SECTION 02 65 00
STORAGE TANK CLOSURE OR REMOVAL

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

A. 40 CFR 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks; current edition.

B. API PUBL 1628 - Guide to the Assessment and Remediation of Underground Petroleum Releases; 1996.

C. NFPA 70B - Recommended Practice for Electrical Equipment Maintenance; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 DESCRIPTION OF THE WORK

THE RETAINED TANK CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, LAYOUT, ENGINEERING, SUPERVISION, TRUCKING, PERMITS, TRANSPORTATION, FEES, INSURANCE, DECOMMISSIONING, APPLICABLE TAXES, AND OTHER INCIDENTAL ITEMS NECESSARY FOR THE PROPER REMOVAL OF EXISTING USTS AND EXISTING PIPING, VENTS, FILLS, AND ASSOCIATED ANCILLARY ITEMS.

1.03 RELATED SECTIONS

A. This Section is not to be used solely, it is to be used in conjunction and coordinated with all other sections of this Specification and Contract Documents pertaining to this project.

1.04 REFERENCES TANK CLOSURES

A. American Petroleum Institute (API)
   1. RP 1604 Removal and Disposal of Used Underground Storage Tanks
   2. API PUBL 1628:1996 3rd Edition Underground Spill Cleanup Manual
   3. RP1631 Interior Lining of Underground Storage Tanks
   4. RP 2003 Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents
   5. Publ 2015 Cleaning Petroleum Storage Tanks
   6. Publ 2015A A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning (Supplement to API Publ 2015)
      a. Publ 2217 Guidelines for Confined Space Work in the Petroleum Industry
      b. Publ 2219 Safe Operating Guidelines for Vacuum Trucks in Petroleum Service
   7. National Fire Protection Association (NFPA)
      a. 327 Standard Procedure for Cleaning or Safeguarding Small Tanks and Containers
      b. 70B Electrical Equipment Maintenance
   8. Local Regulations
      a. NYC Administrative Code C19-57.0, F(27-4062)
      b. Fire Department Directive Number 3 of 1973
   9. NYS Department of Environmental Conservation
      a. 6NYCRR PT. 613.9
      b. Recommended Practices for Underground Storage of Petroleum
      c. Stars Memo #1 – Petroleum Contaminated Soil Guidance
   10. Environmental Protection Agency 1.40 CFR 280.70
      a. 2. USEPA Memorandum: “Statutory Interpretive Guidance on the Restriction on Placement of Non-Hazardous Liquids in Hazardous Waste Landfills”, April 30, 1986.
   11. Occupational Health and Safety (OSHA)
      a. 29 CFR Part 1910 – 146 – Permit-required confined spaces.
   12. Resource Conservation and Recovery Act 40 CFR Parts 260 - 265.
   13. 6 NYCRR Part 360. Solid Waste Management Facilities, July 14, 1985.
   14. 6 NYCRR Part 364, Waste Transporter Permits, January 10, 1985.
   15. 6 NYCRR Part 371, Identification and Listing of Hazardous Waste, July 14, 1985.

16. 6 NYCRR Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities, July 1, 1986.
17. RCRA Information on Hazardous Wastes for Publicly Owned Treatment Works, USEPA, September 1985.
18. Division of Solid and Hazardous Waste Policy Memorandum: “Transportation and Disposal of Oil Spill Debris”, Rev. September 25, 1985.
    a. Note: The latest edition of all references shall apply.

PART 2 PRODUCTS

2.01 NOT USED PART 3 EXECUTION

A. Demolition Methods
   1. Use demolition methods that will not crack, structurally disturb or damage adjacent property, structures, facilities, etc. Do not use explosives.

B. Verification
   1. The Tank Contractor shall investigate and verify the location of all tank(s) and associated equipment to be either removed or closed in-place.

C. Removal
   1. Remove all materials, equipment and fixtures, and promptly dispose of off-site, in compliance with all applicable laws.

D. Inspection and Permit Coordination
   1. The Tank Contractor shall coordinate all required inspections and obtain all required permits for completion and closeout of all Work. (See Section 17191).

