTS installation team. All physical installation activities shall be performed exclusively by the MSTS CONTRACTOR or their designated agents.

The SUBCONTRACTOR shall perform the following specific tasks:

i. **Integrated Design and Engineering:**
   a. **Design Integrated Systems:** Design the Cooling Water Distribution Units (CWDUs), associated manifolds, Chilled Doors, and all required connections, including necessary anchoring and lifting fixtures.
   b. **Develop Detailed Documentation:** Develop detailed drawings for each specialty valve and instrument line item (providing both native file and PDF formats).
   c. **Determine Component Requirements:** meticulously determine all components and subcomponents required for each instrument, valve, CWDU, manifold, and Chilled Door, ensuring full compliance with the cited 19-0-20X series, 19-0-102, and 15-0-012 series specifications and datasheets.
   d. **Obtain Approval for Equivalents:** Obtain prior MSTS written approval for any proposed equivalent components or substituted subassemblies to ensure full system compatibility.
   e. **Perform Sizing Calculations:** All sizing calculations, engineering, and design shall be performed and documented in accordance with the 19-0-20X and 19-0-102- specifications.

ii. **Comprehensive Procurement:**
   a. **Procure System Components:** Procure all necessary components, subcomponents, and materials for the CWDUs, manifolds, and Chilled Doors.
   b. **Procure Instrumentation Components:** Procure all necessary components and subcomponents for each specialty instrument and valve, including one extra set of any gaskets, O-rings, or other software required for assembly.
   c. **Procure Software:** Procure any required set-up computer programs or software for each affected instrument, valve, and CWDU.

iii. **Specialized Fabrication, Assembly, and Setup:**
   a. **Fabricate and Assemble Systems:** Fabricate and assemble all CWDUs, manifolds, and Chilled Doors.
   b. **Assemble Instrumentation:** Assemble each specialty instrument and valve, providing clear documentation of the major assembly steps.
   c. **Configure and Align:** Set up and align all instruments and valves precisely to their data sheet specifications and document the final setup configuration.

iv. **Rigorous Testing, Documentation, and Quality Control:**
   a. **Conduct Inspections and Tests:** Conduct all specified inspections and functional (shop) tests in accordance with Specifications 15-0-012, 19-0-102, and the 19-0-20X series to ensure proper operation of all components prior to shipment.
   b. **Document Software:** Document all software and firmware versions and, where possible, provide complete archive versions to MSTS.
   c. **Provide Submittals:** Provide all specified submittals as detailed in Specifications 15-0-012, 19-0-102, and the Submittal Register.
   d. **Label Components:** Label each instrument, valve, and major component as specified.

v. **Packaging, Shipping, and On-Site Support:**

a. **Package for Shipment:** Upon successful testing and approval, package all instruments, valves, CWDUs, manifolds, Chilled Doors, and extra sets of gaskets, O-rings, or other software for shipment.
b. **Ship to NNSS:** Ship all items to the NNSS, ensuring full compliance with the packaging and shipping requirements of Specification 15-0-012 (Section 1.6), 19-0-102, and the 19-0-20X series of specifications (Section 1.4).
c. **Provide Technical Advisory Support:** As requested by the CONTRACTOR, provide onsite technical advisory support to the MSTS installation team. This expert support is limited to verbal direction and guidance to ensure proper integration; it does not include physical "hands-on" installation work.

7. Acceptance Criteria

Work products and services provided shall meet all applicable MSTS procedures for control and review of work products and pertinent regulatory requirements, as required by this subcontract and incorporated provisions.

Further specific Acceptance Criteria applicable to this scope includes

i. **Component and System Acceptance:**
   a. **Material and Component Quality:** All delivered systems, components (including CWDUs, manifolds, Chilled Doors, instruments, and valves), and materials must be verifiably new, free of fabrication defects, and show no visible shipping damage upon delivery.
   b. **Compliance with Specifications:** All work, components, and materials must be performed and provided to the standards cited in the applicable 19-0-102, 19-0-20X series, 15-0-012, and 16-0-005 specifications and data sheets. The SUBCONTRACTOR shall comply with either the ISO or SAE quality standard as specified, but not both.
   c. **Successful Factory and Shop Testing:** All required factory acceptance tests (FAT) for CWDUs and functional shop tests for specialty instruments and valves must be successfully completed and documented, demonstrating full operational capability prior to shipment.

ii. **Documentation and Submittal Acceptance:**
   a. **Complete Submittal Package:** All submittals required by the Submittal Register and Section 1.3 of all 19-0-20X series, 19-0-102, and 15-0-012 specifications must be provided, reviewed, and approved by MSTS.
   b. **Comprehensive Equipment Documentation:** All furnished equipment must be accompanied by comprehensive documentation, including approved final design drawings, calculations, manufacturer's Operation & Maintenance (O&M) manuals, technical specifications, and all quality inspection and test reports.
   c. **Design Milestone Approval:** The 60%, 90%, and 100% Preliminary Design Reports must meet all technical and formatting requirements stipulated in Specification 15-0-012 and this SOW and receive final approval from MSTS.

iii. **Installation Support Acceptance:**
   a. **On-Site Support:** The SUBCONTRACTOR shall have provided qualified engineering and technical advisory support for the installation of all delivered equipment, as requested by the CONTRACTOR.

iv. **Final Flush and Test (F/T) Services Acceptance: (OPTIONAL SCOPE)**
   a. **Successful F/T Execution:** The SUBCONTRACTOR shall have successfully completed the flush and test services for all required piping systems as described in this SOW and associated specifications, drawings, and requirements.
   b. **Documented F/T Completion:** The following activities must be completed and documented per Specification 16-0-005, section 3.2.11, to the satisfaction of MSTS:
      1. **Flushing Complete:** Flushing of all in-scope piping is complete, with flush water samples

achieving the required water quality stated in the Specifications.
2. **Testing Complete:** Hydrostatic testing of all in-scope piping is complete, with no visible leakage from the tested pipe sections when pressurized to the test pressure required by the Line List and Specifications.
3. **Fluid Removal:** All flush and test water and any associated chemicals have been collected and fully removed from the underground facility.
4. **System Condition:** All tested piping has been completely drained and dried to the specified condition.
5. **Demobilization of Temporary Equipment:** All of the SUBCONTRACTOR's temporary equipment, including pipes, tubes, fittings, and gaskets, have been disconnected from the permanent piping and equipment.
6. **Site Cleanup:** All of the SUBCONTRACTOR's temporary equipment, materials, and waste have been fully removed from the underground work areas.

