

**BROOKHAVEN NATIONAL LABORATORY
OPERATION & MAINTENANCE
SPECIFICATIONS**

CLEANING AND GAS FREEING FUEL OIL TANKS

BROOKHAVEN NATIONAL LABORATORY
Brookhaven Science Associates.
Facilities and Operations - Energy and Utilities Div.
Central Steam Facility/STO 611
Upton, N.Y. 11973

Date: 3 May 2023

A. STATEMENT OF WORK

Contractor shall provide all necessary labor and materials to empty, detergent-clean, properly dispose of all generated wastes, and purge/gas-free two (2) petroleum bulk tanks – Tank Nos. 3 and 6 located at Brookhaven National Laboratory (BNL) as described and detailed herein (see Table 2 below for details on current status of tanks).

The Contractor shall separately quote the following tank cleaning subtasks (Refer to Table 2 for recording quoted prices):

SECTION 1 Pre-Job

This sub-task include training, work planning, & project mobilization as per the following:

1. Training: Completion of OSHA and BNL-required training after each Contractor's staff obtains a temporary ID No. when registering for classes as per the Table 1.

TABLE 1			
Training Desc. (BNL Course No.)	Estimated time (hours)	Required Staff	Virtual/In-person
Vendor Contractor Orientation (HP-Q-006)	2.5 including obtaining badge at Bldg. 400	ALL workers- drivers, tank workers, supervisor	In-person Mon. or Wed. at 0830, or Virtual Fri. at 0830
Confined Space entrant and attendant (HP-OSH-016) ¹	2.5	Tank entrants, attendants, rescue staff & supervisor	In-person as per monthly schedule (Training webpage)
LOTO Authorized (HP-OSH-151B)	3	All tank entrants and attendants & supervisor	In-Person as per monthly schedule
LOTO Job Performance Measure/JPM	0.5	All tank entrants and attendants & supervisor	BNL Subject Matter Expert/In- person
Barricade Posting (TQ-Barricade)	0.5	Staff that sets up Red/Yellow hazard tape around work areas	Virtual

⁽¹⁾ Previously completed Confined Space Training that is equivalent to the BNL Training may be substituted as long as syllabus and training materials are submitted to the BNL Technical Representative (Tech Rep) for review and approval.

2. Pre-project work permit meeting (0.5 hours estimated) for all Contractor's site personnel and BNL staff in order to review work plan and safety hazards.

3. Preparation and review of a BNL Job Hazard Analysis (JHA) – a BNL template will be provided to the Contractor for their review/modifications if needed.

[NOTE: the above tanks to be cleaned are classified as Confined Spaces and require constant ventilation by a Contractor-supplied, high volume ventilation fan that is NFPA and NEMA-approved for use inside each tank. The use of a fully calibrated 4-Gas Monitoring Meter or equivalent for monitoring interior tank atmospheres is required. Associated calibration documents for this meter must be transmitted to the BNL Tech Rep. before project initiation. Additionally, a confined space retrieval system must be provided by the Contractor and inspected by BNL Fire Rescue prior to project initiation].

4. Mobilization charges, if any, for work area setup, equipment staging, retrieval system setup, secondary containment setup of Vactor, bump-testing of safety-related equipment including atmospheric monitor, set-up for: work area/tent, drinking water, spill response/equipment van and Vactor. Contractor will be cleaning two tanks at a time; therefore, only a single mobilization task is required.

Section II Execution of Job

This sub-task includes the removal of any residual petroleum product present after BNL Stationary Engineers transfers into other tanks, removal of all tank sludges, washing of tank's interior using BNL-approved detergent, and purging/vapor-freeing of each tank. Also included is any Safety and Industrial Hygiene work oversight and associated monitoring of atmospheric conditions inside the tank.

Contractor will quote a separate and firm fixed price for the cleaning of Tank No. 6 (#2 Fuel Oil) and the cleaning of Tank No. 3 (#6 Fuel Oil) that includes the removal of tank sludge and transferring this sludge to the Contractor's waste hauling vehicle; detergent-cleaning of each tank's interior – floor and sidewalls to a height of 14 inches above floor grade, and subsequent removal of wash-water to the Contractor's waste hauling vehicle. Then, each tank must be purged/vapor-freed of petroleum and any hazardous vapors below 10% of any LEL (Lower Explosive Level). Contractor must also supply fully calibrated atmospheric testing equipment subject to inspections by the BNL Tech Rep. Access for each tank is through a 32-inch diameter manhole located on the side of each tank at ground level. Additionally, each tank has a non-freeze valve and a water draw off

sump to facilitate tank cleaning that may be utilized.