E. Excavation Work
   1. Adequate and acceptable excavation and barricade protection shall be provided by the Tank Contractor in accordance with Section 011100 - “Summary of Work”, and other applicable sections, NYC Building Code, and OSHA regulations.

F. Operation/Construction Coordination
   1. Tank Contractor shall coordinate all Work with other facility operations and/or construction to avoid interference, conflict, and/or delays.

G. Flammability and Combustibility Considerations
   1. Flammable or combustible vapors are likely to be present in the work area. The concentration of vapors in the tank(s), the excavation, or the work area may reach the flammable (explosive) range before venting is completed and a safe atmosphere is reached. Therefore, precautions must be taken to: (a) eliminate all potential sources of ignition from the area (for example, smoking materials, nonexplosion-proof electrical and internal combustion equipment),
      a. (b) prevent the discharge of static electricity during venting of flammable vapors, and (c) prevent the accumulation of vapors at ground level,
      b. (d) use only intrinsically safe communication equipment in construction zone. Refer to API Publication 2015 and Recommended Practice 2003 for general
      c. precautionary measures to follow during the vapor-freeing procedure.
   2. Before initiating any work and during work in the tank system areas or in the tank(s), a combustible gas indicator (CGI) shall be used to check for hazardous vapor concentrations. All open flame and spark-producing equipment within the vapor hazard area must be shut down. Electrical equipment (for example, pumps, portable hand tools, communication equipment, etc.) used in the area must be explosion-proof in accordance
      a. with NFPA 70B Class I, Division I, Group D or otherwise approved for use in potentially explosive atmospheres.
   3. The tank vapor space is to be tested by placing the combustible gas indicator probe into the fill opening with the drop tube removed. Readings should be taken at the bottom, middle, and upper portions of the tank, and the instrument should be cleared after each reading. If the tank is equipped with a non-removable fill tube, readings should be taken

through another opening. Liquid product must not enter the probe. Readings of 10 percent or less of the lower flammable limit must be obtained before the tank is considered safe for removal.

4. Combustible gas indicator readings may be misleading where the tank atmosphere contains less than 5 percent by volume oxygen, as in a tank vapor-freed with CO2, N2, or another inert gas. In general, readings in oxygen-deficient atmospheres will be on the high, or safe, side. The Tank Contractor shall use an oxygen indicator to assess the oxygen concentration.
5. Combustible gas indicator shall be properly calibrated according to the manufacturer's instructions (typically on pentane or hexane in air), and thoroughly checked and maintained in accordance with the manufacturer's instructions. Persons responsible for testing must be completely familiar with the use of the instrument and the interpretation of the instrument's readings.

H. Remove liquids and residues from the tank(s) by using explosion-proof or air-driven pumps.
   1. Pump motors and suction hoses must be bonded to the tank(s) or otherwise grounded to prevent electrostatic ignition hazards. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck must be vapor-free. The truck should be located upwind from the tank(s) and outside the path of probable vapor travel. The vacuum pump exhaust gases should be discharged through a hose of adequate size and length downwind of the truck and tank area.
   2. See API Publication 2219:2005 3rd Edition for vacuum truck operating and safety practices.

