SECTION 011000 SUMMARY OF WORK

PART 1 - GENERAL

* 1. PROJECT DESCRIPTON
     1. Briefly, and without force and effect upon the contract documents, the work on the contract can be summarized as follows:
     2. The Urea Conversion Project (Project) at the UC Davis Medical Center Central Plant (Plant) involves the following work as an overview.
        1. Removal of existing ammonia equipment inside the ammonia room.
        2. Removal of existing ammonia supply piping, valves, and instrumentation from the ammonia room to the last flange just before the ammonia distribution header outside the HRSG.
        3. Removal of existing Ammonia Injection Grid (AIG) manifold and distribution piping.
        4. Removal of AIG lance assemblies from within the Heat Recovery Steam Generator (HRSG).
        5. Patching of existing AIG piping penetrations through HRSG shell and liner.
        6. Removal of the existing CO catalyst modules from within the HRSG.
        7. Removal of the existing Selective Catalytic Reduction (SCR) catalyst modules from within the HRSG.
        8. Temporary removal of building window, frame, and wall at the ammonia room to allow the removal of existing ammonia equipment and installation of the new urea equipment.
        9. Installation of new urea equipment. The urea equipment (by FuelTech) has already been delivered to the project site.
        10. Restoration of the building window, frame, and wall at the ammonia room after the new urea equipment is placed inside the ammonia room.
        11. Installation of new mechanical and electrical items, interconnections and supports.
        12. Installation of new ammonia/air mixture supply piping and supports to the new ammonia distribution grid.
        13. Installation of new AIG Manifold and distribution piping (materials provided by SCR Solutions).
        14. Fabrication of new AIG Piping penetrations through HRSG shell and liner.
        15. Installation of new AIG lance assemblies and flow straightener duct (materials provided by SCR Solutions).
        16. Installation of new CO catalyst modules and support structures (materials provided by SCR Solutions).
        17. Installation of new SCR catalyst modules and support structures (materials provided by SCR Solutions).
        18. Evacuate and clean the existing underground ammonia tank.
        19. Application of epoxy coating to cover the internal of the underground ammonia tank.
     3. Furnish labor, equipment, tools, and construction materials for construction of the project in full compliance with the design drawings and the specifications.
     4. It is not the intent to specify herein all the details of the Contractors work scope. The Contractor shall bear the responsibility of ensuring that the work is in accordance with all applicable codes, standards, drawings, and specifications.
     5. Contractor shall not proceed with any construction work which is "On Hold" until the "On Hold" is released for construction.
     6. Contractor's price shall include an allowance of plus or minus 18 inches for final location of grounding grid pigtail stub ups, piping stub ups and electrical conduit stub ups.
     7. Provide mechanical and electrical interconnection testing.
  2. SUMMARY OF WORK
     1. WORK TO BE PERFORMED BY THE OWNER
        1. The Owner shall be responsible for the following items.
           1. Clear storage and loose items inside the ammonia room.
           2. Shutoff and isolate ammonia supply from underground tank to ammonia room.
           3. Evacuation and flushing of residual ammonia between tank, ammonia room, and ammonia line up to HRSG ammonia injection grid.
           4. Air, nitrogen or water purge between tank, ammonia room, and ammonia line up to HRSG ammonia injection grid. Drain non-potable water supply line.
           5. Depressurization of IA (instrument air) supply line at the ammonia room.
           6. Lockout/Tagout (LOTO) as needed.
           7. Design, installation, and commissioning of the Distributed Control System addition for controlling the PLC based Ultra NH3 flow control system will be performed by a third-party controls contractor.
           8. Temporary relocation of fire sprinkler piping if necessary.
           9. Temporarily Relocation of HVAC vent if necessary.
           10. Coordinate with UCDH Fire Prevention office to temporarily disable fire sprinkler system in Ammonia Room and establish fire watch plan approved by Owner. Contractor to give a 5-business day notice to UCDH prior to removal of fire sprinkler piping. Contractor responsible for temporary removal and reinstallation of fire sprinkler piping if required.
           11. Third-party inspection for California Building Code related testing and inspections including special inspections as required by the California Building Code. The Contractor shall coordinate with the Owner for scheduling the thirty-party testing and inspections with a minimum of one (1) week advance notice.
           12. Construction power, water, and air at source.
           13. Provide space for a Contractor provided construction trailer within the utility yard.
           14. Provide 2 parking spaces inside the Central Plant Utility Yard for use by the Contractor. For additional parking places on campus, the Contractor will need to utilize the parking kiosks. More details to be provided to the awarded contractor.
           15. Disposal of flush water.
           16. Hot work and confined space permits.
