



026500

REMOVAL AND DISPOSAL OF STORAGE TANKS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION I – GENERAL REQUIREMENTS which are hereby made a part of this Section of Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, material, tools, transportation and equipment necessary to remove and dispose of the existing [Underground Storage Tanks (UST)s and/or Aboveground Storage Tanks (AST)s], associated electrical, structural, and product equipment, (e.g., dead men, anchor straps, piping, manways, piping, pumps, and dispenser(s), if present). This section specifies requirements for the environmental and tank assessment, permitting, removal and disposal of the [UST(s) and/or AST(s)] and is intended to supplement the construction/installation specifications. Generally, the work shall include, but not be limited to:
 - 1. File all necessary notices, obtain all permits and licenses, and pay for all governmental taxes, fees, and other costs in connection with the work. Obtain all necessary approvals of all governmental departments having jurisdiction.
 - 2. Characterize (any testing that may be required by a disposal facility), containerize, remove, and properly dispose of residual fuels from the designated tanks and appurtenant piping.
 - 3. Clean, remove, and dispose of [UST(s) and/or AST(s)], and appurtenant piping for the tank(s). The work shall include the removal and proper disposal of fuel and residual in the tanks and associated piping between the tanks and the building. [Removal of piping and associated contents within the XYZ Building is addressed in Section 024100 BUILDING AND ANCILLARY STRUCTURES DEMOLITION.]
 - 4. Perform all sampling and testing required to properly profile the material for waste disposal. This shall also include all testing required by the disposal or recycling facility.
 - 5. All costs for the testing shall be borne by the Contractor.
 - 6. [Coordinate with the Engineer and Licensed Site Professional (LSP) relative to the collection, sampling and analysis of impacted soils. Refer to Section 026100 EXCAVATED SOIL AND MATERIAL MANAGEMENT PLAN]



7. Coordinate with the Harvard Project Manager, Engineer and Licensed Site Professional to prepare all manifests and/or Bills of Lading for all contaminated materials removed from the Site. Original documents to be provided to the Harvard Project Manager and copies to the Engineer.
8. Comply with the Contractor's submitted Health and Safety Plan

1.03 RELATED WORK

- A. Section 013529 – HAZARDOUS MATERIALS HEALTH AND SAFETY
- B. Section 013543 – ENVIRONMENTAL PROTECTION
- C. Section 015000 - TEMPORARY FACILITIES AND CONTROLS
- D. Section 024100 – BUILDING AND ANCILLARY STRUCTURES DEMOLITION
- E. Section 026000- MISCELLANEOUS HAZARDOUS MATERIAL REMOVAL
- F. Section 026100 EXCAVATED SOIL AND MATERIAL MANAGEMENT PLAN
- G. Section 311000 – SITE PREPARATION
- H. Section 0312000 – EARTHWORK

1.04 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The list provided below is not intended to be all inclusive of each regulation prevailing over the work. The latest version of the document listed shall govern the work performed.

- A. Commonwealth of Massachusetts, State Fire Marshall's Regulations, 527 CMR 9.00, Tanks and Containers.
- B. Massachusetts Department of Environmental Protection, 310 CMR 40.0000, Massachusetts Contingency Plan (MCP).
- C. Commonwealth of Massachusetts, Underground Storage Tank Closure Assessment Manual, April 9, 1996.
- D. Commonwealth of Massachusetts Department of Environmental Protection, 310 CMR 80.00, Underground Storage Tank (UST) Systems
- E. OSHA Hazard Communication Standard, 29 CFR 1910.
- F. National Fire Prevention Association (NFPA) 326, Standard for Safeguarding of Tanks and Containers for Entry, Cleaning or Repair, 2005 edition.
- G. National Fire Prevention Association (NFPA) 51B, Standard for Fire Protection During Welding, Cutting and Other Hot Work, 201 edition.