B-4 PERSONNEL REQUIREMENTS

1. Training

The SUBCONTRACTOR and its personnel will be required to attend the following site-specific training in the course of this work scope.

NOTE: Site access may be delayed until training is complete or renewed. The SUBCONTRACTOR shall contact the Subcontract Technical Representative (STR) to coordinate scheduling of training. See Section B-6, item 6, Badging.

Description	Duration	Frequency
General Training Requirements:		
NNSS Site Access Safety Orientation (1E00W102)	0.5 Hours	One time only
Activity Level Work Control Document Reviews, Task Previews, Pre-Job Briefings, and Post-Job Debriefings (1G00W567)	0.5 Hours	One time only
Initial Security Briefing. DOE O 470.4B, "Safeguards and Security Program" (1S000110) as well as DOE O 470.4B Chg. 3 (Ltd.Chg.)	0.75 Hours	One time only
Counterintelligence Awareness Briefing (1S000170)	1.0 Hours	365 days
General Employee Training (GET) (1E000046)	2.0 Hours	N/A
General Employee Radiological training (GERT) (1E00W585)	0.5 Hours	730 days
Cyber Security training (1S00W180)	1.0 Hour	365 days
Additional Standard Training Requirements:		
Underground Safety for Non-Miners (1E000669)	8.0 Hours	365 days
Tool Pouch Maintenance (JHA) (WBT) (1E00W286)	0.5 Hours	730 days
Standard Industrial Hazards & Controls Awareness (WBT) (1E00W287)	0.5 Hours	Annual
MSTS Export Control Awareness (WBT) (1H00W310)	0.25 Hours	730 days
Protective Actions - How to Act During an Emergency (WBT) (1REMPAW1)	0.5 Hours	365 days
Overview of Controlled Unclassified Information (WBT) (1S00W115)	1.0 Hour	730 days
Integrated Work Control Process (WBT) (1G00W552)	1.0 Hour	730 days

PULSE Underground Qualification Training Requirements:		
U1a Complex EPIP Briefing (1U1AW0007)	0.5 Hours	365 days
U1a MineArc Refuge Chamber Briefing (WBT) (1U1AW030)	0.5 Hours	N/A
U1A General Employee Training (WBT) (1U1AW029)	0.75 Hours	N/A
U1a Site Specific Tour (1E00A662)	2.0 Hours	730 days

The SUBCONTRACTOR shall maintain training records for their personnel and ensure all required training is completed prior to start of work. Additionally, as soon as practical after award, the SUBCONTRACTOR shall submit a badge request for personnel required under the various releases so that they may be scheduled for training and medical evaluation so that crews will be eligible for work on site.

2. Qualifications, Licensing and Certifications

The SUBCONTRACTOR shall ensure that its personnel meet and maintain the appropriate training, qualifications, licensing, and certification requirements to perform the work as specified in this Statement of Work (SOW). The SUBCONTRACTOR shall provide appropriately trained and qualified staff to perform the type of work in accordance with the specifications, exhibits, and other documents, which are made by reference, and part of this SOW. Additionally, the SUBCONTRACTOR shall perform work in accordance with the specifications, exhibits, and other documents, which are made by reference, and are a part of the SOW.

In order to determine if the SUBCONTRACTOR is qualified to perform the scope of work as outlined, the SUBCONTRACTOR must have the following qualifications:

SUBCONTRACTOR shall have a minimum of 6 years of experience with design and build of this type of work.

In addition to the above, the SUBCONTRACTOR shall provide qualified personnel throughout the period of performance of the Subcontract. SUBCONTRACTOR shall be responsible for ensuring its personnel meet and/or maintain current and valid training requirements, certifications, and are fully capable of completing the duties described through the entirety of the Subcontract period of performance.

B-5 TECHNICAL REQUIREMENTS

The SUBCONTRACTOR shall perform in accordance with the terms and conditions of this contract, MSTS internal policies and procedures, and quality assurance provisions, including safety programs, laws, orders, permits, rules, confidentiality of information and intellectual property safeguards. In addition, the SUBCONTRACTOR shall perform work in accordance with the national codes, specifications, drawings, exhibits, and other documents, which by reference are made a part of the SOW.

Inspection of the work required by governmental agencies shall be arranged by the STR. The SUBCONTRACTOR shall request inspections through the STR, after the work is ready for inspection.

1. Specifications

SPEC NUMBER	TITLE	REV	PAGES

13-0-360	Specification for Grouting Equipment and Structural Supports	0	18
13-0-511	Erection of Structural Steel and Miscellaneous Metals	0	26
15-0-012	CWDU and Manifolds Specification	0	33
16-0-001	Piping Material Specification	4	24
16-0-002	Piping Protective Coatings Specification	3	27
16-0-003	Valve Specification	2	23
16-0-004	Shop Piping Specification	0	23
16-0-005	Field Fabrication Specification	1	41
16-0-006	Pipe Welding Specification	0	19
16-0-007	Thermal Insulation Specification	0	40
16-0-008	Pipe, Fittings, and Flanges Specification	0	17
16-0-009	Pipe Supports Specification	1	21
17-0-107	Variable Frequency Drive Specification	0	30
17-0-110	Low Voltage Motor Specification	0	29
17-0-400	Electrical Requirements for Packaged Mechanical Equipment	0	30
19-0-102	Instrumentation and Control Requirements for Packaged Equipment	0	54
19-0-202	Control Valves Datasheets	0	47
19-0-203	On-Off Valve Datasheets	0	52
19-0-204	Pressure Relief Valves Datasheets	0	51
19-0-205	Pressure, Differential Pressure, Level and Temperature Transmitters Datasheets	0	116
SPEC NUMBER	TITLE	REV	PAGES
19-0-206	Vortex Flowmeters Datasheets	0	49

