SECTION 136040

ENGINE COOLANT/ANTI-FREEZE  
ABOVEGROUND STORAGE TANK (AST) SYSTEM

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
   1. SUMMARY
      1. Related Documents: The work of this Section is governed by [Division 1].
      2. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.
      3. Give notices, file plans, obtain permits and licenses, pay fees and backcharges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with the contract documents.
      4. In general, the work of this Section shall include, but not limited to:
         1. Aboveground anti-freeze tanks.
         2. Anti-freeze pump, and associated regulators.
         3. Anti-freeze hose-reels.
         4. Overfill prevention and safety systems.
      5. Related work specified in other Sections includes, but is not necessarily limited to:
         1. Section 136015 Motor Fuel Aboveground Storage Tanks
         2. Section 136020 Motor Fuel Electrical Systems
         3. [ ]
   2. REFERENCES
      1. American Society of Mechanical Engineers:
         1. ASME B16.3: Malleable Iron Threaded Fittings
         2. ASME B16.5: Pipe Flanges and Flanged Fittings
         3. ASME B16.11: Forged Steel Fittings, Socket-Welding and Threaded
         4. ASME B31.3: Process Piping.
         5. ASME B 36.19 Stainless Steel Pipe.
         6. ASME A13.1, Scheme for Identification of Piping Systems.
      2. ASTM International
         1. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
         2. ASTM A403 - Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
         3. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
         4. ASTM A105: Standard Specification for Carbon Steel Forgings for Piping Applications
         5. ASTM A197: Standard Specification for Cupola Malleable Iron
      3. International Code Council
         1. International Fire Code
         2. International Building Code
         3. International Mechanical Code
      4. Petroleum Equipment Institute
         1. PEI RP-700 Recommended practices for the Design and Installation and Servicing of Centralized Fluid-Distribution Systems at Vehicle Maintenance Facilities
      5. National Fire Protection Association:
         1. NFPA 30 - Flammable and Combustible Liquids Code.
         2. NFPA 30A – Code for Motor Fuel Dispensing Facilities and Repair Garages.
      6. Underwriters Laboratories Inc.:
         1. UL 142 – Steel Aboveground Tanks for Flammable and Combustible Liquids
   3. SUBMITTALS
      1. Comply with Section 013300 Submittal Procedures.
      2. Shop Drawings: Submit original copies of product data submittals for materials and equipment in Part 2 of this section including, but not limited to:
         1. Tanks.
         2. Tank accessories.
         3. Pumps.
         4. Level Switches.
         5. Hose Reels.
      3. Test Reports: Submit written test results for piping system pressure test.
      4. Manufacturer’s Field Reports: Submit report of each visit of manufacturer’s representative to provide technical assistance during installation.
      5. Record Drawings: Submit record drawings in accordance with Section 017704 and Clause B-57.
   4. CLOSEOUT SUBMITTALS

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**NOTE TO SPECIFIER**

Closeout documents are critical for the successful tank system project, because a complete set of closeout documents is necessary for the facility to meet life-cycle compliance requirements. This specification section is intended to be highly detailed, as experience has shown that contractors are much better able to comply with a detailed list including specific state and other regulatory forms and reports, and manufacturer checklists. As such, this section should be made as specific as possible. The state or other governing AST regulatory program will have most of the information needed for the appropriate level of specificity. Also, consult manufacturers for their installation checklists and test reports. The final closeout list should be coordinated with the “field quality control section” such that all test forms identified there as required, are included in the closeout list.

Coordinate this section with the corresponding section in other 136000 series specifications.

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Comply with Section 017704 and Clause B-57. In addition, comply with the specifics and additional provisions of this chapter. For the purposes of this section, the terms “Manuals and Instructions” and Closeout Documents” are used interchangeably.