I. Procedure for Removal of Underground Tank Systems. Prior to the start of any work, the Tank Contractor shall:
   1. Remove all product to its lowest draw-off point. (See 3.9 above)
   2. Drain all piping into the tank by forced air only. Location of existing product line check valves shall be verified by the Tank Contractor to ensure proper drainage. If a check valve is indicated by interference to air flow, access tank top prior to draining lines.
   3. The liquid below the draw-off point is considered "tank-bottom" and must also be pumped out. The use of a hand pump or a vacuum pump is needed. This liquid consists of a floating layer of product, water and sediments. Pump out the entire tank bottom including the remaining product layer. (See 3.9 above for safety measures).
   4. Dig down to the top of the tank and expose the upper half of the tank. An as- built drawing shall be prepared by the Tank Contractor showing locations, depth, paving, etc.
   5. Use a combustible gas indicator (explosion meter) calibrated according to the manufacturer's instructions and monitor the area of the tank excavation continuously until the tank is removed. Pipe trenches shall also be monitored to ensure safe working conditions.
   6. Remove the fill tube, except when it is planned to vapor-free the tank by using an eductor as in (3.10,H,4). Disconnect all lines, including but not limited to the fill, gauge, product and vent lines. Cap or plug open ends of lines which are not to be used further.
   7. Temporarily plug all tank openings and install one tank fitting with a 1/8-inch hole to relieve the differential pressure that will develop during the tank removal, complete the excavation, and remove the tank, placing it in a secure location. The tank must be blocked to prevent movement. Examine for perforations. Repair perforations that would allow leaking of cleaning effluent. Use screwed (boiler) plugs to plug any corrosion holes in the tank shell.
   8. The tank should be made safe by using one of the following methods. In all methods, the tank atmosphere should be checked to ensure that petroleum vapors have been satisfactorily purged from the tank. Refer to API 1604 for purging recommendations.
      a. It is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor-freeing procedures described below. For this reason, caution must always be exercised when handling or working around tanks that have stored flammable or combustible liquids.

b. Vent all vapors from the tank to building exterior at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines until the tank is purged of flammable vapors. The work area must be free from sources of ignition during any tank purging operations, (See 3.8).

9. Purging Options.
   a. Addition of dry ice; 1.5 pounds per 100 gallons of tank capacity. The dry ice should be crushed and distributed evenly within the tank's interior. As the dry ice vaporizes, flammable vapors will flow out of the tank. Therefore, observe all safety precautions regarding flammable vapors. Where practical, plug all tank openings except the vent after introducing the solid Carbon Dioxide (CO_2) and continue to observe all normal safety precautions regarding flammable or combustible vapors. (Make sure that all of the dry ice has evaporated before proceeding). CAUTION: Skin contact with dry ice may produce burns.
      1) An alternative to dry ice is to introduce CO_2 gas directly into the tank (via the fill line) to purge flammable vapors. A minimum of one 75 lb. cylinder of CO_2 gas per 2000 gallons of tank volume should be used. Care must be exercised to prevent buildup of any static charge. The nozzle must be bonded or grounded, and the gas introduced slowly to reduce static electricity.
   b. The use of a nitrogen gas (N_2) is another acceptable method for inerting a tank. Vapors within the storage tank must be displaced with an amount of nitrogen gas equal to or greater than the volume of the tank atmosphere. The nozzle must be bonded or grounded, and the gas introduced slowly to reduce static electricity. Note: The carbon dioxide (CO_2) or nitrogen (N_2) methods shall not be utilized if the tank is located indoors or is to be entered for any reason, as the atmosphere will be oxygen deficient. The inert gas shall be introduced through a single tank opening at a point near the bottom of the tank opposite the vent. When inert gases are used, they shall be introduced under low pressure to avoid the generation of static electricity. When using (CO_2) or (N_2), pressures in the tank shall not exceed 5 pounds per square inch.
   c. CAUTION: The process of introducing compressed gases into the tank may create a potential ignition hazard as the result of the development of static electrical charges. The discharging device must therefore be grounded. Explosions have resulted from the discharging of CO_2 fire extinguishers into tanks containing a flammable vapor-air mixture. CO_2 extinguishers should not be used for inerting flammable atmospheres.
   d. Ventilation using an eductor-type air mover usually driven by compressed air is illustrated in API # 1604. The eductor- type air mover must be properly bonded to prevent the generation and discharge of static electricity. When using this method, the fill (drop) tube should remain in place to ensure ventilation at the bottom of the tank. Tanks equipped with fill (drop) tubes that are not removable should be purged by this method. An eductor extension shall be used to discharge vapors a minimum of 12 feet above grade and away from windows and
      1) discharged outdoors.