19-0-207	Pressure Gauges Datasheets	0	16
19-0-208	Leak Detector Switches Datasheets	0	30
19-0-214	Control Narrative Process Utility Systems	0	50
21-0-001	Site Conditions Specification	0	10
01889-19-MAS-003	On-Off (Gate) Valves (MOV) MAS	0	3
01889-19-MAS-004	Pressure Relief Valves MAS	0	3
01889-19-MAS-005	Thermal Relief Valves MAS	0	3
01889-19-MAS-006	Pressure, DP, Level, Temp Transmitters MAS	0	7
01889-19-MAS-007	Vortex Flowmeters MAS	0	3
01889-19-MAS-008	Pressure Gauges MAS	0	3
01889-19-MAS-009	Leak Detectors MAS	0	3
01889-19-MAS-010	Control Valves (MOV) MAS	0	3

2. Drawings

DRAWING NUMBER	TITLE	REV	PAGES

System Descriptions			
01889-21-RPT-002	System Description for the U1A Cooling Water System 4 (CWS4)	0	13
01889-21-RPT-003	System Description for the U1A ECSE Chilled Water (ECW) System	0	17
01889-21-RPT-005	System Description for the U1A Service Air System (SA)	0	11
Piping and Instrumentation Diagrams			
01889-DA-6200A	U1a Complex - UCEP Subproject 020 Service Air System Process Flow Diagram	0	1
01889-DA-6200B	U1a Complex - UCEP Subproject 020 Service Air System Mass & Energy Balance Process Flow Diagram	0	1
01889-DA-6214	UCEP Service Air Compressors and Wet Air Receiver	0	1
01889-DA-6215	UCEP Service Air Filter Dryer Package and Service Air Receiver	0	1
01889-DA-6216	UCEP Service Air Supply Header	0	1
01889-DG-6201	U1a COMPLEX UCEP - SUBPROJECT 020 GAS MANAGEMENT SYSTEM VCS AND PFGC	1	1
01889-DG-6200	U1a Complex - UCEP Subproject 020 Gas Management System - Post Execution Vacuum Cart Piping & Instrumentation Diagram	1	1
01889-DW-6201	UCEP Common Cooling Water Pumps	0	1
01889-DW-6202	UCEP CWS3 Heat Exchanger	1	1
01889-DW-6203	UCEP CWS3 Supply Return Headers	1	1
01889-DW-6204	UCEP CWS4 Pump	0	1
01889-DW-6205	UCEP CWS4 Heat Exchanger	1	1
DRAWING NUMBER	TITLE	REV	PAGES
01889-DW-6206	UCEP CWS4 Filter	0	1

01889-DW-6207	UCEP CWS4 Supply/Return Headers	0	1
01889-DW-6209	UCEP CWS1 Heat Exchanger	0	1
01889-DW-6210	UCEP CWS1 Supply Return Headers	1	1
01889-DW-6212	UCEP CWS2 Heat Exchanger	0	1
01889-DW-6213	UCEP CWS2 Supply/Return Headers	1	1
01889-DW-6220	UCEP ECSE Chilled Water Supply Return Headers	1	1
01889-DW-6221	UCEP Secondary Cooling Water - ECSE Area Server Racks	0	1
01889-DW-6222	UCEP Secondary Cooling Water - Zero Room	1	1
01889-DW-6223	UCEP Secondary Cooling Water - NDSE and SCE Room	0	1
01889-DW-6224	UCEP Secondary Cooling Water - Manifold and Valve Table	0	1
04618-DA-6246	Service Air ASD Header	0	1
04618-DW-6240	CWS1 ASD Headers	1A	1
04618-DW-6241	CWS1 ASD Connection Details	1A	1
04618-DW-6242	CWS2 East ASD Headers	1A	1
04618-DW-6244	CWS4 East ASD Headers	1A	1
04618-DW-6247	*CWS2 East ASD Connection Details Sheet 1*	1A	1
04618-DW-6248	CWS2 East ASD Connection Sheet Details 2	1A	1
04618-DW-6249	CWS4 East ASD Connection Details Sheet 1	1A	1
04618-DW-6250	CWS4 East ASD Connection Details Sheet 2	1A	1
01889-GI-0200	U1a Complex - UCEP Subproject 020 UCEP Process and HVAC Drawing List	0	1
DRAWING NUMBER	TITLE	REV	PAGES
01889-GI-0201	Symbols - UCEP P&ID Equipment and Piping	0	1

01889-GI-0202	Symbols - UCEP P&ID Instrument Symbols & Valve Details	0	1
01889-GI-0203	Legend - UCEP P&ID Tagging, Legends and Acronyms	0	1
01889-GI-0204	UCEP P&ID Control Valve Detail Legend	0	1
04618-GI-0211	P&ID Equipment and Piping - Symbols and Legend	0	1
04618-GI-0212	P&ID Equipment Symbols & Valve Details - Symbols and Legend	0	1
04618-GI-0213	P&ID Tagging, Legends & Acronyms - Symbols and Legend	0	1
Equipment Arrangements			
01889-M-4201	U1a UNDERGROUND - U1a.104/108 EQUIPMENT ARRANGEMENT	0	1
01889-M-4202	U1a.102 EQUIPMENT ARRANGEMENT	0	1
01889-M-4203	U1a.100 AND 103 EQUIPMENT ARRANGEMENT	0	1
01889-M-4204	U1a.100 AND ZERO ROOM EQUIPMENT ARRANGEMENT	1	1
01889-M-4205	U1a.102D and 106B EQUIPMENT ARRANGEMENT	0	1
Piping Plans and Sections			
01889-M-1003	Utility Manifold Plan	0	1
01889-M-4300	U1a Chilled and Cooling Water System - Overall Piping Plan	0	1
01889-M-4301	Piping Plan - Underground - U1a.108	0	1
01889-M-4302	Piping Plan - Underground - U1a.104/108	2	1
01889-M-4303	Piping Plan - Underground - U1a.108	0	1
01889-M-4304	Piping Plan - Underground - U1a.108	0	1
DRAWING NUMBER	TITLE	REV	PAGES
01889-M-4305	Piping Plan - Underground - U1a.108	0	1