           17. Wiring terminations at the DCS cabinet just outside of the ammonia room (north side).
     2. WORK TO BE PERFORMED BY THE CONTRACTOR
        1. Refer to drawings Appendix for a listing of engineer’s design drawings that cover the work in this contract. The Contractor shall be aware that Owner furnished equipment vendor drawings are also included in the design package as the Contractor will also need to refer to the vendor drawings for a complete project.
        2. The Contractor shall provide typical submittals required for performance of the work for Owner’s review and approval, including but not limited to:
           1. Calculations/Engineering Data
           2. Product Data
           3. Vendor Drawings
           4. Samples
           5. Certificates
           6. Test Reports
           7. Catalog Data
           8. Demolition Plans and Procedures
           9. As-builts
        3. The Contractor should be aware that the FuelTech and SCR Solutions equipment/material is currently onsite. The Owner will locate an outdoor location as the temporary laydown area for this equipment and material.
        4. The Contractor shall be responsible for receiving and unloading all project equipment and materials that is not already on site. The Contractor shall be responsible for loading, transporting, and unloading of all equipment and materials from temporary laydown area to the construction area for erection and installation.
        5. All necessary construction, lifting equipment, including adequate rigging equipment, shall be provided by the Contractor. The Contractor shall be liable for any damage (that is caused by the Contractor) to the equipment until the equipment is installed at the plant and turned over to the Owner.
        6. Any necessary temporary power distribution system, power distribution center with associated aboveground conduits, cables, and other necessary equipment shall be supplied and installed by the Contractor outside the 480V 60A welding circuit already available within the UCDH Central Plant. The Contractor shall supply, install, and connect all additional temporary conduit, 480V distribution cabling, etc. for a complete temporary power distribution system.
        7. The Owner will provide 2 parking spaces inside the Central Plant Utility Yard for use by the contractor. For additional parking places on campus, the contractor will need to utilize the parking kiosks. More details to be provided to the awarded contractor. The Owner will also provide space for a contractor provided construction trailer within the utility yard.
        8. Contractor to provide Porta-Johns for its own labor and subcontractors.
        9. Contractor to provide confined space hole watches and rescue teams as applicable.
        10. Contractor to provide temporary fencing if necessary.
        11. Demolition/removal of the following items.
            1. Removal of existing ammonia vaporizer skid, associated housekeeping pad and adjacent housekeeping pad (inside the ammonia room).
            2. Removal of existing ammonia expansion tank and housekeeping pad (inside the ammonia room).
            3. Removal of existing ammonia suction pump skid and housekeeping pad (inside the ammonia room).
            4. Removal of PA speaker and reinstallation of PA speaker above the ammonia room entrance door.
            5. Instrumentations and associated conduits (inside the ammonia room).
            6. Wall mounted electrical pull boxes and disconnect switches.
            7. Removal of ammonia leak detector and reinstallation of such detector near the NW corner of the ammonia room.
            8. Controls and Instrumentation wiring and conduit from the ammonia room to the DCS cabinet located just outside the ammonia room (North side).
            9. Miscellaneous supports for the removed items.
            10. Above ground cables and conduits as shown on the demolition drawings and illustrations.
            11. Cables located in existing underground conduit, which is being re-used, shall be fully removed to make the conduit available for new cables.
            12. Underground cables or wires which originate from the demo equipment shall be removed from the demo equipment to the next termination point, unless otherwise noted.
            13. Conduits rising from below ground which are no longer being used shall be capped flush with the finish grade with a male threaded fitting.
            14. Removal of interconnecting piping as necessary to allow removal of equipment.
            15. Contractor shall pay special attention to protect and save the existing grounding pigtails/wires that are attached to the existing equipment that will be removed. All existing grounding pigtails/wires will be reused and extended for the installation of the new equipment.
            16. Other miscellaneous mechanical, electrical, and structural items surrounding and adjacent to the HRSG as shown in the demolition drawings.
            17. Overhead Lights. (Note: Overhead lighting circuit(s) to be extended to walls for new wall mounted lighting.)
            18. Remove the existing DENOX PLC and Display to allow room for the installation of the new FuelTech remote panel with power and ethernet cable to the FuelTech PLC in the ammonia room.
            19. Temporary relocation of fire sprinkler piping if necessary.
            20. Temporarily Relocation of HVAC vent if necessary.
            21. Demolition of AIG / SCR components:

Remove existing CO catalyst modules and all module retainer bars.

Remove SCR catalyst access doors on roof.

Remove existing SCR catalyst modules.

Demolish existing exterior AIG piping and supports.

Demolish existing AIG harps and lances inside SCR duct.

Cut existing lance support pockets to within 1/2" of liner. Stuff lance support pockets with insulation and cap 1/8" plate. Note that several lance support pockets must be removed at casing.

Remove existing AIG casing penetrations and repair casing holes.

Remove/Relocate existing casing stiffeners as shown on drawings.

* + - 1. During the demolition phase, some of the existing equipment/systems adjacent to the work area may be in service. Contractor shall walkdown these equipment/systems to fully understand the locations and operating service boundary.
      2. For the demolition of the existing equipment, Contractor shall verify equipment and work areas have been de-energized, disconnected, depressurized, drained, cleared, emptied, etc. prior to demolition.
      3. Contractor shall work with the owner to investigate, save, and protect the piping and conduit that are remaining inside the ammonia room. These piping and conduit may remain active and energized during the entire construction period.
      4. Cover and protect floor drain inside the ammonia room during the construction period.
      5. Contractor shall minimize cutting of existing equipment skids (and other loose devices) and remove them as whole unit in case the equipment needs to be reused.
      6. All removed items/equipment shall be stored at the laydown yard properly for a period of 1 month after the demolition is complete. After that, Contractor shall arrange and provide dumpsters and trucking for off-haul and disposal of all demolition items. Contractor shall coordinate with Owner regarding scheduling for transportation of the demolition items.
      7. De-terminate electrical connections and interconnecting piping as necessary to allow removal of equipment.
      8. Contractor shall include the following constraints in planning of the demolition and installation work:
         1. Total Cogeneration Unit Shutdown for this project will be 21 days or less. The installation phase by the Contractor shall be completed by the end of the 17th day. The FuelTech startup and commissioning team will begin the startup and commissioning process at the beginning of the 18th day.
         2. Contractor shall obtain all necessary construction permits.
         3. Contractor shall coordinate its work with other construction contractors scheduled for the outage who will be working at the same time.
         4. Contractor to stage all equipment prior to Cogeneration Unit Shutdown.
         5. Contractor to remove Ammonia Room Wall and Window prior to Cogeneration Unit Shutdown.
         6. Contractor to staff the job to meet the 21-day outage window including the use of 12-hour shifts, weekend work, and night shifts. Outage work to include demolition, installation, and offline commissioning of equipment. Outage work to also include cleaning, prepping, and coating the Underground Storage Tank.
         7. Online commissioning to take place immediately on the 22nd day after installation and offline commissioning.
         8. The Plant will be shut down on **(Pending date), 2024**. Demolition work may only begin with Owner’s approval and after the Plant completes LOTO, equipment isolation, selection of electrical determinations, and other clearances on **(Pending date), 2024**.
         9. Contractor shall pay **[$$]** per day as liquidated damages for each calendar day the Plant is not able to return to normal operations past the 21-day outage period and as a result of Contractor’s work performance.
         10. It is expected that new installation work will begin after demolition is complete, unless otherwise approved by the Owner.
      9. Furnish and install new concrete housekeeping foundations for the following equipment:
         1. Decomposition Chamber and Structure
         2. Metering and Heater Module
         3. Blower Module
         4. 4,500 gallon storage tank with seismic restraint system
      10. Contractor shall remove the building wall, frame, and window to allow adequate room for the removal of existing equipment and the installation of the new equipment. Contractor shall secure the open wall during the time period that the window and wall is removed.
      11. Once the new concrete housekeeping foundations are cured and up to design strength, Contractor can place the new equipment onto the new concrete housekeeping foundations.
      12. After equipment is placed inside the ammonia room, Contractor shall re-install the building wall, frame, and window.
      13. Installation of the following Owner furnished equipment (refer to detailed vendor drawings which show in greater detail the equipment installation work):
          1. Decomposition chamber and the associated structural support
          2. Metering and heater module
          3. Blower module
          4. 4,500 gallon urea storage tank
          5. Manual and control valves (i.e., numbered valves indicated on P&ID’s. The Contractor shall furnish and install all required valves not furnished by the vendor)
          6. Vendor provided loose ship items including instrumentations, piping, tubing, enclosures, etc.
          7. Relocation of the previously demolished Ammonia Leak Detector to the North wall.
          8. Relocation of the previously demolished PA speaker to the West wall above the entrance doorway.
          9. New FuelTech remote panel at the existing DENOX box, with power and ethernet cable to the FuelTech PLC at the ammonia room.
      14. Installation of the following Contractor furnished equipment:
          1. Any necessary valves as indicated on the P&IDs not furnished by the vendor.
          2. Instrumentation tubing, fittings, manifolds, supports, and valves.
          3. Piping, fittings, other miscellaneous supports, and other piping components to complete the piping system.
          4. New urea fill piping at the PG&E metering yard. The new urea piping will tee into the existing ammonia piping.
          5. Piping and equipment system thermal insulation (including stainless steel insulation covers) for all piping and equipment with surface temperature equal to and above 140 °F. Insulation shall comply with specifications.
          6. Two (2) 480V MCC Buckets equipped with breakers and door operators. 480V MCCs are located in the Plant Operations Building.
          7. Two (2) NEMA 4X pull boxes for power wiring.
          8. One (1) NEMA 4X interface terminal board enclosure for controls and instrumentation.
          9. One (1) 120V panelboard single pole breaker for controls power. Panelboard is located adjacent to the ammonia room.
          10. Four (4) new wall mounted LED lights. Two (2) new lights on the South wall and two (2) new lights on the North wall. Lights to be powered from existing lighting room lighting circuits.
          11. Galvanized rigid conduit, flexible conduit, conduit fittings, and equipment bushings.
          12. Cable trays, wireways and associated fittings, supports and hardware.
          13. Junction or pull boxes necessary for a complete electrical raceway system.
          14. Cables and wires for low voltage power, instrumentation, controls, and communication systems.
          15. Low voltage cable termination lugs and terminals.
          16. Wire labeling and cable marking devices. Labeling to include landing location and source location on each conductor.
          17. Ground bus extension(s) and ground tails.
          18. Any other miscellaneous electrical equipment or minor materials necessary for a complete system or as shown on the design drawings.
      15. Furnish and install concrete-embedded anchor bolts with nuts and washers, and other embedded metal as shown on the drawings.
      16. Furnish, install, pressure test, water flush, clean, and leak test piping for the following piping systems:
          1. Instrument Air supply to blower valves.
          2. Air supply from blower module to metering and heater module.
          3. Ammonia/air mixture to ammonia injection grid.
          4. Heated air supply to decomposition chamber.
          5. Ammonia supply to injector.
          6. Atomizing air supply to injector.
          7. Instrument air supply to metering module.
          8. Urea solution supply to metering and heater module.
          9. Other piping system that comes with the Owner furnished equipment.
          10. Secondary urea fill connecting piping at the PG&E yard area.