H. Harvard University, Construction Environmental Health and Safety Standard.

1.05 DEFINITIONS

- A. Harvard Project Manager: A representative of the Property Owner, President and Fellows of Harvard College
- B. Harvard EHS: Harvard University, Environmental, Health and Safety
- C. DOT: United States Department of Transportation
- D. Engineer: Authorized representative of the Harvard Project Manager
- E. LEL: Lower Explosive Limit
- F. LSP: Licensed Site Professional
- G. Mass DEP: Massachusetts Department of Environmental Protection
- H. DPS: Massachusetts Department of Public Safety
- I. OSHA: Occupational, Health and Safety Administration
- J. PID: Photoionization Detector

1.06 REGULATORY REQUIREMENTS

- A. Tank closure shall be carried out in accordance with the requirements identified in 40 CFR Part 280, M.G.L c.148, Massachusetts Board of Fire Prevention Regulations 527 CMR 9.00, MADEP Policy #WSC-402-96, as well as any other applicable local and Commonwealth of Massachusetts regulations. Wherever there is a conflict or overlap of requirements, the most stringent provisions shall apply.
- B. The Contractor shall obtain and pay for all local and state permits, including a UST removal permit (Form FP-292), and make necessary arrangements with the local Fire Department prior to the removal of tanks.
- C. The Contractor shall keep the local Fire Department informed of all activities throughout the performance of the work.
- D. The Contractor shall obtain all local, State, and Federal permits required for the transport and disposal of all waste materials resulting from the performance of this work.
- E. The Contractor shall document that the disposal facility(ies) proposed have all certifications and permits required by Harvard EH&S, local, State, and Federal regulatory agencies to receive and recycle or dispose of the liquid and the solid wastes resulting from performance of the work. Disposal facilities must be from the Harvard approved disposal facility list.



- F. For work that will be sub-contracted, the Contractor is responsible to ensure that the Sub-contractor has reviewed and will strictly adhere to this specification, all reference documents, and with all local, state and federal regulations.
- G. All Contractors and/or Sub-contractors must have current, applicable licenses for all work performed.

1.07 SAFETY REQUIREMENTS

- A. Provide appropriate protective equipment for all personnel working in direct contact with vapors, liquids or sludge removed from the tanks. All personnel shall be trained in the proper use and maintenance of the appropriate protective equipment used on this project. Smoking will not be allowed in the work area or loading area during the course of the work.
- B. Personnel working inside and in the general vicinity of the tanks shall be trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this work, including training for confined space entry. Personnel shall use proper protection and safety equipment during work in and around the tanks, including instruments to monitor air quality, explosive atmospheres and oxygen content.
- C. All provisions of the site Health and Safety Plan included shall be in force during tank removal activities, unless modified in writing by the Contractor's Site Safety Officer.
- D. Warning signs and devices shall be placed at regular intervals along the work area perimeter, and establish restricted work zones, support areas and decontamination areas as needed. Contractor shall furnish, install and maintain fencing or other appropriate barricades at open excavations, including illumination if left over night.
- E. Prior to ending operations on any working day or at any time the Contractor is not on site, the Contractor shall secure all areas of work by erecting temporary safety fencing in accordance with Section 015000 – TEMPORARY FACILITIES AND CONTROLS.
- F. Cutting of steel or other metals by thermal methods shall, at all times, occur in a non-explosive environment. During such work, percent of lower explosive limit in the tanks, piping of the surrounding atmosphere shall be continuously monitored. The Contractor shall note that residual pockets of oils or residues may exist in some of the pipelines and the Contractor shall exercise care to prevent release to the environment and harm to workers, facility staff or the public resulting from potential explosive nature of the contained materials.
- G. The Contractor shall provide and maintain an adequate supply of fire extinguishers and other required safety equipment in close proximity to all tank cleaning and removal activities.