01889-M-4306	Piping Plan - Underground - U1a.102,108.	2	1
01889-M-4308	U1a.102 PIPING PLAN - UPPER	1	1
01889-M-4309	Piping Plan - Underground - U1a.102 - Upper	1	1
01889-M-4310	Piping Plan - Underground - U1a.102 and U1j Utility Shaft - Upper	1	1
01889-M-4311	Piping Plan - Underground - U1a.102 - Upper	1	1
01889-M-4312	Piping Plan - Underground - U1a.102 - Upper	1	1
01889-M-4313	Piping Plan - Underground - U1a.102,102D	3	1
01889-M-4314	Piping Plan - Underground - U1a.102	3	1
01889-M-4315	Piping Plan - Underground - U1a.100/102	3	1
01889-M-4316	Piping Plan - Underground - U1a.100	2	1
01889-M-4317	Piping Plan - Underground - U1a.100	1	1
01889-M-4318	Piping Plan - Underground - U1a.100	2	1
01889-M-4319	Piping Plan - Underground - U1a.100 (Zero Room)	0	1
01889-M-4320	Piping Plan - Underground - U1a.100 (Zero Room)	1	1
01889-M-4321	Piping Plan - Underground - U1a.102 - Lower	1	1
01889-M-4322	Piping Plan - Underground - U1a.102 - Lower	2	1
01889-M-4323	Piping Plan - Underground - U1a.102 - Lower	1	1
01889-M-4324	Piping Plan - Underground - U1a.102 - Lower	0	1
01889-M-4325	Piping Plan - Underground - U1a.102 - Lower	1	1
01889-M-4326	Piping Plan - Underground - U1a.108	0	1
01889-M-4327	Piping Plan - Underground - U1a.108	1	1
DRAWING NUMBER	TITLE	REV	PAGES
01889-M-4328	Piping Plan - Underground - U1a.102D	1	1

01889-M-4329	Piping Plan - Underground - U1a.102D	1	1
01889-M-4330	Piping Plan - Underground - U1a.103	0	1
01889-M-4331	Piping Plan - Underground - U1a.103	1	1
01889-M-4350	PIPING SECTION - U1a.108	0	1
01889-M-4351	PIPING SECTION - U1a.104,108	1	1
01889-M-4352	PIPING SECTION - U1j. BORE HOLE	0	1
01889-M-4353	PIPING SECTION - U1a.102	0	1
01889-M-4354	PIPING SECTION - U1a.102	1	1
01889-M-4355	PIPING SECTION - U1a.102	0	1
01889-M-4356	PIPING SECTION - U1a.102	0	1
01889-M-4357	PIPING SECTION - U1a.100/103	0	1
01889-M-4358	PIPING SECTION - U1a.100 ZERO ROOM	1	1
01889-M-5004	Manifold Details	1	1
01889-M-5281	Underground - U1a.104,108 - Tie Point Plot Plan	0	1
01889-M-5282	Underground - Drift 102,102F - Tie Point Plot Plan	1	1
01889-M-5283	Underground - Drift U1a.100,108 - Tie Point Plot Plan	0	1
04618-P-4400	CWS1 - PIPING PLAN	1	1
04618-P-4401	CWS BRANCH SECTIONS	1	1
04618-P-4402	U1a. 104 SOUTH CWS PLAN	2	1
04618-P-4403	SOUTH CWS SECTIONS	1	1
04618-P-4404	SOUTH CWS SECTIONS	1	1
04618-P-4405	SOUTH CWS SECTIONS	2	1
DRAWING NUMBER	TITLE	REV	PAGES
04618-P-4406	SA NORTH & SOUTH SECTIONS	1	1

Lists			
01889-16-LST-001	Line List	1	8
01889-16-LST-002	Valve List	3	32
01889-16-LST-003	Piping Specialty Item List	1	4
01889-16-LST-005	SUBSURFACE SA ISOMETRIC LIST	2	4
01889-16-LST-006	SUBSURFACE ECW ISOMETRIC LIST	4	6
01889-16-LST-007	U1a Complex - UCEP Subproject 020 - Subsurface CCW Isometric List	8	17
01889-16-LST-008	U1a Complex - UCEP Subproject 020 - Subsurface CWS4 Isometric List	4	6
01889-16-LST-009	Sub Surface Compressed Air List	0	3
01889-16-LST-010	Subsurface UW Isometric List	0	3
04618-16-LST-001	Piping Line List	1	16
ARCHITECTURAL			
01889-A-0200	U1a Complex Plan Equipment Arrangement Key Plan	1	1
01889-A-0201	Plot Plan	1	1
01889-A-0202	Key Plan	1	1
01889-A-1201	GA Drift Overall Floor Plan	0	1
04618-A-0300	U1a. 104 - SOUTH PIPING PLAN	2	1
04618-A-0301	U1a. 104 - NORTH PIPING PLAN	1	1
04618-A-0302	TIE POINT DRAWING	1	1
04618-A-0303	SA NORTH PLANS	1	1
DRAWING NUMBER	TITLE	REV	PAGES

Design Criteria Document			
01889-DCD-04	Fluid and Gas Systems Design Criteria Document	2	17

B-6 PLACE OF PERFORMANCE

The performance of this integrated SOW will occur at multiple locations, encompassing the SUBCONTRACTOR's off-site facilities for fabrication and testing, designated MSTS delivery and laydown areas, and specific underground work locations for final system validation.