* + 1. Coordinate closeout submittals with sections [ ] and [ ] to provide a single package for the project.
    2. Format of Closeout Documents, including Operation and Maintenance Manuals and Record Document
       1. Provide Electronic (pdf format for documents and jpeg format for photos) of all closeout documents, record documents, drawings, manuals, operating instructions, warranties, and all other documents referenced in this and related sections. Submission shall be on CD-ROM discs readable by Windows operating system. Files should be organized in logical folders and subfolders.
       2. In addition, provide bound manuals with all closeout documents, including record documents and drawings. Provide two (2) bound manuals/sets of documents. Bind Manuals in hardcover, three-ring binders, and provide identified dividers with tabs. Use multiple volumes as needed. Do not use three ring binders larger than 3 inches. Copies of faxed pages are unacceptable.
       3. Obtain at time of purchase of equipment, two (2) copies of operation, lubrication and maintenance manuals for all items. Assemble these manuals in the three ring binders above, and provide electronic versions.
       4. Furnish hard copy and electronic manuals for the fuel system to Engineer for approval and distribution to Owner within 30 days of completion of the fuel system. Included shall be 8 hours of training and review at which time the contractor shall review the contents of closeout documents with fuel system operating personnel.
    3. Manuals, Instructions, and Closeout Documents shall include the following items. Items shall be for the new fuel system facility:
       1. A minimum of [96] high resolution (no less than 4 mega-pixels) digital (.jpeg format) photographs depicting the installation at each critical construction phase. Particular attention should be paid to underground, buried, and normally inaccessible components.
       2. AST installation/warranty checklist with proof of delivery to manufacturer.
       3. Environmental Monitoring System final setup printout.
       4. Copies of any State/Local approvals, authorizations, permits, and registrations to include:
          1. [ ]
          2. [ ]
          3. [ ]
       5. Tank Test Results, and Test Results for all secondary containment structures or annuluses.
       6. Records of all other inspections and tests to include:
          1. [ ]
          2. [ ]
       7. Tank certificate, licenses, and/or registration to include [ ].
       8. Warranties for all equipment and apparatus. In general, any product / manufacturer documentation that was provided with the equipment shall be provided as part of the closeout documents. Any warranty requiring forms or checklists shall be completed and fully executed.
       9. Training certification for instruction seminars signed by the individuals trained on these systems.
       10. All instruction bulletins, preventive maintenance schedules, operational instructions, and parts lists provided with the tanks, and all other systems.
       11. Waste disposal documentation (if any).
       12. Other environmental information or permits (if any).
       13. Copies of receipts for any keys, locks, or other equipment turned over to the Owner.
       14. Operating and installation manuals and instructions for each piece of equipment that was provided with manuals or instructions, including but not limited to the tank installation instructions.
  1. QUALITY ASSURANCE
     1. Qualifications: Use adequate numbers of skilled, licensed individuals who are thoroughly trained and experienced in the installation and testing of the specified systems and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section.
     2. Substitutions: Comply with Section 016000 – Product Requirements.
     3. Materials and Equipment shall be manufactured, installed, and tested as specified in latest editions of applicable publications, standards and ruling of:
        1. Local and State building, plumbing, mechanical, electrical, fire and health department codes.
        2. National Fire Protection Association (NFPA).
        3. Occupational Safety and Health Act (OSHA).
        4. Factory Mutual Association (FM).
        5. Underwriter’s Laboratories (UL).
        6. American Petroleum Institute (API).
     4. The most recent editions of applicable specifications and publications of the following organizations form part of the Contract Documents:
        1. American National Standards Institute (ANSI).
        2. American Society of Mechanical Engineers (ASME).
        3. National Electric Manufacturers Association (NEMA).
        4. American Society for Testing of Materials (ASTM).
        5. American Welding Society (AWS).
        6. Manufacturers Standardization Society of the Valve and Fitting Industry (MSS).
     5. Specific reference is made to the following Standards of the National Fire Protection Association (NFPA) which shall govern provision of work as specified and as required by codes and authorities:
        1. NFPA 30 - Flammable and Combustible Liquids Code.
        2. NFPA 30A – Code for Motor Fuel Dispensing Facilities
     6. Comply with the testing and field quality control requirements elsewhere in this section.
  2. QUALIFICATIONS
     1. Manufacturer: Utilize companies specializing in manufacturing products specified in this section with minimum ten years documented experience.
     2. Installer: Company specializing in performing Work of this section with minimum ten years documented experience.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Comply with [ ].
     2. Accept piping and fittings on site in shipping containers with labeling in place. Inspect for damage.
     3. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.
  4. ENVIRONMENTAL REQUIREMENTS
     1. Comply with Section 013543 – Environmental Procedures.
  5. FIELD MEASUREMENTS
     1. Verify field measurements prior to fabrication.
  6. COORDINATION
     1. Comply with [ ].
  7. WARRANTY
     1. All tanks shall carry a [30] year warranty.

1. PRODUCTS
   1. ABOVEGROUND ANTI-FREEZE STORAGE TANK

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**NOTE TO SPECIFIER**

Consider the use of compartmented tanks, where other product tanks will be installed. Compartmented tanks save space.