1.08 QUALITY ASSURANCE AND MEASUREMENT FOR CONTAMINATION

- A. The Contractor shall provide a designated representative available on site during the tank and pipe cleaning and removal to monitor for leaks. The designated representative will perform inspections and tests to ensure that the work is performed in compliance with the specification and with applicable Federal, State and local regulations, guidelines and



policies. The Contractor's representative is to follow the Massachusetts Underground storage Tank Closure Assessment Manual for the proper protocols for compliance with this requirement.

- B. It is not intended that the presence or activities of the Engineer shall relieve the Contractor in any way of his/her obligation to maintain an adequate inspection program of his/her own, or any other obligation under this specification.

1.09 SUBMITTALS

- A. The Contractor shall submit each item in this Article according to the Conditions of the Contract and the Submittals [Section 013300], for information only, unless otherwise indicated.
- B. The Contractor shall submit a Waste Management Plan as specified in Section 017419 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. The Plan shall include identification of the proposed waste hauler and disposal facility with copies of all applicable licenses, registrations and approvals.
- C. The Contractor shall provide copies of all worker certifications associated with OSHA 40 Hour Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120.
- D. The Contractor shall provide the Harvard Project Manager with all required documentation relating to the proper removal and disposal of any hazardous or regulated waste that leaves the site in accordance with the Waste Management Plan.
- E. After completion of the tank removal, provide a final report documenting removal, transportation and disposal activities. The report shall be prepared in accordance with the *Underground Storage Tank Closure Assessment Manual*, prepared by the Commonwealth of Massachusetts and dated April 9, 1996. The document shall include the following:
 - 1. Complete original manifests and/or Bills of Lading for all hazardous or non-regulated materials disposed off-site, including but not limited to, discarded tank, waste liquid and sludge and associated debris from the Site.
 - 2. Permit (Form #FP-292) for storage tank removal and transportation to approved tank disposal yard
 - 3. Notice (Form FP290R) to DPS indicating a change in the registration information for the USTs.
 - 4. Original receipt of tank acceptance for a State approved tank yard.
 - 5. Generator's Copy of manifest to Harvard EH&S for its disposal of waste materials.
- F. Payment for work related to this section will not be issued until all documentation required is submitted.



PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide suitable personnel, material and equipment to clean and remove the fuel piping and tanks and all sludge and liquids that may be in the piping and tanks prior to removal. Take all necessary precautions during removal of the tanks to prevent damage to utilities adjacent to the area. All fuel fill, boiler supply and other fuel lines and vents shall be removed.

3.02 PERMITTING

- A. Prior to initiating storage tank removal activities, the Contractor shall notify the local fire department. The Contractor shall apply for and obtain a Permit (Form #FP-292) for storage tank removal and transportation to approved tank disposal yard in accordance with the provisions of M.G.L. Chapter 148, Section 38A and 527 CMR 9.00.
- B. Within 72 hours of closing the storage tank, the Contractor shall provide receipt to the local fire department for delivery of the USTs to the disposal site designated on permit.
- C. Within 30 days of removing the storage tanks, the Contractor shall send notice to Department of Public Safety to change registration information for the storage tanks. The form used to give this notice, FP290R, is available from the local fire department.

3.03 TANK CLEANING

- A. The Contractor shall perform the following activities prior to closure of the tank:
 - 1. Notify the local fire department.
 - 2. Contact DIGSAFE to obtain information on underground utilities, a minimum of 72 hours prior to excavation.
 - 3. Contact Harvard Engineering & Utilities to obtain information on underground utilities, a minimum of 72 hours prior to excavation.
 - 4. Obtain all necessary permits, as previously detailed within this Section.
- B. Inspect the work area prior to excavation, decontamination and removal activities to the extent required to safely perform the work. Before the UST is uncovered check for stains around the fill pipes, free products, sheen and petroleum odors in nearby basements and storm sewers. If stained soil or petroleum odors are found, note these areas for future field screening and/or sampling during the UST removal.
- C. The Contractor shall protect existing site surfaces, materials, and structures from inadvertent Contamination from cleaning operations. Should such contamination occur, the Contractor shall not be reimbursed for costs associated with replacement or proper disposal of contaminated materials.