10. The tank atmosphere must be tested to ensure that the tank is safe.
    a. If one of the first three methods (1, 2, or 3) was chosen to inert the tank, the tank interior shall be tested with an oxygen meter. The oxygen meter will give a reading of % oxygen per volume. For a safe condition, the reading should be no greater than 6-7% oxygen. Note: These conditions are not safe for tank entry.
    b. If the last method (4) was chosen to purge the tank, the tank interior should be tested with a CGI or an explosion meter. The explosion meter will give a reading of % LEL (Lower Explosive Limit). For a safe condition, the reading should be 10% or less LEL.
    c. If the tank is not in a safe condition, then the purging or inerting process must be continued until the CGI reads less than 10% LEL.

11. Tanks can be cleaned at this point. Clean the inside of the tank, as per the recommendations contained in API 2015, to remove sludge and refuse that would create a vapor hazard if not removed. Dispose of product, sludge, tank rinse effluent in compliance

with all applicable laws. Provide manifest(s) to Construction Manager for all contaminated materials transported off-site. Manifest(s) shall: indicate the type of product; volume collected; origin address; transporter's name; address; and license information; disposal facility's name, address, and license information; dates of

a. transactions.

12. As soon as the petroleum vapors are satisfactorily purged from the tank, cut one or more large holes in the tank top.
13. At this point, the tank interior should be cleaned with a high pressure rinse using as little water as possible to remove loose scale, corrosion and residual product. Other methods acceptable to the Construction Manager may be utilized. In the case of a fuel oil storage tank where large amounts of sludge and/or tar may be present, it may be necessary to enter the tank and manually remove such wastes (see 3.10, O.). As noted earlier, all safety precautions should be taken and the wastes recovered and drummed for proper disposal.
14. A visual observation of the tank interior should be made; if any holes are discovered, or if petroleum is present in the soil as indicated by visual observations, field screening, olfactory senses or sample results, then it must be reported as a spill to the Construction Manager and the DEC within two hours. The presence of product may require additional work, such as soil excavation, and/or dewatering as directed by the Construction Manager.
15. All future correspondence and submittals related to this project shall reference the following: "CEQR # 23CHA004M".
16. Tanks which cannot be entered shall be cleaned in accordance with procedures outlined in NFPA 327 (current version) using steam.
17. "Confined space entry permit" requirements shall be adhered to for safety of all workers during tank entry operations.
18. The Construction Manager shall coordinate the site assessment of the excavation zone in accordance with applicable regulatory requirements. The Tank Contractor shall provide at no additional cost two (2) laborers, equipment and materials to assist the Construction Manager in documenting the condition of the tank and ascertaining and obtaining all samples.
19. The final step is to dispose of the removed tank. Once properly emptied* and cleaned, petroleum storage tanks are not a hazardous waste and hence, may be disposed of at a landfill permitted under Part 360 or at a scrap yard.
    a. *For purposes of this policy "Empty" shall be defined as in 6 NYCRR Part 371, Section 371.1(f)(2)(i).
20. In order to make a tank acceptable for disposal at a scrap yard or sanitary landfill, the
    a. following steps shall be taken.
        (a) The tank interior shall be cleaned by high-pressure spray rinse or other methods acceptable to the Construction Manager. The water collected from this operation shall be disposed of in same manner as the tank bottoms.
        (b) A tank which is being discarded should be then rendered unusable by cutting entry holes at each end cap to make it acceptable for disposal at a sanitary landfill
            (1) or scrap yard.
            (2) Note: The cleaning process described in step a. is acceptable for all storage tanks
            (3) except for large #5 or #6 fuel oil storage tanks. The tar and sludge remaining in these tanks must be removed by manual cleaning methods. Tank entry for cleaning requires protective clothing, auxiliary air and masks for personnel involved. If leaded fuel was stored, particular attention shall be given to API publication 2015A.
21. Tanks shall be labeled after removal from the ground but prior to removal from the site. (See API # 1604, Section 4.4.4). Labeling, at minimum, shall include date removed, tank contents, and tank size.

22. Surface slabs or pavements shall be restored in accordance with Contract Documents. All backfill shall be ¾" self compacting crushed stone or approved equal.