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* + 1. Manufacturers: Subject to compliance with project requirements, manufacturers offering products which may be incorporated into the Work include the following:
       1. Containment Solutions.
       2. Modern Welding.
       3. Highland Tank.

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**NOTE TO SPECIFIER**

The properties of the engine coolant/anti-freeze used at the facility should be confirmed before completing this specification. Generally, engine coolant with corrosion preventative properties can be stored and distributed in steel. If the MSDS or other product information suggests that the coolant product is not compatible with steel, then a 304 stainless steel primary tank and piping should be specified.

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* + 1. Section 016000 – Product Requirements: Product options and substitutions. Substitutions: Permitted.
    2. General:
       1. Provide double-walled UL-142 steel tanks [with a stainless steel primary tank]. Tanks shall be constructed and listed in accordance with Underwriters Laboratories Inc. Standard 142 for Secondary Containment Aboveground Tanks for Flammable and Combustible Liquids.
       2. The tank shall be listed to allow the detection of leaks from the primary tank.
       3. The tanks must be off-loaded on site with a crane.
       4. All openings shall be from the top, with threaded NPT risers. All tank openings and dimensions shall be located as shown on the construction drawings. Any deviations will require the contractor to submit design drawings at the contractor’s expense.
       5. The tank to include a Warranty for [30] years.
       6. The tank manufacturer shall provide proof of a minimum 5 years of manufacturing secondary containment tanks.
       7. All tanks shall be new, and procured after the Notice to Proceed for this project is issued. That is to say, “left-over” tanks from previous projects currently in the Contractor’s possession are not acceptable.
    3. Primary tank:
       1. The standard primary storage tank shall be rectangular in design. It shall be constructed of UL specified steel thickness, with continuous welds.
       2. The primary storage tank shall be constructed of steel [304 stainless steel].
       3. The primary storage tank shall be constructed and listed in accordance with UL 142 Standards.
       4. The primary tank shall have a working vent and emergency vent. The emergency vent shall be sized in accordance with NFPA 30 by the tank manufacturer. The working vent shall be one nominal pipe size larger that the evacuation port.
       5. Refer to construction drawings for number and orientation of tank top fittings.
    4. Secondary Leak Containment Tank:
       1. The secondary leak containment tank shall be rectangular in design and listed according to UL 142 secondary aboveground tanks for flammable and combustible liquids.
       2. The secondary tank shall provide true 360° Radius "pressure testable" containment for the primary tank.
       3. The secondary tank shall have an emergency vent. The emergency vent shall be sized in accordance with NFPA 30 by the tank manufacturer.
       4. Refer to construction drawings for number and orientation of tank top fittings.
       5. The port openings in the top of the secondary tank shall be constructed with full welds to prevent moisture from seeping between the secondary and primary tanks.
       6. The top of the secondary tank shall be sloped so that water will not accumulate on top of the tank.
    5. Coatings:
       1. The exterior surface of the secondary tank shall be cleansed of foreign material and coated with a corrosion resistant industrial paint (3 to 5 mils dry film thickness).
       2. The standard color shall be [desert sand].
    6. Tank Appurtenances:
       1. The tank shall be equipped as shown on the construction drawings, which includes, but is not limited to:
          1. The tank shall have an interstitial monitor, as shown on the construction drawings. [The interstitial monitor shall be a mechanical float-type] [The interstitial monitor shall be manufactured by the environmental monitoring system manufacturer and shall be connected to the environmental monitoring system. Coordinate with Section 136020 Motor Fuel Electrical Systems]
          2. The tank shall be equipped with a fill port and spill containment box.
          3. The tank shall be equipped with a steel vent and vent cap.
          4. The tank shall be equipped with a site level gauge, as shown on the construction drawings.
          5. The tank shall be equipped with a mechanical overfill protection device which restricts air flow to the collection station when the tank is full.
          6. The tank shall be equipped with an audible/visual overfill protection device. [The audible/visual overfill alarm shall be a stand alone, hard wired system] [The audible/visual overfill alarm shall be manufactured by and connected to the environmental monitoring system. Coordinate with Section 136020 Motor Fuel Electrical Systems]]
       2. Signage: Tank shall include signage and labels including an NFPA diamond, a product label, “combustible” or “flammable” as appropriate, safe fill height, "Anti-Freeze," the grade, and any other required signage.