- D. Assure that any electrical power connected to the tanks or its ancillary equipment (pumps) has been deactivated and the actual wiring properly dismantled at the circuit breaker(s).
- E. Collect, containerize and dispose of all residual oils, other product, and sludge remaining in the tanks and piping prior to tank cleaning and removal.
- F. Tanks shall have interiors steam cleaned followed by three (3) rinses. The steam discharge nozzle and all conductive insulated objects subject to impingement or condensation should be bonded to the tank or be grounded. Surfaces shall be steam cleaned using a commercial-scale steam cleaner. The Contractor shall be required to use a detergent and provide a steam generator capable of supplying steam at 15 psig. Liquid waste generated as a result of steam cleaning and rinsing operations shall be collected and removed by the Contractor. The Contractor shall dispose of the liquids as per the method specified for the tank sludges and residues.
- G. After the above operations, all flammable vapors shall be removed from the tanks by displacement with inert gas. The vapors shall be made inert by adding solid carbon dioxide, (dry ice), in the amount of 1.5 pounds per 100 gallons of tank capacity. The dry ice shall be crushed and distributed evenly over the greatest possible area to ensure rapid sublimation. All available tank openings shall be open to the atmosphere during this procedure to ensure rapid dissipation of the dry ice.
- H. To evaluate the effectiveness of the dry ice procedure, the Contractor shall use a suitably calibrated instrument to determine if the resultant vapor mixture within the tanks exceeds ten percent of the Lower Explosive Limit (LEL). Readings shall be taken throughout the tanks depth wherever access is possible. If the vapors within the tanks exceed ten percent of the LEL, the displacement procedure shall be repeated followed by a recheck of the LEL until the vapors are less than 10 percent of the LEL.
- I. After acceptable LEL levels have been reached, excavation of tanks may begin after approval of the Engineer.

3.04 TANK EXCAVATION

- A. The Contractor shall provide all labor, permitting, tools, material, services, and equipment necessary to properly demolish the concrete vault, excavate the tank(s), and associated mechanical piping and appurtenances, after pipe and tank cleaning and disposal activities.
- B. After the tank and mechanical piping have been purged, cleaned, and gas freed of vapors, but prior to removal, the Contractor shall plug all holes and inert the tanks and piping, as specified by the Board of Fire Prevention regulations.
- C. Once the tanks are cleaned and inert, the Contractor must be careful to excavate around the tank, exposing as much of the tank as possible, to allow for a visual inspection of the tank surface. The inspection is performed to identify possible holes, cracks, etc. and other evidence that a leak may have occurred. Remove the tank hold-down straps, if any, lift the tank out of the excavation, place on a level surface, and block the tank to prevent movement. The exterior of each tank and pipe shall be cleaned, and if contaminated soil or groundwater conditions exist, the cleaning wastes contained for proper disposal. Methods for removal shall be predetermined by Contractor and approved by the Engineer



or their representative.