Section III Waste Management

This sub-section deals with the disposition of the different types of wastes (solid and liquids) that will be generated as part of the project.

Transportation and disposal costs for the following waste streams must be quoted:

1. Heavy fuel oil sludge estimated at ~10,975 gallons (~47 tons) to be combusted at a BNL-approved Treatment, Storage and Disposal Facility (Covanta, Tradebe, Clean Water) on a per gallon/pound basis.
2. Wash water/lean oily water liquids for the post-sludge step is estimated at 500 gallons per tank and treated at a BNL-approved Treatment, Storage and Disposal Facility (TSDF-Tradebe, Clean Water).
3. Solid-oily debris including pads, pigs, PPE, wipes, misc. non-recyclable debris must be placed into heavy-duty, 16 mil clear plastic bags, tightly secured and then placed into BNL's HAZSTOR Shed next to Bldg. 610.
4. Contractor should quote any alternatives to the above steps that could reduce the amount of waste (Pollution Prevention) via filtration, steam generator usage, etc.

Section IV Post-Job

This sub-task includes the testing for hazardous vapors for each tank's interior by a certified Marine Chemist; records requirements including submission to BNL Tech Rep. of return-receipted Waste Manifests/Bill of Ladings (within 10-days of shipments), copies of Confined Space entrance logs with atmospheric monitoring readings, list of consumables, etc. Additionally, demobilization of work setups must be completed.

In the event that any tank cleaned is not vapor-free as per the Marine Chemist, the Contractor will repeat the purging process until target hazardous atmospheric levels are reached in order to ensure safe tank entrances.

Section V Project Schedule

Milestone #1: Tank No. 6 Cleaning Project must be completed by 8/1/2023.

Milestone #2: Tank No.3 Cleaning Project must be completed by 9/1/2023.

DESCRIPTION OF TANKS

The tanks are further described as follows and require a tank cleaning as per 6 NYCRR Part 613-4 requirements such that the tank is free from all liquids, sludges, tank bottoms, and vapors. This cleaning is required to perform the DEC's 10-year, API 653 Inspections to be performed by others:

TABLE 2				
BNL Tank No.	MOSF Capacity	Tank Material	Product Stored	Estimated sludge in tank
Tank No. 6 (611-06)	300,000	Steel	No. 2 Fuel Oil	< ~4,250 gallons
Tank No. 3 (611-03)	300,000	Steel	No. 6 Fuel Oil	~10,975 gallons

The cleaning of the above tanks should be done as one entire project to avoid multiple mobilization/demobilization costs. BNL Staff will transfer all useable fuel from both tanks to be cleaned to other NYSDEC-registered tanks.

BNL Technical Representative for project: Pete Picciano ([631-344-5327](tel:631-344-5327)/ppicciano@bnl.gov)

BNL Project Supervisor Dan Farge ([631-344-4437](tel:631-344-4437)/farge@bnl.gov)

BNL Environmental Compliance Representative: Steve Ferrone([631-344-5531](tel:631-344-5531)/ferrone@bnl.gov)

BNL ESH-Representative: Jessica Panzarella (631-344-2162 jpanzarella@bnl.gov) or Firoza Zaroni (631-344-4532/firoza@bnl.gov)

GENERAL CONDITIONS

GC-1. DEFINITIONS:

- A. As used in these Specifications, the following have the meaning shown opposite:
 - 1. BNL - Brookhaven Science Associates, operator of Brookhaven National Laboratory.
 - 2. BNL- Representative/Rep. BNL authorized Construction Inspector
 - 3. BNL Site - Land occupied by Brookhaven National Laboratory, Brookhaven Township, Suffolk County, New York.
 - 4. NYSDEC - New York Department of Environmental Conservation
 - 5. Site - Immediate area of BNL Site assigned to Contractor for performance of work.
 - 6. SCDHS - Suffolk County Department of Health Services
 - 7. Work - Includes but is not limited to all labor, materials, tools, and equipment required and inferred by Contractor to complete all construction.
 - 8. Contractor - Person or entity identified in Lump Sum Contract and responsible for completion of all work.
 - 9. Subcontractor - Person or entity directly contracting with Contractor including one who furnishes material worked to a special design according to Drawings and Specifications, but not one who merely furnishes materials so worked.
- B. Words such as provide, furnish, install, and include mean work by Contractor. Words such as approved, directed, and inspected, mean PE's approval, direction, and inspection.
- C. In the interest of brevity, words such as "Contractor shall", have been omitted from the Specifications.