1. **Fabrication and Pre-Shipment Testing:**
    a. Work Location: All design, engineering, fabrication, assembly, and pre-shipment functional testing of the Cooling Water Distribution Units (CWDUs), manifolds, specialty valves, and instruments shall be performed at the SUBCONTRACTOR's facility.
    b. SUBCONTRACTOR to specify facility address upon award.
2. **Component Delivery Location**
    a. Delivery location will be Nevada National Security Site Receiving Warehouse 160 Mercury, NV 89023
    b. The delivery location shall be for all fabricated systems and components (including CWDUs, manifolds, Chilled Doors, specialty valves, and instruments).'
    c. Optional Delivery/Staging Location: While the primary delivery location is Warehouse 160, an alternate optional delivery and staging location may be utilized **only if** it is first coordinated with and formally designated in writing by the STR prior to shipment. The pre-approved optional location is:
        - UCEP Laydown Yard, Area 6, PULSE Facility
3. **On-Site Technical Support and Flush & Test Services: (OPTIONAL SCOPE)**
    a. **Work Location:** All on-site work, including technical advisory support during installation and all Flush and Test (F/T) services, will be performed at the Nevada National Security Site (NNSS) within the PULSE facility. Specific underground work locations include, but are not limited to:
        - Underground Drifts U1a.100, .102, .102B, .102D, .102F, .103, .104, .106, .106B, and .108.
4. **Site Access and Work Hours**

MSTS personnel at the NNSS work a standard 4/10 schedule. The standard work week consists of ten (10) hours of work between 6:00 a.m. and 4:30 p.m. with one-half hour designated as an unpaid period for lunch, Monday through Thursday.

Onsite work required to be performed outside normal operating hours shall be coordinated and/or approved through the STR and/or the Procurement Specialist prior to performing work.

MSTS observes ten (10) Federal Holidays per year and four (4) weeks of non-productive time in December/January. The four (4) weeks of nonproductive time includes two (2) weeks of craft furlough days (end of calendar year holiday period) and two (2) weeks of block training at the PULSE facility. In addition, the facility may experience additional outages or unavailability on average of approximately forty (40) non-productive days per fiscal year for PULSE.

5. **Badging**

Any onsite work shall be coordinated with the STR in accordance with the SOW and site-specific training requirements. The SUBCONTRACTOR shall wear an MSTS issued security badge identifying themselves. The SUBCONTRACTOR shall wear a Contractor issued security badge identifying themselves. A minimum of ten (10) working days advance notice is needed for site badging. SUBCONTRACTOR employees shall be required to

submit to vehicle searches and not personally carry or transport certain prohibited articles (ProhibitedControlledArticlesPolicy.pdf).

B-7 CLEARANCE REQUIREMENTS

The following access authorization or clearance requirements are required.

1) Check all that apply:

- ☒ No security clearance; unclassified work
- ☐ DOE L
- ☐ DOE Q
- ☐ HSPD-12 PIV Credential

2) If applicable, add any or all parts of the following statement security qualifications:

- ☐ The SUBCONTRACTOR shall have the ability to obtain a U.S. Department of Energy (DOE) facility security clearance and have personnel capable of obtaining a Q-type or L-type security clearance.
- ☐ Q- or L-type security clearance is required for all SUBCONTRACTOR personnel having access to classified information or special nuclear material when performing such work.
- ☐ A corresponding level of security clearance from another federal agency may be applicable if approved by the MSTS and DOE.
- ☒ N/A

B-8 SPECIAL REQUIREMENTS

1. Qualifications, Licensing, Certifications

In order to determine the SUBCONTRACTOR or SUB-TIER qualified to perform the Flush and Test Services scope of work as outlined, the SUBCONTRACTOR or SUB-TIER must meet the below minimum qualifications:

a. Experience - SUBCONTRACTOR or SUB-TIER shall have the following job experience

i. SUBCONTRACTOR or SUB-TIER shall have minimum 5 years of experience in (providing F/T services, similar to the scope and complexity of the work as described.

ii. In addition, the SUBCONTRACTOR's or SUB-TIER personnel shall meet the minimum requirements as stated:

1. QA - Minimum of five (5) years of experience in performing quality assurance related activities.
2. Program/Project Manager - Minimum of five (5) years of experience in managing projects similar in size, scope, and complexity.
3. Superintendent - Minimum of eight (8) years of experience in performing on-site execution of construction related work.

4. Safety - Minimum of five (5) years of experience in performing safety related duties on a full-time basis AND Qualified in accordance with OSHA 30Enter type of worky the CONTRACTOR as satisfactory.

iii. SUBCONTRACTOR or SUB-TIER shall have previous experience of progressive responsibility in administrative coordinative program experience

iv. SUBCONTRACTOR or SUB-TIER shall have demonstrated experience at a government facility, working with multiple regulators and clients in an operational environment.

v. SUBCONTRACTOR or SUB-TIER shall have experience in preparing evaluations and forecasts for maintenance services to ensure service delivery

b. Licenses – SUBCONTRACTOR or SUB-TIER shall have the following job-specific licenses:

i. Not Applicable, no specific licenses required.

c. Certifications – SUBCONTRACTOR or SUB-TIER shall have the following job-specific certifications:

i. Not Applicable, no specific certifications are required.

In addition to the above, the SUBCONTRACTOR or SUB-TIER shall provide qualified personnel throughout the period of performance of the Subcontract. SUBCONTRACTOR or SUB-TIER shall be responsible for ensuring its personnel meet and/or maintain current and valid training requirements, certifications and are fully capable to complete the duties described through the entirety of the Subcontract period of performance.

2. Government Assets

Use of Government Vehicles	
☒	There is **NO** anticipated need for any SUBCONTRACTOR employees to use a Government-furnished vehicle in the performance of this SOW. The SUBCONTRACTOR's employees, therefore, are specifically prohibited from driving any Government-furnished vehicles under the performance of this SOW unless this SOW is formally modified by the parties and the employee(s) will present a valid driver's license to the STR for review.
☐	One or more SUBCONTRACTOR employees will have access to Government-furnished vehicles while performing this SOW.
Government Property	
☒	Government Property **NOT** anticipated to be furnished to or acquired by the SUBCONTRACTOR under this SOW.
☐	Pursuant to Federal Acquisition Regulation (FAR) 52.245.1 – Government Property, the following Government-owned property will be furnished to the SUBCONTRACTOR. The SUBCONTRACTOR shall be responsible for managing the Government-Furnished Property (GFP) below and/or Contractor-Acquired Property (CAP) as required in accordance with FAR 52.245-1. A list of the property to be furnished to the SUBCONTRACTOR can be found in Appendix Choose an item, along with any special technical and/or handling instructions.