- D. The LSP shall monitor the excavations and every 20 feet along pipe trenches for visual indications of the release of petroleum and shall use a PID for headspace screening of samples and to conduct ambient air readings during all excavation activities. The Contractor shall assist the LSP in collecting appropriate soil samples during post excavation from excavation graves. These samples will be submitted by the LSP for analysis at an analytical laboratory at Harvard's expense. Headspace screening performed by the LSP will be in accordance with the *Underground Storage Tank Closure Assessment Manual*. [Note that a reading exceeding 100 ppmv below 2 feet of the soil around the USTs is a Mass DEP 72-hour reportable condition and such findings shall immediately be conveyed to the Harvard Project Manager. If this condition is encountered or any other condition that is a 2-hour or 72-hour reportable condition, all subsequent earthwork and/or groundwater handling work will be under the direction of a LSP retained by Harvard EH&S. Harvard's LSP, in coordination with Harvard's EH&S, will coordinate reporting obligations as well as any further environmental remediation. As a result, the Contractor may be required to perform additional excavation in the area(s).]
- E. If large areas of petroleum impacted soils are encountered in the UST excavation, or greater than one-half inch (1/2") of free oil on a groundwater surface, work shall stop and the Harvard Project Manager and EH&S shall be immediately notified. Subsequent earthwork and/or groundwater handling work will be under the direction of a LSP retained by Harvard EH&S.
- F. Incidental volumes of visually (or by field PID) contaminated soils may be expected during excavation of the USTs and piping. These soils shall be segregated and stored during characterization and preparation for offsite disposal by the Contractor (Section 026100 EXCAVATED SOIL AND MATERIAL MANAGEMENT PLAN). The maximum depth of all excavation areas shall be marked with caution tape or the like to aid potential future excavation. Apparently clean soils shall be stockpiled separately for future reuse at the site. Reuse of these soils will be directed by Harvard EH&S or the project LSP, with results below applicable MCP standards.
- G. Where contaminated soil is present below the groundwater table, the Contractor, at the discretion of the Engineer or their LSP representative shall discontinue excavation and shall line the excavation with 6 mil thick polyethylene sheeting prior to backfill.

3.05 TANK REMOVAL

- A. The tanks shall be removed from the excavation and the exterior cleaned to remove all soil and inspected for signs of corrosion, structural damage, or leakage. All materials coming into contact with the tanks, or in the vicinity of the excavation such as shovels, slings and tools shall be of the non-sparking type.
- B. Tank anchoring structures such as concrete deadmen or hold down slabs shall be removed, unless otherwise directed by the Engineer.
- C. All piping including electrical conduit associated with the tanks shall be completely removed to the interior face of any associated building wall. Piping shall be reduced to appropriate lengths and cleaned of all contaminated materials. Sleeves and piping passing through wall shall be flushed clean and then permanently capped and plugged on the outside in a manner approved by the Engineer.



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- D. All level monitoring and control equipment shall be completely removed to the interior face of any associated building wall. This includes transmitters, indicators, conduit, wiring, pumps and dispensers.
- E. The Contractor shall prominently label each UST tank with past product content and date of removal. The tanks shall be rendered unusable at the direction of the Fire Protection Officer. The tank shall be removed from the site the day it is excavated and transported to a certified tank salvage facility. Prior to removal from the site, the tank atmosphere must be tested to ensure the flammable vapors are no more than five (5) percent of the lower flammable limit; and not greater than eight (8) percent oxygen. Test results shall be provided to the Engineer and the Fire Prevention Officer and subsequently documented, in writing, to the Engineer and the Fire Prevention Officer.
- F. Each tank should be secured onto a truck or vehicle and transported to a certified tank salvage facility, in accordance with all applicable federal, state, and local regulations. The Contractor shall prepare the proper manifests or bills of lading. The certificates of receipt of proper disposal shall be submitted to the Fire Prevention Officer within 72 hours of tank removal, with copies provided to the Harvard Project Manager and the Engineer.

3.06 TANK DISPOSAL

- A. The Contractor shall dispose of all demolition related wastes as designated herein, in accordance with all applicable regulations.
- B. The Contractor shall characterize, containerize, transport, and dispose of all residue, sludges, cleaning materials, and fluids from the tanks at a Harvard EH&S approved and permitted disposal/recycling facility.
- C. If evidence of soil or groundwater contamination is identified by the Engineer or the LSP during the tank closure, then disposal of pumped groundwater shall be performed by the Contractor only as approved by the LSP.
- D. Tanks and piping shall be delivered for disposal in an acceptable manner to an approved disposal or recycling facility following decontamination.
- E. All concrete associated with existing buried tanks shall be broken up and re-used/disposed in accordance with Section 017419 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.