GC-2. SCALE OF DRAWINGS:

- A. Drawings, if provided, are to scale, but follow indicated dimensions.

GC-3. REFERENCE DRAWINGS:

- A. Drawings of existing building and site are available for reference at the CSP.

GC-4. MANUFACTURERS' SPECIFICATIONS:

- A. Conform to specified manufacturer's published specifications and installation instructions unless otherwise specified or indicated.

GC-5. WORK.HOURS:

- A. Perform all work on weekdays between 8:00 a.m. and 4:00 p.m., unless otherwise specified or approved.

GC-6. IDENTIFICATION OF EMPLOYEES:

- A. All Contractor and Subcontractor employees must receive Contractor-Contractor Orientation/CVO Training by BNL before being allowed entrance to the BNL Site. After completing this course identification badges for each employee will be furnished and must be displayed at all times while on the BNL Site. Badges will be furnished at no cost to the Contractor. Return badges immediately upon release of employees.

GC-7. COORDINATION:

- A. Arrange and coordinate work, be responsible for acts and omissions of all parties involved in the work, be responsible for satisfactory performance of all work, ensure that each trade is fully informed of the extent of work required and coordinate installation of all equipment and shop fabricated material, including that supplied by BNL. BNL assumes no responsibility for contractual relations between Contractor and other parties.

GC-8. CONTRACTOR'S STAFF AND MATERIALS:

- A. N/A

GC-9. SUBCONTRACTOR APPROVAL:

- A. BNL reserves the right to approve or disapprove subcontractors. No later than two (2) weeks after signed Contract, submit directly to BNL Rep., a complete list of proposed Subcontractors for approval.

GC-10. CONSTRUCTION SCHEDULE:

- A. Within one (1) week after a signed contract is in place, Contractor must submit, directly to BNL rep. a detailed work schedule which must meet the above completion dates.
- B. When work falls behind schedule due to Contractor's fault or negligence, cost over-runs including labor and overtime to complete work as per the above schedule shall not be charged to BNL.

GC-11. SCHEDULE OF VALUES:

- A. Before final payment, Contractor must supply BNL with all returned receipted manifests/Bill of Ladings for all waste shipments performed by Contractor.

GC-12. OUT-OF-SCOPE ISSUES:

- A. Unless otherwise specified, Contractor shall not proceed with any work due to unforeseen, out-of-scope conditions without the express written approval of BNL. In no case, will the Contractor delay performing necessary actions that will either prevent an injury to their staff or BNL employees and/or would delay the cleanup of hazardous materials spilled/released to the environment.

GC-13. CONTRACTORS MATERIAL:

- A. Contractor shall bring their own equipment and materials in order to

complete the project as per the schedule and will not use BNL-owned property-tools-materials unless an emergency occurs.

GC-14. TRANSPORTATION:

- A. In transporting materials and equipment, Contractor must use designated roads and obey all posted speed limits. When necessary to maintain work schedule, ship all materials, including Subcontractors' items, from point of origin to BNL Site by direct means equal to, or better than express service.

GC-15. TRAFFIC WAYS:

- A. Schedule, confirm, and perform work, as directed, so as not to interfere with BNL traffic on existing roads, walks, parking, and other paved areas. Park all vehicles in designated parking areas. Load and unload vehicles as directed. HAZMAT vehicles should have secondary containment devices placed under equipment that may leak petroleum.

GC-16. CODES AND STANDARDS:

- A. Meet requirements of Occupational Health and Safety Requirements and SBMS requirements and any other codes and standards specified. In cases of conflict, the standard providing the greater protection shall govern. Copies are available for reference at F&O – EU. Entry into confined spaces shall meet the requirements of BNL's SBMS Subject Area – Confined Spaces.