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**NOTE TO SPECIFIER**

Considering that the scope of fluids AST installations will vary, and often will only include a tank replacement, specifications are provided here for the installation of ancillary equipment, such as hose reels and piping, so that the specifications are available in the cases where more than the tank needs to be replaced. Remove these sections if not in the scope. At larger or more specialized facilities, e.g. those that may have fluid management systems, these specifications may need to be adjusted to meet those unique needs.

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* 1. HOSE REEL
     1. Manufacturers: Subject to compliance with project requirements, manufacturers offering products which may be incorporated into the Work include the following:
        1. Graco
        2. Alemite
        3. Ballcrank
     2. Section 016000 – Product Requirements: Product options and substitutions. Substitutions: Permitted.
     3. Provide industrial/heavy duty series hose reels and associated equipment. The hose reels will supply anti-freeze for vehicle service. When the hose reel sets serve multiple uses, coordinate with other sections.
     4. 50’ hoses rated for anti-freeze distribution. [Equip each hose reel with a battery operated metering distribution wand.]
  2. ANTI-FREEZE PUMP
     1. Manufacturers: Subject to compliance with project requirements, manufacturers offering products which may be incorporated into the Work include the following:
        1. Graco
        2. Alemite
        3. Ballcrank
     2. Section 016000 – Product Requirements: Product options and substitutions. Substitutions: Permitted.
     3. The anti-freeze dispensing pump shall be a double acting, air operated diaphragm pump with a self-lubricating non stalling air valve.
     4. Performance Characteristics
        1. Performance shall be identical for all similar service pumps.
        2. Pump shall have the capacity to pump fluid at 20 GPM with an input of 20 SCFM of air at 40 PSI.
     5. Appurtenances
        1. Each air powered diaphragm pump shall have an incorporated air filter, air regulator with pressure gauge, strainer, and an oil lubricator.
        2. The air supply shall be equipped with a runaway valve which restricts flow in the event of a distribution system failure.
        3. The connection between the pump and distribution piping shall be equipped with a fire rated flexible hose to prevent transmitting the pump’s pulses into the piping system.
  3. ANTI-FREEZE PIPING
     1. All aboveground anti-freeze piping between the collection station and tank shall be schedule 40 seamless steel pipe conforming to ASTM A53. [Schedule 40S stainless steel piping conforming to ASTM A312].
     2. Pipe filling shall be 150 lb. threaded malleable iron, to ASME B16.3 [schedule 40 threaded stainless steel conforming to A403]. Piping shall be painted with 1 primer and 2 finish coats to match building interior. All steel shall be prepared to an SSPC SP-2 standard. [Stainless steel piping shall not be painted.]
     3. All piping/tubing shall be labeled with flow arrows and product labels to meet ASME A13.1 requirements.
     4. Provide a fire rated flexible hose between the pump and piping.
  4. FIRE EXTINGUISHER
     1. Provide a UL Listed 4A:80BC fire extinguisher in the vicinity of each anti-freeze tank. Include a cabinet and signage.

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**NOTE TO SPECIFIER**

When a maintenance fluid (including engine coolant/anti-freeze) AST is being placed inside a building, it is critical to be sure the floor slab has adequate strength to support the tank. If the condition or makeup of the floor slab cannot be verified (or if a tank of similar size was not in the same location previously), if the floor is not level, if the condition is in question, a housekeeping/leveling slab shall be designed to support the new tank. The slab shall be designed for the site specific conditions, but in no case shall be less than 4 inches thick with reinforcement and anchoring to the existing floor.

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* 1. CONCRETE
     1. Concrete for the AST support slab shall have a minimum 28-day compressive strength of 3000 psi, with a maximum slump of 4 inches. Concrete shall be broom finished.
     2. Reinforcing bar shall comply with ASTM A-615.

1. EXECUTION
   1. INSTALLATION – ABOVEGROUND ANTI-FREEZE TANKS
      1. Install and test the anti-freeze tank in accordance with manufacturer instructions, PEI RP 200, or in accordance with the following instructions:
         1. The primary tank shall be pressure tested to UL 142 Standard (minimum 3 to maximum 5 psi) at the factory, and shall be field tested by the contractor to a maximum 3 psi.
         2. The secondary tank shall be tested liquid tight at the factory (minimum 3 to maximum 5 psi), and shall also be field tested by the contractor to a maximum 3 psi.
         3. Extreme caution should be taken not to over-pressurize the tank. Confirm the maximum test pressure from the tank manufacturer prior to testing Never apply pressure to a tank that has contained petroleum or other flammable/combustible product.
      2. Install one fire extinguisher at each anti-freeze tank with accompanying cabinets and signage.