3. Quality Assurance (QA)

The work as described has been identified to be.

☐	**SAFETY CLASS/SAFETY SIGNIFICANT SERVICES AND/OR COMMODITIES (NUCLEAR/RADIOLOGICAL)** This PO is related to items or services used in support of the nuclear and/or radiological mission(s) of the Nevada National Security Site, therefore: The SUBCONTRACTOR shall implement and maintain a Quality Assurance (QA) program in accordance with at least one the following quality assurance criteria and requirements: • ASME NQA-1 (2015) quality assurance requirements for nuclear facility applications • ASME NQA-1 (2008 with 2009 addenda) quality assurance requirements for nuclear facility applications • Equivalent program authorized in writing by the contractor's quality assurance organization In addition, the SUBCONTRACTOR shall be responsible for: **Price Anderson Amendments Act (PAAA)** The item or service identified in the purchase order agreement is being procured by a contractor to the Department of Energy (DOE)/National Nuclear Security Administration (NNSA). This item or service is intended to be used in the performance of activities that (1) prevent or mitigate radiological or harm to the worker, the public or the environment or (2) provide a healthful and safe workplace for DOE/NNSA contractor personnel. Therefore, the SUBCONTRACTOR is responsible for assuring that the items or services provided under this purchase agreement meet the stated requirements.
☒	**GENERAL SERVICES AND/OR COMMODITIES** This subcontract is for items or services that support the mission(s) of the Nevada National Security Sites, therefore: **SUSPECT/COUNTERFEIT ITEMS REQUIREMENTS**: The SUBCONTRACTOR will take positive measures to ensure that only new, unused equipment/material from acceptable sources is provided under this subcontract. Notwithstanding any other provisions of this subcontract, should any suspect/counterfeit items or components be found within or on this equipment during contractor receipt inspection, SUBCONTRACTOR shall, at its expense, promptly replace such items or components. These requirements shall be flowed down to all levels of subcontractors as they pertain to this procurement activity.

B-9 ENVIRONMENTALLY PREFERABLE PRODUCTS

MSTS is required by the U.S. Department of Energy to purchase Environmentally Preferable Products (EPP) (also known as green or sustainable purchasing) and are also required to flow those procurement requirements to their SUBCONTRACTOR. When designing materials and/or supplying materials to be used onsite as part of a subcontract SOW, those materials must meet these same requirements.

The following is a list of EPP types that must be used if they are available:

- **Products with Recycled Content.** MSTS supports efforts that reduce or eliminate environmental hazards, conserve environmental resources, minimize life-cycle cost and liabilities. Towards the end, the acquisition cycle is viewed as an important key in understanding what is brought onto the Site as well as identifying what can be reused/recycled. Focus is directed on recycled-content, biobased-content, ozone-

depleting substances, and other environmental impacts. Specific additional clauses are included in this solicitation that address potential requirements and preferences based on the nature of the item being considered for purchase.

- **Water Efficient Plumbing Products**. When purchasing commercially available, off-the-shelf water consuming products, products must meet EPA's WaterSense standards (http://www.epa.gov/watersense).
- **Non-Toxic or Less Toxic Alternatives**
- **Green Certified Products**. (e.g., Design for Environment, Green Seal)
- **Bio-Based Products**. MSTS will give preference to acquiring Department of Agriculture designated biobased products. For more information to this program, see www.biopreferred.gov.
- **Energy Efficient Products**.
  - EPA Energy Star® When purchasing commercially available, off-the-shelf energy-consuming products, products must be Energy Star rated (www.energystar.gov).
  - Federal Energy Management Program designated products, When purchasing commercially available, off-the-shelf energy-consuming products, products must use no more than one watt of standby power as defined and measured by International Electrotechnical Commission (IEC) code 62301 or otherwise met FEMP specifications for low standby power consumption. If FEMP has not specified a standby power level for a product category, the item shall be the lowest standby power consumption available.
- **Energy Efficient Electronics**. When purchasing the following products, EPEAT ratings will apply:
  - Desktop and Notebook Computers – must meet the EPEAT silver rating or higher
  - Displays, Monitors, Integrated Desktop Computers, Workstation Desktops, Thin Client, Workstation Notebooks, and/or Tablet Notebooks – must meet the EPEAT silver rating or higher
  - Fax Machines, Multifunction Devices, and Printers – must meet the EPEAT bronze rating or higher
  - Copiers and Digital Duplicators – must meet the EPEAT silver rating or higher
- **Reuse of Leased IT Electronic Equipment** In accordance with DOE Order 436.1, Departmental Sustainability, MSTS is striving to reduce or eliminate environmental hazards, conserve environmental resources, minimize life-cycle cost and maximize operational sustainability through the incorporation of electronics stewardship practices thereby minimizing the economic and environmental impacts of managing toxic by-products and hazardous wastes generated in the conduct of site activities. Therefore, MSTS requires that at the end of the lease period, the equipment is to be reused, refurbished, donated, or recycled using environmentally sound management practices.

B-10 MEETINGS

After subcontract award, a Subcontract Kickoff Meeting may be requested, which may be a conference call, an internet meeting, or a meeting to be held at MSTS. The time, date, and agenda for the meeting will be provided to the SUBCONTRACTOR by MSTS.

The SUBCONTRACTOR shall interface with various MSTS (and other) organizations through MSTS' Procurement Specialist (or designated Subcontract Technical Representative (STR) for in-scope work), as required, or at points and frequency determined by the Procurement Specialist.

MSTS will issue meeting notices and prepare an agenda and minutes for each meeting addressed in this Section. When applicable, minutes will identify action items, assigned actioner, and due dates.