J. Procedure for Tank Closure In Place.
   1. Remove all liquids to the lowest draw-off point.
   2. Drain all piping into the tank by forced air only. Location of existing product line check valves shall be verified by the Tank Contractor to assure proper drainage. If a check valve is indicated by interference to air flow, access tank top prior to draining lines.
   3. The liquid below the draw-off point is considered "tank bottom" and must also be pumped out. The use of a hand pump or a vacuum pump is required. This liquid consists of a floating layer of product, water and sediments. Pump out the entire tank bottom including the remaining product layer.
   4. The Tank Contractor shall utilize a 4'x 4' opening to initially access the tank top. The Tank Contractor shall then proceed to uncover the tank system piping at the tank top to ensure proper purging, flushing and abandonment of the tank system. Concrete surface slabs shall be sawcut. An as-built drawing shall be prepared by the Tank Contractor showing locations, depth, paving, etc. and provided to the Construction Manager after the Work is complete.
   5. Use a combustible gas indicator (explosion meter) calibrated according to the manufacturer's instructions, and monitor the area of the tank and tank excavation continuously until the tank is closed. Pipe trenches shall also be monitored to ensure safe working conditions.
   6. Remove the fill (drop) tube. Disconnect the fill, gauge, and product lines. Cap or plug ends of lines which are not to be used further. The vent line should remain connected until the tank is filled.
   7. The tank should be made safe by using one of the following methods. In all methods, the tank atmosphere should be checked to ensure that petroleum vapors have been satisfactorily purged from the tank. Refer to API 1604 for purging recommendations.
      a. It is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor-freeing procedures described below. For this reason, caution must always be exercised when handling or
         (1) working around tanks that have stored flammable or combustible liquids.
      b. Vent all vapors from the tank to the building exterior at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines until the tank is purged of flammable vapors. The work area should be
         (1) free from sources of ignition during any tank purging operations, (See 3.8).
         (2) Purging Options.
      c. Addition of dry ice; 1.5 pounds per 100 gallons of tank capacity. The dry ice should be crushed and distributed evenly within the tank's interior. As the dry ice vaporizes, flammable vapors will flow out of the tank. Therefore, observe all safety precautions regarding flammable vapors. Where practical, plug all tank openings except the vent after introducing the solid Carbon Dioxide (CO_2) and continue to observe all normal safety precautions regarding flammable or combustible vapors. (Make sure that all of the dry ice has evaporated before proceeding).
         1) CAUTION: Skin contact with dry ice may produce burns.
      d. An alternative to dry ice is to introduce CO_2 gas directly into the tank (via the fill line) to purge flammable vapors. A minimum of one 75 lb. cylinder of CO_2 gas per 2000 gallons of tank volume should be used. Care must be exercised to prevent buildup of any static charge. The nozzle must be bonded or grounded and the gas introduced slowly to reduce static electricity.
      e. The use of a nitrogen gas (N_2) is another acceptable method for inerting a tank. Vapors within the storage tank must be displaced with an amount of nitrogen gas equal to or greater than the volume of the tank atmosphere. The nozzle must be

bonded or grounded and the gas introduced slowly to reduce static electricity.Note: The carbon dioxide (CO_2) or nitrogen (N_2) methods shall not be utilized if the tank is to be entered for any reason, as the tank atmosphere will be oxygen deficient. The inert gas shall be introduced through a single tank opening at a point near the bottom of the tank opposite the vent. When inert gases are used, they shall be introduced under low pressure to avoid the generation of static electricity. When using (CO_2) or (N_2), pressures in the tank shall not exceed 5 pounds per square inch.

f. CAUTION: The process of introducing compressed gases into the tank may create a potential ignition hazard as the result of the development of static electrical charges. The discharging device must therefore be grounded. Explosions have resulted from the discharging of CO_2 fire extinguishers into tanks containing a flammable vapor-air mixture. CO_2 extinguishers should not be used for inerting flammable atmospheres.

g. Ventilation using an eductor-type air mover usually driven by compressed air is illustrated in API # 1604. The eductor- type air mover must be properly bonded to prevent the generation and discharge of static electricity. When using this method, the fill (drop) tube should remain in place to ensure ventilation at the bottom of the tank. Tanks

   1) equipped with fill (drop) tubes that are not removable should be purged by this method. An eductor extension shall be used to discharge vapors a minimum of 12 feet above grade.