GC-17. FIRE PROTECTION AND DETECTING SYSTEMS:

- A. Do not modify, disconnect and, in any way, impair systems without approval.
- B. Notify BNL Rep. forty-eight (48) hours in advance of all work on fire protection systems.

GC-18. OPEN FLAME OPERATIONS:

- A. Perform all cutting, welding, and other open flame operations in accordance with BNL SBMS requirements as well as NFPA's National Fire Codes pertaining to such work.
- B. Notify BNL rep. forty-eight (48) hours in advance of all open flame operations so that a fire watch may be assigned.

GC-19. PROTECTION OF PROPERTY:

- A. Protect all new and existing property from damage by and because of work in this contract as approved.
- B. Repair, refinish, replace, and otherwise correct all damage as directed and approved.

GC-20. TEMPORARY SERVICES:

- A. All methods, materials, and scheduling of temporary services shall be as

directed and approved.

1. BNL will furnish, without charge, sources of water including backflow prevention devices and electric power. F&O-EU will, upon request, indicate locations.
2. Install, operate, maintain, and remove temporary water and power systems as required for all work.

GC-21. SERVICE INTERRUPTIONS:

- A. Do not interrupt service until directed. Notify BNL Rep. two (2) weeks in advance of all proposed service interruptions unless otherwise specified or directed.
- B. Keep all interruptions to a minimum. Complete all possible prior work and prefabrication, and have all labor and materials on site, as approved, prior to interruption.

GC-22. COORDINATION WITH BNL ACTIVITIES:

- A. Coordinate and schedule all work with BNL activities and operations through the BNL Rep.

GC-23. CUTTING AND PATCHING:

- A., Open both tank's access covers in order to enter tank and replace cover after purging all vapors in order to perform work. Repair any damaged equipment due to Contractor's negligence to match existing conditions as required.

GC-24. WORK BY TRADES:

- A. N/A

GC-25. SALVAGE:

- A. Place all cleaned scrap metal free of all petroleum residues into the BNL-provided scrap metal container. Recyclables such as beverage cans, mixed paper and cardboard must be recycled using the BNL-provided recycle containers.
- B. All removed materials and equipment remain the property of BNL unless otherwise specified.

GC-27. CLEANING:

- A. Keep site clear of debris and rubbish at all times. At job completion, promptly remove tools and equipment, and clean premises thoroughly, as approved.
- B. Place all municipal trash and rubbish into BNL-provided trash containers appropriate area of BNL Site where directed. Burning of debris and rubbish will not be permitted.

MECHANICAL WORK

M-1. CODES AND STANDARDS:

A. All material and work shall be in accordance with all applicable portions of the latest editions and revisions of all applicable regulations and standards including but not limited to the following:

1. American National Standards Institute - (ANSI) American National standard Safety Requirements for Confined Spaces ANSI Z117.1-1989.
2. American National Standards Institute/Compressed Gas Association - ANSI/CGA 07.1 1989 Commodity Specification.
3. American Petroleum Institute - (API), Pub. 2015, Cleaning Petroleum Storage Tanks, Fourth Edition, 1991.
4. General Industry, Safety and Health Regulations, OSHA 29 CFR, Part 1910.
5. Construction, Safety and Health Regulations, OSHA 29 CFR Part 1926
6. Suffolk County Sanitary Code - Article 12 including the Standards for Administration.

NOTE: Where regulations and standards overlap, the most stringent shall apply.

M-2. GENERAL SCOPE:

A. Contractor shall provide all materials, tools, labor, and materials to clean and or degrease and Gas Free three (3) tanks as detailed on the Statement of Work. This includes gas freeing, inserting, and disposal of the wastes as specified.

M-3. EQUIPMENT:

A. All personal protective equipment shall be provided by the contractor and shall comply with BNL SBMS and all OSHA 29 CFR 1910 and 1926 regulations and shall include but not be limited to the following areas of protection.

1. Confined Space including a C.S. Plan
2. Lock-Out-Tag-Out (Complex)
3. Head
4. Eye and face
5. Hand
6. Foot
7. Protective Clothing
8. Respiratory
9. Hearing
10. Fall Protection

BNL reserves the right to inspect all of Contractor's equipment for proper functionality and to especially check all Contractor's waste hauling vehicles for compliance with NYS DMV requirements as well as a check for any petroleum leak from the vehicle.