The purpose of the meetings is the exchange of work-related information. The person or persons designated by the SUBCONTRACTOR to attend all meetings shall have all required authority to make decisions and commit SUBCONTRACTOR to technical decisions made during meetings.

FREQUENCY	DURATION	TITLE	DESCRIPTION / PURPOSE
One-time	2 hours	Post Award Kick-OFF meeting	Sub-contract meet/greet with Subcontractor
One-time	6 hours	Site Walk-Down meeting	Review Facility/Site
One-time	4 hours	Schedule Meeting	Review schedule
Weekly	1 hour	Planning/progress meetings	Status updates
Daily	1 hour	Plan-of-the-Day meeting	After Notice to Proceed/Construction begins
TBD	TBD	Design Review Mtg	Review submitted design

B-11 SUBMITTALS

If the SOW requires the submittal of SUBCONTRACTOR Information, the following apply:

- The following items shall be submitted to the submittal e-mail address(es) as indicated on Appendix A , *Submittal Register*, identifies deliverables due during the execution of this subcontract and the recipient.
- The SUBCONTRACTOR shall include the Procurement Specialist and STR on the transmittal.
- Subcontractor information shall be submitted in either hard copy or electronic format (If electronic, it must be viewable using either Microsoft® Windows®, Microsoft® Office, or Adobe® Acrobat® software).
- Submittals should consist of any information, documentation, data, etc. which will require review/approval or used as verification or acceptance of work completed.

B-12 DELIVERABLES

The SUBCONTRACTOR shall provide all necessary documentation, reports, plans, and certifications required to demonstrate full compliance with the technical and management aspects of this integrated SOW. The deliverables are categorized below into Project Management, Component-Specific Technical Data, and Final Project Closeout.

1. Project Management and Reporting Deliverables

These deliverables apply to the entire scope of work and are essential for project tracking, management, and oversight.

a. **Project Schedule:** A detailed schedule to successfully deliver the entire scope of work defined in this SOW, including all design, procurement, fabrication, testing, and on-site support activities.

b. **Monthly Activity Status Report:** To be submitted by the fifth (5th) of each month for the previous month's activities, this report shall include, at a minimum:

i. A Project Manager's narrative of accomplishment highlights and a status assessment for activities planned for the next 30 days (30-day look-ahead).

ii. A detailed summary of issues and concerns (cost, schedule, technical), with recommended solutions and progress toward resolution.

iii. A list of new or outstanding agreements and commitments for issue resolution.

iv. Schedule performance metrics against the Performance Measurement Baseline for the current month and contract-to-date.

v. An updated Action Item Log showing the cumulative status of all actions.

vi. A Monthly Accrual Report.

c. Labor, Material, and Equipment Plan: A comprehensive plan detailing the labor, material, and equipment requirements needed to execute the full scope of work.

d. Supervision Plan: A plan outlining the supervision requirements to satisfy the integrated scope of work defined in this SOW.

2. Component-Specific Technical Deliverables

The following technical data packages are required for their respective component groups.

A. Cooling Water Distribution Units (CWDUs) and Manifolds:

i. **Design and Engineering Data:**
1. All design reports (60%, 90%, 100% Preliminary Design) as specified in Section B-3.

ii. **Quality and Manufacturing Data:**
1. Comprehensive Inspection and Test Plan (ITP), including Factory Acceptance Test (FAT) procedures for the CWDUs.

iii. **Component and Material Data:**
1. Manufacturer's Operation & Maintenance (O&M) Manuals for all furnished equipment.

iv. **Certification and Test Reports:**
1. Final FAT and inspection reports.
2. All required certifications and test reporting as specified in the "Description of Work."

B. Specialty Valves and Instrumentation:

i. **Engineering and Design Data:**
1. All relevant design and sizing Calculations.
2. Drawings, including General Arrangement, Pneumatic Schematics, and Wiring Terminations.

ii. **Quality and Manufacturing Data:**
1. Quality Assurance (QA) Manual.
2. Welding Procedures and associated Personnel Qualifications (if applicable).
3. A comprehensive Inspection and Test Plan (ITP), including Factory Acceptance Test (FAT) procedures.

iii. **Component and Material Data:**
1. Manufacturer Data Sheets for all subcomponents (e.g., Valve Body and Bonnet, Actuator, Positioner, Position Feedback, Gaskets/Seals, All Adapters).
2. Certified Material Test Reports (CMTRs).

iv. **Certification and Test Reports:**

1. Certificates of Conformance for all components.
2. Certificate of Calibration for all instrumentation.
3. Final FAT and inspection reports.
4. Sound Pressure Level test data, if applicable.

3. Final Project and Closeout Deliverables

i. **Punch List Support:** The SUBCONTRACTOR shall actively participate in the project turnover process by assisting the Subcontract Technical Representative (STR) and Construction Manager (CM) in developing and completing the final project punch list. The SUBCONTRACTOR must notify the STR and CM no later than one (1) day after completing any assigned punch list item(s).

B-13 APPENDIX

APPENDIX NUMBER	*TITLE*	*REV*	*PAGES*
Appendix A	Submittal Register	*NA*	*5*

The SUBCONTRACTOR shall meet the required schedule and provide the documents specified in accordance with the following submittals.