(NOTE: THE ABOVE PIPING SHALL BE FURNISHED, INSTALLED, AND TESTED IN ACCORDANCE WITH ASME B31.1 POWER PIPING CODE).

* + - 1. Furnish and install the new grounding pigtails to tie-in to existing grounding to all Owner furnished equipment.
      2. Furnish and install drilled-in type anchor bolts.
      3. Furnish and install all grout materials.
      4. Except where noted on the project drawings, the Contractor shall install, and terminate all cables.
      5. Cable, Raceway and Termination Schedules: The cable and raceway schedules are furnished as an aid to the identification and installation of cables, conduits, and cable trays, etc. Not all project cables or raceways are reflected in the cable and raceway schedule. Some cables and raceways are shown on the project drawings in schematic or diagrammatic formats (e.g., communications, lighting, grounding). Except where noted on the project drawings, the Contractor shall be responsible for the supply and installation of these field-routed cables and raceways.
      6. A computer-generated termination schedule in excel format will be furnished later as an aid to terminating wires and cables.
      7. Receive and Maintain Electrical Equipment: Contractor shall be responsible for receiving, receipt inspection and testing (where required) of electrical components and equipment furnished by the Owner.
      8. Where additional dress-out of equipment is required, (e.g., connection of shipping sections of switchgear and MCCs, etc.) the Contractor shall perform this work and perform it in accordance with the manufacturer's instructions.
      9. Contractor shall be responsible for proper maintenance of this equipment during pre-installation storage and after installation until Owner's acceptance.
      10. Provide electrical testing (megger, point-to-point, etc.) for newly installed items (Owner furnished or Contractor furnished) based on industry standards.
      11. Grounding System: Contractor shall furnish and install all above ground cables, fittings, and devices to extend and complete the plant grounding and lightning protection systems. The locations of the ground taps to the grid are shown on the referenced grounding drawings.
      12. Wherever above ground activities of the Contractor damage or cut the underground portion of the ground grid or taps to the ground grid, the Contractor shall repair, or replace, the damaged area in consultation with, and with the approval of, the Plant Manager.
      13. Installation, point to point wire check, and instrument loop check of all instrumentation. The Contractor shall also assist the startup with all instrument calibration and commissioning.
      14. Furnish, install, and/or repair site concrete slab-on-grade/surfacing as necessary around new foundation area.
      15. Contractor shall furnish and perform final painting including but is not limited to all non-insulated steel piping, plastic piping, pipe, and conduit supports, vents, electrical panels, panel supports, equipment, touchup of shop applied coatings damaged during construction and miscellaneous items associated with construction. Contractor shall also apply touch-up painting (provided by Owner) to the Owner furnished equipment as necessary.
      16. The Contractor shall provide flushing of all fluid pipelines to assure cleanliness of piping systems.
      17. The Contractor shall provide the following work at the existing underground storage tank:
          1. Draining of residual ammonia.
          2. Cleaning of tank walls.
          3. Prep tank walls for coating per coating manufacturer instructions.
          4. Coat tank per manufacturer instructions.
      18. Contractor shall remove all Contractors' construction trailers and conduct final site cleanup.
      19. Contractor shall provide the necessary safety essentials, including rescue team, to perform the scope of work described herein.
      20. Contractor shall provide security, including temporary fencing, temporary closure of building opening (with plywood or other adequate material) and/or security guards, to protect the plant during the construction period when the wall, frame, and window at the ammonia room are removed.
      21. AIG and SCR Installation work:
          1. CO catalyst replacement