B. Electrical Equipment: All electrical appliances and equipment shall be UL approved intrinsically safe, explosion proof, for use in explosive atmospheres, double insulated, and/or grounded to insulate the operator from shock. Electrical equipment shall conform to the requirements of BNL Electrical Safety Standards and all other applicable regulations and standards.

C. Cleaning Tools:

1. Hand and power tools to be non-sparking when used inside flammable atmospheric enclosures.
2. Power cleaning/liner-removal devices such as sand blasters, carpet removal chippers, must be bonded to the tank to prevent static sparks. Procedures and personal protective equipment shall conform to the requirements of 29 CFR 1910.94 (a)

D. Test Equipment: Contractor to provide portable test equipment necessary to determine the concentrations of oxygen, explosive mixtures, toxic dusts, mists, fumes, and gases that are present both in and adjacent to the proposed work area.

The Contractor shall submit manufacturers' specifications and calibration certificates to the BNL Tech Rep. for all test equipment to be utilized on this project PRIOR TO THE ON-SITE WORK. All test equipment shall be labeled to show when it was last calibrated, or when the next calibration is due, and any deviations from readings. All calibration records shall be traceable to the National Institute of Standards and Technology.

All test equipment shall be UL approved, intrinsically safe, explosion-proof, double insulated, and /or grounded to insulate the operator from electric shock.

E. Respirators (if used): Contractor shall provide supplied air respiratory protection to all employees, and authorized, trained visitors exposed or with the potential for exposure to airborne hazards in accordance with OSHA 29 CFR 1910 and 1926, BNL OSHA and the Contractors written respiratory protection program.

All respirators shall be certified by the National Institute for Occupational Safety and Health (NIOSH) for their intended use.

Where airline supplied air respirators are used each employee shall be provided with an egress/escape bottle capable of providing the employee with five (5) minutes of reserve air capacity.

All employees wearing respiratory protection shall have a medical examination verifying that the individual is physically able to perform work and wear a respirator.

Alternatively, a positive displacement blower/e.g., Coppus Blower can be used that is

intrinsically safe and explosion proof and has sufficient capacity to keep the lower explosive limit (LEL) from reaching 10% of this value.

F. Breathing Air: Breathing air shall meet at least the requirements of the specification for Grade D breathing air as described in ANSI/CGA G7.1-1989 Commodity Specification and OSHA 29 CFR 1910.

Breathing air may be supplied by cylinder or air compressor.

1. Cylinders to be maintained and tested as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49CFR Part 178).
2. Compressor to be specifically designed for breathing air, provided with safety and standby devices, such as:
 - a) Receiver of sufficient capacity to provide adequate escape time for a user in the event of a compressor failure.
 - b) Audible compressor failure alarm.
 - c) Inline air purifying sorbent beds and filters for high air quality.
 - d) If oil lubricated air compressors are to be used, CO and High Temperature Indicators are required (OSHA 1910. 134)

G. First Aid: Contractor shall provide industrial type first aid kit, complete and in good condition.

H. Fire Extinguishers: provide a minimum of two (2)-30 lb. dry chemical extinguishers suitable for petroleum.

M-4 TESTING:

A. Vapor Testing: Tests for combustible mixture, oxygen concentration or toxic elements to be done so that sample is representative of the air concentration which working staff are subjected to within the tank. Exhaust vapors from tank may be sampled if exhaust inlet is near the bottom of the tank.

B. Explosive Mixture Limits:

1. Personnel to be restricted from vicinity unless vapor concentration is less than 10% of the L.E.L. (Lower Explosive Limit).
2. Tank entry prohibited unless concentration is lower than 10% of the L.E.L.

C. Oxygen Concentration: Tank entry without air supplied respirators to be prohibited when tank air has an oxygen concentration less than 19.5% or greater than 23.5%.

D. Toxic Gas Limits: as a minimum, the Contractor shall test for aromatic hydrocarbons, hydrogen sulfide and sulfur dioxide.

Tank entry to be restricted to personnel with respirators unless the permissible exposure limit (PEL) as an eight (8) hour time-weighted average (TWA), short-term exposure limits (STEL), and ceiling limits are less than the following concentrations in accordance with OSHA 29 CFR 1910 and BNL SBMS.