APPENDIX A
SUBMITTAL REGISTER

Section A: Purchase Order/Subcontract Information			
Subcontractor Name:	*TBD*	SOW Title:	UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services
Purchase Order and Release Number:	*TBD*	Requisition Number:	*TBD*

Section B: Submittal Delivery Requirement
Submittals shall be electronically, unless otherwise noted, to: *Procurement Specialist; Insert email address and Subcontract Technical Representative; thompsCD@nv.doe.gov*

Section C: Submittal Requirement Details					
NO.	TITLE	REFERENCE	DUE DATE / FREQUENCY	REVIEWED BY	COMMENTS
001	Subcontract Schedule	*Exhibit B-1,4.i, Exhibit B-1,4.iv, & B-4B-12-1a*	No later than 10 calendar days from date of award, updated **biweekly**	ProcSpec	Prior to the start of work
002	General Assembly and Fabrication Drawings	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR	
003	Component Cutsheets	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR	
004	Calculations	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR	
005	CMTRs	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
006	Test Reports	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
007	O&M Manuals	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	

APPENDIX A
SUBMITTAL REGISTER

Section A: Purchase Order/Subcontract Information			
Subcontractor Name:	*TBD*	SOW Title:	UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services
Purchase Order and Release Number:	*TBD*	Requisition Number:	*TBD*

Section B: Submittal Delivery Requirement
Submittals shall be electronically, unless otherwise noted, to: *Procurement Specialist; Insert email address and Subcontract Technical Representative; thompsCD@nv.doe.gov*

Section C: Submittal Requirement Details					
NO.	TITLE	REFERENCE	DUE DATE / FREQUENCY	REVIEWED BY	COMMENTS
008	Spare Parts Lists	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
009	Warranties	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
010	As-Built Drawings	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
011	Certificate of Conformance	*Section 1.5 Specification 15-0-012*	Per Specification 15-0-012 timelines	STR ENG	
012	Monthly Progress Report	*Exhibit B-1, 4.i & Exhibit B-1, 4.ii & Exhibit B-12, 1.b*	7th of each month	STR	• Status of Items scheduled • Risks • Schedule update with critical path • Summary of Daily Reports
013	Daily Report	*Exhibit B-1, 4.i & Exhibit B-1, 4.ii*	Within 2 hours of next workday beginning	STR	• Progress • Issues • Conclusions • Action Items
014	Daily Work & Inspection Report (during F/T activities)	*Exhibit B-3, 4.ii*	Within 2 hours of next workday beginning	STR	Progress Issues Conclusions Action Items

APPENDIX A
SUBMITTAL REGISTER

Section A: Purchase Order/Subcontract Information			
Subcontractor Name:	*TBD*	SOW Title:	UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services
Purchase Order and Release Number:	*TBD*	Requisition Number:	*TBD*

Section B: Submittal Delivery Requirement
Submittals shall be electronically, unless otherwise noted, to: *Procurement Specialist; Insert email address and Subcontract Technical Representative; thompsCD@nv.doe.gov*

Section C: Submittal Requirement Details					
NO.	TITLE	REFERENCE	DUE DATE / FREQUENCY	REVIEWED BY	COMMENTS
015	Program Review Meetings: Agenda and Minutes	*Exhibit B-1, 5.c.viii*	Agenda: 7 days prior to meeting Minutes: 7 days after meeting	STR	
016	Resource Loaded Schedule	*Exhibit B-3, 4.ii*	Within 15 Days after award	STR ProcRep	Primavera 6 or compatible Include critical path
016	Project Schedule Update	*Exhibit B-1, 4.i*	With Monthly Progress Report	STR ProcRep	Review will include: Critical Path Events planned but not started Schedule analysis and metrics Any logic and duration changes
017	Rolling Action Item Log	*Exhibit B-1, 4.ii*	Per approved SUBCONTRACTOR Schedule	STR	
018	Project Execution Plan	*Exhibit B-1, 4.iii*	IAW Project Schedule	STR ProcRep	
019	Quality Assurance Program	*Exhibit B-3, 3* *&* *Exhibit B-12, 4.ii*	IAW Project Schedule	STR ProcRep	
020	Quality Inspection Plan for flushes and tests	*Exhibit B-3, 2.iii*	IAW Project Schedule	STR ProcRep	

APPENDIX A
SUBMITTAL REGISTER

Section A: Purchase Order/Subcontract Information			
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Purchase Order and Release Number:	*TBD*	Requisition Number:	*TBD*

Section B: Submittal Delivery Requirement
Submittals shall be electronically, unless otherwise noted, to: *Procurement Specialist; Insert email address and Subcontract Technical Representative; thompsCD@nv.doe.gov*

Section C: Submittal Requirement Details					
NO.	TITLE	REFERENCE	DUE DATE / FREQUENCY	REVIEWED BY	COMMENTS
021	Test Plans	*Exhibit B-3, 2.iii*	IAW Project Schedule	STR ProcRep	
022	Test Procedures	*Exhibit B-3, 2.iii*	IAW Project Schedule	STR ProcRep	
023	Waste Management Plan	*Exhibit B-3, 5.iv*	IAW Project Schedule	STR ProcRep	*OPTIONAL SCOPE*
024	Flush Plans	Exhibit B-1, 2.iii	IAW Project Schedule	STR ProcRep	
025	Flush Procedures	Exhibit B-1, 2.iii	IAW Project Schedule	STR ProcRep	
026	Flush and Test Water Conservation Plan	Exhibit B-1, 2.iii	IAW Project Schedule	STR ProcRep	*OPTIONAL SCOPE*
027	Quality Control Inspection Report (or acceptable alternative)	Exhibit B-1, 3.i	IAW Project Schedule	STR ProcRep	
028	Flush Water Sample Results	Exhibit B-1, 4.iii	IAW Project Schedule	STR ProcRep	*OPTIONAL SCOPE*
029	Close-out Documentation	Exhibit B-1, 4.ii & Exhibit B-12	IAW Project Schedule	STR ProcRep	

APPENDIX A
SUBMITTAL REGISTER

Section A: Purchase Order/Subcontract Information			
Subcontractor Name:	*TBD*	SOW Title:	UCEP Integrated Cooling, Piping, Valve, and Instrumentation Systems Services
Purchase Order and Release Number:	*TBD*	Requisition Number:	*TBD*

Section B: Submittal Delivery Requirement
Submittals shall be electronically, unless otherwise noted, to: *Procurement Specialist; Insert email address and Subcontract Technical Representative; thompsCD@nv.doe.gov*

Section C: Submittal Requirement Details					
NO.	TITLE	REFERENCE	DUE DATE / FREQUENCY	REVIEWED BY	COMMENTS
030	Material List/Plan	Exhibit B-1, 2.iv	IAW Project Schedule	STR ProcRep	

NLT = No Later Than
NTP = Notice to Proceed
TLO = Transmittal Letter Only