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* + 1. [Install a leveling slab on top of the existing floor structure to support the AST. The slab shall be installed in accordance with the construction drawings.]
  1. INSTALLATION – ABOVEGROUND ANTI-FREEZE PIPING
     1. Anti-freeze system working pressure shall be 175 psi. Pneumatic test pressure shall be 200 psi. All pipe, tubing, hoses and fittings shall be rated for 200 psi.
     2. Install piping in accordance with PEI-RP 700, NFPA 30 and NFPA 30A, and tubing/fitting manufacturer requirements.
     3. All piping shall be supported in accordance with the [ ] Mechanical Code.
     4. Route piping in orderly manner and maintain gradient.
     5. Install piping to conserve building space and not interfere with use of space.
     6. Group piping whenever practical at common elevations.
     7. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
     8. In additional to pipe hangars, anchor all anti-freeze piping for lateral motion to accommodate pulsing of pneumatic pump.
     9. Sleeve pipe passing through partitions, walls and floors. Refer to [ ].
     10. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.
     11. Provide clearance for access to valves and fittings.
     12. Provide access where valves and fittings are not exposed.
     13. Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer.
     14. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting.
     15. Install identification on piping systems.
     16. Install valves with stems upright or horizontal, not inverted.
     17. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.
     18. Soap/bubble test all aboveground piping to per NFPA 30.
     19. Remove all PVC plugs and replace with steel plugs.
  2. INSTALLATION – ANTI-FREEZE SYSTEM
     1. Install the anti-freeze system, distribution system, distribution tanks, and alarm systems in accordance with manufacturer specifications, NFPA 30 and 30A, the construction drawings, and the related specification sections outlined above.
  3. FIELD QUALITY CONTROL – ANTI-FREEZE SYSTEM
     1. Test the supply and distribution piping systems in accordance with NFPA 30. Test the distribution tanks in accordance with manufacturer requirements.
     2. Flush all piping prior to introducing anti-freeze into the system. Dispose of all wastes in accordance with local, State, and Federal regulations.
     3. Test all leak detection sensors, level probes, safety devices, and overfill alarms. Provide a report to the owner.
     4. Provide documentation of all tests signed by certified personnel to the owner prior to the operation of the facility and in the closeout documents.
     5. Provide written notice to the owner when the system is ready to receive product, including a certification that all leak monitoring systems, overfill protection devices, and safety systems are fully tested and operational.
  4. COMMISSIONING
     1. The contractor shall commission the anti-freeze system. Commissioning shall include all testing, start-up, calibration, programming, and documentation. At the conclusion of the commissioning, the facility shall be ready for the owner and tenants to conduct unrestricted operations and use all systems to their full intended and designed capacity.
     2. The contractor shall submit a system commissioning plan to the owner and engineer for approval at least 30 days prior to commissioning the system. The plan, at a minimum shall include health and safety, testing, calibration, startup, and operational testing procedures for all operation and safety equipment. The plan shall also include all testing and commissioning procedures specifically outlined in this section. The contractor shall be responsible for supplying all fluids and commodities required to startup and calibrate systems. The plan may be combined with commission plans for other vehicle service equipment systems.
     3. Commissioning of the system shall commence no less than [ ] days prior to date of beneficial occupancy, and be completed prior to beneficial occupancy.
     4. Notify the engineer no less than 14 days prior to the completion of Commissioning. When Commissioning is completed, the contractor shall facilitate a final inspection by the engineer. The contractor shall have all necessary trade personnel on-site to operate equipment, open containment areas, and open electrical enclosures and equipment during the engineer’s final Commissioning inspection. That final inspection shall include, but not be limited to:
        1. Operational test of all systems.
        2. Operation test of all safety devices (e-stop switches, crash valves, overfill alarms);
        3. General review of the installation against plans, specs, and manufacturer requirements;
        4. Review of all test reports and manufacturer start-up reports;
        5. Test of all leak detection sensors;
        6. Closeout document requirements review;
        7. Tank registration form review, to include all outstanding regulatory reports;
        8. Inspect of all sumps and containment areas;
        9. Review and validation of monitoring system programming; and
        10. Confirmation that system training has been completed.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022