Contaminant	TWA (ppm)	TEL (ppm)	Ceiling (ppm)
a) Benzene	1.0	5.0	
b) Hydrogen Sulfide	10.0	15.0	20.0
c) Sulfur Dioxide	2.0	5.0	
d) Tetraethyl Lead	0.075 mg/cu.meter - skin		

Personal monitoring shall be performed in accordance with OSHA 29 CFR 1910 and BNL SBMS.

M-5. GAS FREEING:

A. All free flammable liquids/sludges must be removed from each tank prior to any gas freeing operation. Any flammable liquid may be transported to the Central Steam Facility (CSF) for reuse when approved by the BNL Tech. Rep. When transferring, all tanks and pumps shall be bonded to the tank and ground bond system, all pumps shall be non-sparking, NFPA-approved for the transfer of flammable liquids.

B. All tanks must be rendered free of petroleum vapors. Provisions must be made for natural breathing of the tank to ensure that the tank remains vapor free.

C. Flammable vapors may be removed from the tank by using one of the following methods:

1. Forcing ambient air through the top tank vent and completely purging the entire tank via the use of a Coppus blower/equivalent with properly sized trunk lines.

2. The use of nitrogen gas is another acceptable method of inserting a tank. Purge with a volume of N₂ at least equal to the volume of the tank being purged. After N₂ purging, each tank must be evacuated with breathing air.

Positive ventilation using an air eductor is another method of purging flammable vapors from a tank. As this method is the most dangerous, all sources of ignition must be carefully controlled, and used only under direct supervision and with permission from the BNL Technical Representative and the BNL Fire Department and this will require a Fire Watch in the area. When purging vapors, a clearance of 75 feet from all ignition sources is required.

SUPPLEMENTAL CONDITIONS

SC-1. PRE-BID SITE INSPECTION:

- A. Bidders shall contact the F&O Central Steam Plant Supervisor to schedule a pre-bid inspection of the job site, if required.

SC-2. SUBMISSIONS:

- A. Approval of submissions shall not relieve contractor of any responsibility for errors and satisfactory completion of the work.
- B. Submissions shall be in advance of work schedule to allow sufficient time for checking, correcting, re-submitting, and rechecking.
- C. The Contractor shall check and mark his approval on all Subcontractors' submissions before forwarding to BNL Tech Rep. Submissions not so marked will be returned unchecked by BNL Rep.

Required submissions:

- 1. List of equipment to be used:
 - a. Vacuum guzzler/Vactor manufacturer, M/N
 - b. Cleaning equipment used (tools-manufacturer) and fuel oil cleaner (SDS).
 - c. Atmospheric gas analyzer model, P/N, and calibration date.
 - d. Respirators and breathing air supply model and P/N (Must be NIOSH approved).
 - e. Protective clothing info – type including gloves.
 - f. First aid equipment list.
 - g. Fire extinguisher incl. type – suitable for fuel oil fires .
 - h. Sign (e.g. - indicating confined spaces) for project completion.
- 2. Job Hazard Analysis (JHA)
 - a. BNL shall provide a JHA template for the Contractor to modify and complete, and to submit to BNL ESH Representative for review after bid is awarded.

SC-3. TEMPORARYWORK

- A. All methods, materials and scheduling for installation and removal of temporary set-up work for project completion shall be as directed and approved by the BNL Tech Rep. The Contractor shall maintain and secure all temporary work setups.
- B. Toilet Facilities: BNL toilet facilities will be available to Contractor personnel at Bldg. 636.

SC-4. SAFETY REQUIREMENTS

- A. All Contractor and Subcontractor shall conform to all requirements for wearing badges, protective clothing and other safety measures as directed. All Contractor and Subcontractor personnel must be trained as per Table 1.
- B. Approval by BNL Environment, Safety and Health Representative is required in the event of any/all procedures relating to Cutting and Gas Freeing.

SC-5. SPECIAL CLEANING:

- A. Contractor shall use extreme care to prevent the spilling and spreading of oil, sludge, dirt fumes and other foreign matter. If any spillage occurs, contractor shall notify the BNL Technical Representative immediately. Contractor shall be responsible for, at their own expense, all cleanup and disposal costs related to accidental spillage.
- B. The Contractor shall place all debris in approved covered containers to prevent petroleum spills.