Install gasket on CO catalyst modules following manufacturer’s instructions.

Install CO catalyst modules inside existing CO catalyst frame.

Install new catalyst retainer blocks. Retainer blocks are to be welded to existing frame. Protect catalyst face from weld spatter.

Install new bolted catalyst retainer bars. Bars are slotted to allow for minor variations in frame.

* + - * 1. SCR catalyst replacement

Install new SCR catalyst retainer bolt assemblies by welding new coupling nuts to existing SCR catalyst frame.

Install downstream seal track in sections matching existing liner plates.

Assemble new catalyst retainer bars and bolt assemblies. Catalyst retainer bars are unique Left/Right and are shipped in two pieces to be field welded on site. Leave catalyst retainer bars loose.

Install new SCR catalyst modules onto existing pedestals. Gasket is pre-installed on downstream face by manufacturer.

Snug-tighten new catalyst retainer bolts and install top seal bar. Install strap bolt assemblies (snug), then tighten new catalyst retainer bolts.

* + - * 1. AIG external piping

Install new casing penetrations and new casing stiffeners.

Install new AIG header and supports, aligning to and mating with AIG header piping designed by others.

Install new AIG external piping and supports. Piping is shipped in spools with field trim allowance to allow for adjustment to site conditions. Install piping from bottom to top; Do Not make final field welds before assembling AIG harps.

Perform field welds to new AIG harp headers inside unit,and finalize AIG harp position within unit.

Make final field weld on external piping and seal weld casing penetration flange.

* + - * 1. AIG lances, harps, and baffle plates

Install lance and baffle casing support plates. Make minimal cuts in liner to reduce amount of required liner repairs. Re-insulate all affected areas and install liner cover plates. Repair liner plates as required.

Install horizontal baffles.

Cut liner holes for new AIG piping penetrations. Patch liners as required. Cut new liner holes tight to penetrating pipe, as access will prevent the installation of cover plates on the penetrating pipes.

Install AIG harps after making field welds to penetrating AIG piping.

Finish installation of AIG and baffle plates.

* 1. GENERAL INFORMATION
     1. OWNER, ARCHITECH, AND ENGINEER DEFINED
        1. Owner and Project Site Street Address: UCDMC CENTRAL PLANT

4840 2ND AVE

SACRAMENTO, CA 95817

PROJECT MANAGER: Thomas Kaiser [tkaiser@health.ucdavis.edu](mailto:tkaiser@health.ucdavis.edu)

* + - 1. Architect for Building Wall and Frame Removable/Restoration Details: HGA

1200 R STREET

SACRAMENTO, CA 95811

* + - 1. BOP Engineering Design: IEC CORPORATION

8775 FOLSOM BLVD. SUITE 110

SACRAMENTO, CA 95826

AIG and Ammonia Distribution Header Engineering Design and Material Supply:

SCR Solutions

24 East Main Street

PO BOX 5142

Clinton, NJ 08809

* + - 1. Third-Party Inspection Services: TBD

1.4 Appendix List

Appendix A – Urea Conversion Drawing Package (BLD-01444)

Appendix B – AIG/SCR Catalyst Retrofit Drawing Package (2023-0181 DA01)

Appendix C – Owner Supplied FuelTech Equipment

Appendix D – Underground Tank Cleaning/Epoxy Coating

END OF SECTION