8. In all methods, the tank atmosphere shall be checked to ensure that petroleum vapors have been satisfactorily purged from the tank. The tank atmosphere must be tested to ensure that the tank is safe.
   a. If one of the first three methods (1, 2, or 3) was chosen to inert the tank, the tank interior shall be tested with an oxygen meter. The oxygen meter will give reading of % oxygen per volume. For a safe condition, the reading should be no greater than 6-7% oxygen. Note: These conditions are not safe for tank entry.
   b. If the last method (4) was chosen to purge the tank, the tank interior should be tested with a CGI or an explosion meter. The explosion meter will give a reading of % LEL (Lower Explosive Limit). For a safe condition, the reading should be 10% or less LEL.
   c. If the tank is not in a safe condition, then the purging or inerting process must be continued until the CGI reads less than 10% LEL.
9. At this point, the tank interior shall be cleaned with a high pressure rinse using as little water as possible to remove loose scale, corrosion and residual product. Other methods acceptable to the Construction Manager may be utilized. In the case of a fuel oil storage tank where large amounts of sludge, tar or tank linings may be present, it may be necessary to enter the tank and manually remove such wastes. As noted earlier, all safety precautions shall be taken and the wastes recovered and drummed for proper disposal.
10. Clean the inside of the tank, as per the recommendations contained in API 2015, to remove sludge and refuse that would create a vapor hazard if not removed. Dispose of sludge, tank rinse effluent, and tank system parts in compliance with all applicable laws. Provide manifest(s) to Construction Manager for all contaminated materials transported off-site. Manifest(s) shall: indicate the type of product; volume collected; origin address; transporter’s name; license information; disposal facility’s name, address and license information; and dates of transaction.
11. A visual observation of the tank interior shall be made; if any holes are discovered or if petroleum is present in the soil then it must be reported as a spill to the Construction Manager and the DEC within two hours.
12. Tanks which cannot be entered shall be cleaned in accordance with procedures outlined in NFPA Publication 327 (current version) using steam.
13. OSHA “Confined space entry permit” requirements shall be adhered to for the safety of all workers during tank entry operations.
14. The Construction Manager shall coordinate the site in accordance with applicable
    a. regulatory requirements. The Tank Contractor shall provide at no additional cost, two (2) laborers, equipment and materials to assist the Construction Manager in

documenting the condition of the tank and ascertaining and collecting all required samples. The Tank Contractor shall assist the Construction Manager with the collection of soil samples from below the tank by saw cutting and obtaining soil samples through the bottom of the tank.

b. Sampling methods, frequency, depths of collection and quantity will be determined by the Construction Manager.

15. The tank shall be closed by filling (vibrating) with 2500 psi lean concrete.
16. Disconnect and remove the vent and fill lines.
17. Surface slabs or pavements shall be restored in accordance with Contract Documents. All backfill from the top to surface slab shall be ¾" self compacting crushed stone or approved equal with approved filter fabric barrier. All other cut surfaces (i.e. vent removal, electric conduits, etc.) shall be properly filled and patched.

K. Procedure for Disconnection and Removal of Piping and Controls for Petroleum Storage Tank Systems. Prior to the start of any work, the Tank Contractor shall:

1. Remove all product within the tank to its lowest draw-off point. (See 3.9 above)
2. Drain all piping into the tank by forced air only. Location of existing product line check valves shall be verified by the Tank Contractor to ensure proper drainage. If a check valve is indicated by interference to air flow, access tank top prior to draining lines.
3. Provide excavation and removal of all fill lines, including fill ports and spill boxes; vent lines, including all associated connecting, anchoring and supporting structures; supply and return piping, all piping shall be cut and capped at the building exterior.
4. All monitoring system control wiring must be disconnected and removed from the tank and control box by a Licensed Electrician to meet the standards of the NYC 2011 Electrical Code.

END OF SECTION 02 65 00